APPENDICES

What is known about distracted driving?

Dr Lyndel Bates, Marina Alexander, Margo Van Felius, John Seccombe, Emma Bures

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Table of Appendices

Appendix A: Terms and theories

Table A.1: Table of terms and theories

Selected theories, frameworks and constructs	Definition
Behavioural Adaptation Theory	A range of theories that describe adaptative behaviours based on systemic factors
BCT	Behavioural Change techniques
Cognitive control hypothesis	Suggests that interference resulting from cognitive load will depend on the level of automatization of the driving subtask
Dual Process Model	Dual process models (many different theories)
Malleable Attentional Resource Theory	Malleable attentional resources theory posits that attentional capacity can change in size in response to changes in task demands
MRT	Multiple Resource Theory
Other theories that may inform road safety approaches	Reasoned Action Process Approach, the Differential Association Theory, the Health Action Approach, and the Fogg Behavioural Model
Perceptual load theory	The extent that individuals can focus their attention in the face of irrelevant distractions depends on the level and type of information load involved in their current task
PARCC Model	Precision, Accuracy, Representativeness, Comparability and Completeness model
SPIDER Model	Scanning, Predicting, Identifying, Decision-making, Executing a Response model
Social learning theory	Social learning theory posits that people learn from one another via observation, imitation, and modelling. It encompasses attention, memory and motivation
Task-capability interface model	An early driving behavioural adaptation theory used in driving research.
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TTM	Transtheoretical Model (stages of change)
UTAUT	Unified Theory of Acceptance and Use of Technology

Appendix B: Literature extraction tables

Table B.1: Technological distractions – Human Machine Interface (HMI)

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2015	Strayer, D. L., Cooper, J. M., Turrill, J., Coleman, J. R., & Hopman, R. J. (2015). *The smartphone and the driver's cognitive workload: a comparison of Apple, Google, and Microsoft's intelligent personal assistants*. Retrieved from https://www.ncbi.nlm.nih.gov/ pubmed/28604047	USA	HMI	Circuit driving on test track with HMI tasks **Aim:** Examine impact of voice-based interactions with intelligent personal assistants (Apple Siri, Google Now, Microsoft Cortana) on cognitive workload. **Conditions:** 5 conditions, mixed within and between subject design. 3 age groups (21-34, 35-53, 54-70). Control single task baseline. **Measures:** Detection response tasks (DRTs) 2 number dialling tasks, 2 contact calling tasks, 4 music selection tasks – presented in 2 blocks. **Participants:** Experiment 1: 31 experienced drivers Experiment 2: 34 experienced drivers. **Limitations:** None mentioned	Four key findings: (1) Voice-based interactions were associated with significant workload increase to the driver. The workload was similar when calling a contact, selecting music, sending a message, and dialling a number. (2) The Google system was less cognitively demanding than the Apple or Microsoft systems. (3) Voice-based interactions with intelligent assistants was more cognitively demanding than conducting a person-to-person conversation (4) The 'switch cost' measured through DRT was up to 18 seconds, resulting in extended periods of driver inattention	Multiple resource theory

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2015	Sun, Y., Wu, S., & Spence, I. (2015). The commingled division of visual attention. *PloS one, 10*(6), e0130611. doi:https://doi.org/10.1371/journal.pone. 0130611	Canada	HMI IVT	Computer display generic multitask test **Aim:** Measure how complexity of a primary visual task affects performance of a secondary visual task . **Conditions:** (1) commingled stimuli - varying levels of complexity of primary visual task (counting number of spots or enumeration) and intermittent secondary visual task (detect an unfilled black-outline square) (2) same as first condition however increasing complexity of an intermittent secondary visual task (several shapes rather than only one shape). **Measures:** Level of inattentional blindness (IB), response latencies, analysis of variance. **Participants:** 55 undergraduate students from the University of Toronto. **Limitations:** None mentioned.	In condition (1) results showed when complexity of primary visual task increases, IB to secondary visual task increases In condition (2) IB to secondary visual task also increased with increasing complexity of the primary visual task. Conversely, increasing mental load allocation to secondary visual task (identifying which type of shape was present) reduced accuracy of primary task (measured as response latency). The authors compare these findings to in-vehicle augmented displays heads up displays (AR-HUDs). They hypothesise overloading the driver with visual information about road environment (secondary visual task) will reduce driving performance (primary visual task)	Biased competition model
2016	Hagiwara, T., Sakakima, R., Kamada, T., & Suzuki, Y. (2016). Effect of different distractions on driving performance for drivers using a touch screen. *Accident Reconstruction Journal, 26*(3), 47-53. Retrieved from https://journals-sagepub- com.libraryproxy. griffith.edu.au/doi/abs/10.3141/2434-03	Japan/USA	HMI IVT or IVIS	Field experiment on test track **Aim:** Evaluate the influence of three secondary tasks on primary driving task while maintaining 30m headway. **Conditions:** Maintenance of 30m headway at speed of 60km/h (equivalent time = 2 seconds). Voice, touch, tap tasks using in-vehicle technology (IVT). IVT was placed in different locations. **Measures:** Vehicle motion, glance analysis, tapping screen time, vehicle speed variation, headway distance, lateral distance from lane centre. **Participants:** 16 participants with drivers' licences **Limitations:** None mentioned.	The three secondary tasks had different effects on the three vehicle motions. Voice and touch showed less consistent headway distance than Tap. Lateral distance was less consistent with touch when compared with voice and tap. The screen position condition did not vary the three vehicle motions. The authors claim the largest effect observed was during combined visual, manual, cognitive task loadings.	Multiple resource theory

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2016	Knapper, A., Van Nes, N., Christoph, M., Hagenzieker, M., & Brookhuis, K. (2016). The Use of Navigation Systems in Naturalistic Driving. *Traffic Injury Prevention, 17*(3), 264-270. doi:https://doi.org/10.1080/15389588.2015.1077384	Netherlands	HMI Portable devices Nomadic devices	Naturalistic driving study **Aim:** Assess how drivers use portable navigations systems and how performance is affected. **Conditions:** Normal driving over one month. Cameras, customised GPS device and recorder, other sensory data recorders. **Measures:** Length of time GPS used, vehicle speed, visual glance measures, time interacting with GPS device. **Participants:** 21 experienced drivers who regularly use a mobile phone GPS app. **Limitations:** Small sample, customised GPS device may be different to commercial examples, GPS device exhibited malfunctioned at some points and only started recording several minutes after first use.	Participants used the GPS device about 25% of total driving time. GPS was used for trips only made once and for longer trips. When using GPS device a slightly higher level of speeding was recorded. Participants mostly used their device in the first 10% of their trip. When operating the GPS most drivers were at a standstill or they slowed their speed. The authors conclude that although operating a GPS is a secondary visual-manual task and potentially increases risk of crashing, most participants either slowed down or stopped completely when using the device.	None specifically mentioned.
2016	Mehler, B., Kidd, D. G., Reimer, B., Reagan, I. J., Dobres, J., & McCartt, A. (2016). Multi-modal assessment of on-road demand of voice and manual phone calling and voice navigation entry across two embedded vehicle systems. *Ergonomics, 59*(3), 344-367. doi:https://doi.org/10.1080/00140139.2015.1081412	USA	HMI	Naturalistic driving study **Aim:** Compare the relative demands (mental workload) of visual manual versus voice activated Human Machine Interface devices. **Conditions:** Making phone calls with either voice activated or with a visual-manual interface. The same contact list was used for all participants. Two 'easy' and two 'hard' tasks were performed. Two voice interfaces were used (MyLink and Sensus). **Measures:** Physiological metrics (heart rate, skin conductance, and subjective ratings), vehicle control metrics (speed, steering metrics). **Participants:** 80 drivers. **Limitations:** Drivers had limited prior experience with voice-activated systems. Not all measures of cognitive demand were measured.	Results showed that auditory-vocal interfaces decreased 'eyes off the road time'. The Mylink system ('one shot') showed a distinct advantage when compared with the Sensus system (several steps) when the systems worked correctly. However, frequent voice recognition errors increased driver workload and increasing the risk of inattentiveness to the primary driving task. On average participants somewhat decreased their speed during phone calls. Visual manual calling recorded less speed reduction than manual phone calling. The authors express caution when designing auditory-vocal interfaces so as not to increase driver cognitive workload. Prior studies have shown that increased cognitive demand constrains visual scanning patterns, suppresses brain activity, and degrades vehicle control.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2016	Strayer, D. L., Cooper, J. M., Turrill, J., Coleman, J. R., & Hopman, R. J. (2016). Talking to your car can drive you to distraction: Principles and Implications. *Cognitive Research, 1*(1). doi:http://dx.doi.org/10.1186/s41235-016-0018-3	USA	HMI IVIS	Naturalistic driving study **Aim:** Examine the impact of IVIS interactions on the cognitive workload of drivers across 3 separate age ranges. **Conditions:** Suburban driving route (2 separate driving sessions separated by 5 days), 10 different vehicles, 3 age ranges. **Measures:** Cognitive workload (objective performance and subjective measures). **Participants:** 257 experienced drivers (zero at-fault driving history). **Limitations:** None mentioned.	Five conclusions were made by the authors. Overall, cognitive workload was moderate to high when engaging in the IVIS task. Older drivers experienced significantly higher cognitive workload than younger drivers. Practice did not significantly change the cognitive workload. Robust, intuitive systems with lower levels of complexity and shorter duration times resulted in lower cognitive workload than more complex systems. Cognitive workload residual costs were significant and did not return to baseline until 27 seconds after the IVIS task.	None specifically mentioned.
2016	Wu, X., He, J., Ellis, J., Choi, W., Wang, P., & Peng, K. (2016). Which is a Better In-Vehicle Information Display? A Comparison of Google Glass and Smartphones. *Journal of Display Technology, 12*(11), 1364-1371. doi:10.1109/jdt.2016.2594263	USA/China	HMI Wearable devices	Simulator driving study **Aim:** Compare driving performance resulting from interacting with a head-down display (HDD) versus a heads-up display (HUD). **Conditions:** Driver used either a Samsung Smartphone (HDD) or Google Glass head-mounted display (aka heads up display or HUD) during a lane change task. Baseline drive only condition. **Measures:** Car following, lane keeping, safety margins during tactical lane change. **Participants:** 30 experienced drivers (>3yrs). **Limitations:** None mentioned.	Results showed that compared to the baseline condition (drive only), drivers using a smartphone (HDD) indicated higher risk of lane departures or collisions. Subjective workload measures were also higher than baseline. The google glass condition (HUD) indicated higher risk of lane departures or collisions than baseline but less than the HDD condition. That is, HUD was at approx. midpoint between baseline and HDD. The study showed that HMD (or HUDs) caused less driving decrement than HDDs, however both displays impaired driving performance compared to baseline.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2017	Simmons, S. M., Caird, J. K., & Steel, P. (2017). A meta-analysis of in-vehicle and nomadic voice-recognition system interaction and driving performance. *Accident Analysis and Prevention, 106*, 31-43. doi:10.1016/j.aap.2017.05.013	Canada	HMI Original equipment manufacturers (OEMs)	Meta-analysis **Aim:** Synthesise the effects of using a VR system to perform everyday tasks while driving and to analyse the differences in driver performance between using visual manual (VM) and voice recognition (VR) systems **Conditions:** Articles that analysed hazard detection time, reaction time, vehicle lateral position, vehicle speed, headway, or comparisons with baseline driving in relation to visual manual (VM) distraction from voice recognition (VR) devices. **Measures:** Prisma guidelines for meta-analysis. **Participants:** 43 included studies **Limitations:** Role of moderators, lack of consistency in reporting methods, unclear study designs, no clear findings re whether increased distraction is linked to increased crash risk.	A meta-analysis provides a higher level of evidence than results for individual studies. MRT predicts dual-task interference increases when tasks compete for the same input modality (Wickens 2002, 2008, 2013)) The meta-analysis found that while, in theory, VR systems separate visual and manual tasks, in practice, drivers frequently glanced at in-vehicle displays during voice interactions. This behaviour did not decline with short term practice. Moreover, visual-auditory overlap and 'cross-talk' contributed to performance decrements through increases in cognitive workload (working memory and task switching). Increased cognitive workload, in turn, was associated with inattentional blindness (IB) resulting in decrements in hazard detections.	Multiple resource theory
2017	Steinberger, F., Schroeter, R., & Watling, C. N. (2017). From road distraction to safe driving: Evaluating the effects of boredom and gamification on driving behaviour, physiological arousal, and subjective experience. *Computers in Human Behavior, 75*, 714-726. doi:10.1016/j.chb.2017.06.019	Australia	HMI Mind wandering	Simulator driving study, self-report interviews **Aim:** Gain deeper understanding of driver boredom and to investigate the impact of gamified driving on road safety and task engagement. **Conditions:** Two research drives with boredom intervention 'Toastmaster' app on smartphone held by a mounting bracket on windscreen. **Measures:** Driving behaviour (lane position, driving speed, eye glances, boredom responses, hazard reactions) physiological arousal, subjective experience. **Participants:** 32 male drivers. **Limitations:** Only male drivers, small sample size, low ecological validity due to simulator study.	The data showed the gamified driving intervention (a speed control game) significantly reduced overall speed (and speeding) and improved anticipatory driving when compared with the baseline condition. However, participants demonstrated slower hazard reaction times in the experimental condition. The authors propose these slower hazard reaction times can be explained by cognitive distraction (mind on the game). They suggest game tasks could be adjusted to reduce hazard reaction time. The authors hypothesise the 'coast challenges' within the app encouraged drivers to prepare for upcoming speed limit and smoothed overall speed transitions. Very few long eye glances (>2 s) towards the smartphone were observed. Single short eye glances increased; however, the authors claim short glances only increase crash risk minimally.	Opportunities cost model of subjective effort and task performance

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2017	Tippey, K. G., Sivaraj, E., & Ferris, T. K. (2017). Driving While Interacting With Google Glass: Investigating the Combined Effect of Head-Up Display and Hands-Free Input on Driving Safety and Multitask Performance. *Human factors, 59*(4), 671-688. doi:http://dx.doi.org/10.1177/ 0018720817691406	USA	HMI Wearable devices	Desktop driving simulator study, post experiment questionnaire **Aim:** Compare the effects of (1) voice-to-text inputs versus manual input and (2) head-up display versus head-down display. **Conditions:** Four task conditions (1) no texting baseline, (2) texting using smartphone, (3) texting using smartphone voice to text input, and (4) Google Glass with voice to text input. **Measures:** Steering rate and lane position, brake reaction times, eyes of the road glance analysis. **Participants:** 24 participants. **Limitations:** Experimental nature of study, low fidelity simulator does not replicate real driving scenarios.	Texting was used as a proxy for a range of HMI interactions. The baseline condition (no texting) showed the best driving performance. The touch keyboard condition was consistently associated with the worst performance across driving metrics, texting metrics, and subjective (self-report) measures. Eye glance off the road measures showed that voice-to-text had smaller performance decrements than touch-keyboards by a factor of 3. However, display characteristics (HUD in Glass versus HDD on smartphone) did not produce significant performance differences. Nonetheless, subjective (self-report) questionnaires showed users preferred the Google Glass interface and the authors suggest this may reflect an overall reduction in mental workload.	Multiple resource theory
2018	He, J., McCarley, J. S., Crager, K., Jadliwala, M., Hua, L., & Huang, S. (2018). Does wearable device bring distraction closer to drivers? Comparing smartphones and Google Glass. *Applied Ergonomics, 70*, 156-166. doi:10.1016/j.apergo.2018.02.022	China/ USA	HMI Wearable devices	Desktop simulator driving study, self-report questionnaire with scale **Aim:** Compare the impacts of Google Glass (HMD) versus smartphone (HDD) on driving performance when performing a secondary texting task. **Conditions:** a distracted driving task under two conditions (1) smartphone and (2) Google Glass Head-mounted display (HMD). **Measures:** Within-subject repeated measures design with driving difficulty, task load, and text device as factors. Standard deviation of lane position, steering wheel position. Time to engagement and time to reply. **Participants:** 29 experienced young drivers (more than 2 years driving experience). **Limitations:** None mentioned.	Both smartphone and the Google Glass HMD impaired driving performance on all measures (lane deviation and steering wheel position and steering wheel reversal rate). Google Glass had a slightly smaller negative standard deviation of steering wheel position and reversal rate. Google Glass showed slightly higher standard deviations of speed suggesting HMDs may be more disruptive to driving performance than HDDs Response times for the Google Glass condition was shorter than the smartphone condition regardless of task load. The authors suggest that when task load increases, drivers may choose to delay engaging with a handheld device but not with an HMD (as it is easier to engage in this task)	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2018	Oviedo-Trespalacios, O., Haque, M., King, M. J., & Demmel, S. (2018). Driving behaviour while self-regulating mobile phone interactions: A human-machine system approach. *Accident Analysis and Prevention, 118*(0), 253-262. doi:https://doi.org/10.1016/j.aap.2018.03.020	Australia	HMI	Simulator driving study, self-report questionnaire **Aim:** Investigate the relationship between self-regulatory secondary task performance and driving. **Conditions:** Three driving conditions: (1) non distraction, (2) handsfree interactions, (3) visual-manual interactions. **Measures:** Longitudinal and lateral vehicle control. **Participants:** 35 young drivers (age < 35 yrs). **Limitations:** Simulator studies have lower ecological validity, small sample size, limited environmental conditions, artificial dialogues and reading activities could limit generalisability of findings.	Drivers self-regulated their engagement in secondary tasks dependent on driving complexity. Visual manual tasks (handheld phone use) resulted in larger variability of lateral lane position and lower driving speeds. However, longer duration visual-manual interactions were associated with higher speeds. Road traffic conditions play a large role in self-regulation suggesting that drivers adapt their behaviour to perceived risk. Authors hypothesise that road environment complexity increases cognitive workload leading to behavioural adaptations. Male gender and perceived crash risk were predictors of increased speed and lateral vehicle deviation.	Human-machine systems framework Task capability interface (TCI) model
2019	Biondi, F., Getty, D. J., Cooper, J. M., & Strayer, D. L. (2019). Examining the effect of infotainment auditory-vocal systems' design components on workload and usability. *Transportation Research Part F: Traffic Psychology and Behaviour, 62*(0), 520-528. doi:https://doi.org/10.1016/j.trf.2019.02.006	Canada/ USA	HMI	Simulator driving study with recorded voice commands, questionnaire **Aim:** Investigate the role of voice system design components in determining levels of driver workload in on-board infotainment systems. **Conditions:** Twelve vehicle infotainment system comparison for system accuracy and ease of use. **Measures:** Infotainment system: menu depth and system accuracy (using pre-recorded Wizard of Oz paradigm) On-road study: Task duration for voice tuning and voice dialling tasks, self-report measures of usability using sentiment analysis and system usability scale (SUS). **Participants:** 120 drivers (not at-fault driver in a collision for past 2 years) **Limitations:** Data may not predict effect on more complicated infotainment systems.	Delay in voice dialling was found to be a significant predictor of (higher) task duration. Higher task durations, in turn, are a predictor of higher driver distraction. Delay time was also associated with self-reported measures of system complexity and workload. For voice-tuning of radio, (deeper) menu depth was a significant predictor of higher mental workload and complexity. Sentiment analysis and SUS showed delay times had a direct effect on the user experience. Longer delay (processing) times were associated with lower usability ratings and more negative opinions of the system.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2019	Christoph, M., Wesseling, S., & van Nes, N. (2019). Self-regulation of drivers' mobile phone use: The influence of driving context. *Transportation Research Part F-Traffic Psychology and Behaviour, 66*, 262-272. doi:10.1016/j.trf.2019.09.012	The Netherlands	HMI	Secondary data analysis (naturalist driving dataset) **Aim:** Understand how drivers self-regulate their behaviour when engaging in secondary tasks. **Conditions:** All participants drove a leased Renault Clio equipped with cameras and data acquisition systems. **Measures:** Prevalence of mobile phone engagement, effect of passenger presence, influence of speed, driving context (urban, rural, highway). **Participants:** 28 drivers who completed 100 driving trips. **Limitations:** Small participant sample.	Dutch drivers spend on average 9% of driving time engaged in visual manual (VM) tasks and usually when they were stationary. The second most prevalent context was highway driving followed by urban environments and, lastly, rural roads. Most drivers were holding the phone for some time before engaging in VM task, suggesting drivers wait for 'the most suitable' moment to engage in a VM task. When driving and engaged in a VM task speed did not noticeably vary. VM tasks were performed less often when carrying a passenger and in complex driving contexts (e.g., at intersections). However, 4% of VM tasks were in complex driving contexts. Authors conclude drivers self-regulate in complex driving scenarios and passenger presence.	None specifically mentioned.
2019	Desmet, C., & Diependaele, K. (2019). An eye-tracking study on the road examining the effects of handsfree phoning on visual attention. *Transportation Research Part F-Traffic Psychology and Behaviour, 60*, 549-559. doi:10.1016/j.trf.2018.11.013	Belgium	HMI Inattentional blindness	Naturalistic driving study **Aim:** Examine the effects of handsfree phoning on eye-movement patterns while driving in traffic. **Conditions:** Every participant had a control (no phone call) and experimental condition (handsfree mobile phone call) driving trip. All participants talked with the same woman about the same subject (holidays, hobbies, children). **Measures:** Frequency of eye fixation, eye fixation duration, saccade (rapid eye movement) duration, horizontal and vertical densities of eye fixation **Participants:** 26 drivers with mobile phone use while driving experience. **Limitations:** Small sample size, limited scenarios.	The authors discuss the merits of naturalistic driving studies compared to simulator studies (see Engström 2017: cognitive control hypothesis). Results showed that when engaged in handsfree phoning the driver's gaze is broader but less directed at the traffic situation. In particular, road signs, other vehicles, and the speedometer were less fixated on. The authors suggest that the eyes 'wander' more frequently, but they do not consciously scan for relevant traffic information resulting in inattentional blindness or the so called 'looked-but-failed-to-see' crashes.	Cognitive control hypothesis (Engström et al 2017) Inattentional blindness

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2019	Flannagan, C., Bärgman, J., & Balint, A. (2019). Replacement of distractions with other distractions: A propensity-based approach to estimating realistic crash odds ratios for driver engagement in secondary tasks. *Transportation Research Part F-Traffic Psychology and Behaviour, 63,* 186-192. doi:10.1016/j.trf.2019.04.013	USA	DAS Multitask	Naturalistic driving study using United States SHRP2 datasets **Aim:** Understand how often drivers engage in cell phone and non-cell phone distracting behaviour in normal (baseline) conditions. **Conditions:** Crash (830 cases) and baseline data (19,991 cases) from SHRP2. Only baseline data was used in analysis. **Measures:** Baseline propensity model for cell phone positive (handheld or voice) and cell phone negative distractions with a range of covariates. Age propensity modelling for the same. The authors note that legislative bans on cell phones have not resulted in lower crash rates in the US.	Younger drivers were more likely to engage in all distracting behaviours than other age groups. Older drivers had the most elevated crash OR for cell-phone use but rarely used the cell phone. Younger drivers (and to a less extend older drivers) were overrepresented in the SHRPA sample relative to the entire USA driving population, therefore generalised odds ratios should be interpreted with caution. The baseline data suggest that age is the best predictor of cell phone use (and all other distracting behaviours). Inventions should be targeted at specific age groups rather than blanket bans.	None specifically mentioned.
2019	Grahn, H., & Kujala, T. (2020). Impacts of Touch Screen Size, User Interface Design, and Subtask Boundaries on In-Car Task's Visual Demand and Driver Distraction. *International Journal of Human-Computer Studies, 142,* 15. doi:10.1016/j.ijhcs.2020.102467	Finland	HMI IVT	Simulator driving study, **Aim:** Examine touch screen size, interaction method, and subtask boundaries on secondary task visual demand and visual distraction potential. **Conditions:** Within subject design. Email reading, email replying, song searching. Automotive targeted application (Carrio) and Android based smartphone application. Two experimental conditions with varying design factors (size and orientation of displays). **Measures:** Number of in-car glances and 'red in-car glances' (inappropriately long in-car glances in relation to the visual demand of the task). Multilevel modelling. **Participants:** 48 drivers. **Limitations:** Limited tasks. Only glance measures where studied.	The effect of the screen size was not significant. Lower task complexity produced lower glance duration. When visual demand of the driving task decreased, the duration of in-car glances increased.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2019	Li, X., Vaezipour, A., Rakotonirainy, A., & Demmel, S. (2019). Effects of an in-vehicle eco-safe driving system on drivers' glance behaviour. *Accident Analysis and Prevention, 122*(0), 143-152. doi:https://doi.org/10.1016/j.aap.2018.10.007	Australia	HMI Eco-driving	High fidelity simulator study, focus groups, multidisciplinary workshop **Aim:** Investigate the effect of eco-safe system on drivers' glance behaviour, and to assess distraction behaviours. **Conditions:** Urban and suburban driving scenario with three conditions: (1) car following, (2) signalised intersection with crossing traffic, (3) stop-sign intersection without crossing traffic. Within-subjects experiment (all participants completed each condition) with one baseline condition and three experimental conditions: advice only, feedback only, and advice and feedback. Experimental conditions used a variety of graphically presented information. **Measures:** Eye-tracking (glance and saccade duration). **Participants:** 53 drivers. **Limitations:** Traffic scenarios were not strictly controlled. Only glance behaviour was analysed.	Participants glance behaviour was adapted for different driving contexts. In the car following condition participants had longer glance duration than the intersection condition. However, in the two intersection conditions, drivers directed their glances more frequently to the HMI display compared to the car following condition. This implied that in safer (stationary) situations, drivers spent more time looking at the HMI than in more complex (while in motion) driving contexts. In the three experimental conditions, drivers had significantly more saccadic (rapid shift) eye-movement than the baseline. Drivers had better visual allocation (less distraction) when provided with advice only or feedback only rather than advice AND feedback. Drivers glance duration, on average, was below the 2 s measure recommended by the NHTSA guidelines	None specifically mentioned.
2019	Oviedo-Trespalacios, O., King, M. J., Vaezipour, A., & Truelove, V. (2019). Can our phones keep us safe? A content analysis of smartphone applications to prevent mobile phone distracted driving. *Transportation Research Part F-Traffic Psychology and Behaviour, 60*, 657-668. doi:10.1016/j.trf.2018.11.017	Australia	HMI Nomadic devices	Review of technology - content analysis **Aim:** Conduct a review of current smartphone applications that aim to prevent distracted driving. **Conditions:** test applications designed to stop, prevent, or reduce phone use behaviour while driving. **Measures:** (1) safety implications of features currently available in smartphone applications, (2) potential effectiveness of smartphone applications to reduce mobile phone distraction. **Participants:** 29 relevant applications. **Limitations:** User reviews were not considered. Reliability of applications was not tested.	Results showed that available applications use voluntary blocking (do not disturb) features rather than tailored workload approaches. Drivers who rely on mobile phone functionality often disable these voluntary features. The authors assert that current technology shows potential for integration and interaction within and between system elements of the vehicle and wider transport ecosystem. These could include collaborations with industry, governments, and the wider community. The authors argue that a definition of standard practice for the design of effective applications is necessary.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2019	Strayer, D. L., Cooper, J. M., McCarty, M. M., Getty, D. J., Wheatley, C. L., Motzkus, C. J., Goethe, R. M., Biondi, F., & Horrey, W. J. (2019). Visual and Cognitive Demands of CarPlay, Android Auto, and Five Native Infotainment Systems. *Human Factors, 61*(8), 1371-1386. doi:http://dx.doi.org/10.1177/ 0018720819836575	USA	HMI IVIS Nomadic devices	Naturalistic driving study, self-report questionnaire **Aim:** Compare and contrast the workload associated with in-vehicle infotainment systems, CarPlay (Apple), and Android Auto. **Conditions:** Participants drove on a suburban residential street. Audio entertainment, calling and/or dialling, navigation, and text messaging conditions. A detection response task (DRT). **Measures:** Facial tracking and video recordings of manual interaction with study systems. **Participants:** 64 drivers (24 participants in each configuration of five vehicles) crossed with the three different infotainment systems. **Limitations:** Studies conditions were highly controlled which does not reflect real world settings (ecological validity). Assumptions were made about driver willingness to engage with technology.	The CarPlay and Android Auto systems were significantly less demanding (lower workload) than the embedded in-vehicle infotainment systems. CarPlay and Android Auto traded off relative to each other in such a way that, when collapsed over task type, the overall demand of the systems did not differ. Android Auto and CarPlay vary in demand when they are deployed in different vehicles.	Multiple resource theory

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2019	Suh, Y., & Ferris, T. K. (2019). On-Road Evaluation of In-vehicle Interface Characteristics and Their Effects on Performance of Visual Detection on the Road and Manual Entry. *Human Factors, 61*(1), 105-118. doi:10.1177/0018720818790841	Korea/USA	HMI	Naturalistic driving study on controlled track, self-report surveys **Aim:** Investigate the impact of in-vehicle interface characteristics on drivers' multitasking performance measures and safety (distraction potential). **Conditions:** Within-subject design. Keyboard input task (1) physical, (2) small touchscreen, (3) large touchscreen. Detection response task (DRT) designed to log verbal acknowledgement of randomly positioned road sign (n=8). Feedback mechanisms were (1) visual, (2) auditory, (3) vibrotactile or 'feeling sounds'. **Measures:** Video recording, audio recording. For input task: input efficiency, input accuracy, input time. For DRT: detection rate, response promptness. For subjective measures: perceived workload. **Participants:** 29 drivers **Limitations:** Small sample size, experiment was not fully factorial (some factors were combined).	Overall, the findings suggest that synthetic, non-visual feedback (auditory and vibrotactile feedback) of touch screens significantly supported visual awareness of the road and improved input efficiency. In contrast the touch screens (without synthetic feedback) increased driver distraction by requiring the driver to visually check the keypad more often. The authors contend these findings confirm the rationale of multiple resource theory – the addition of non-visual cues offload visual demands from the input and secondary task to the detection response primary task.	Multiple resource theory
2020	Li, X., Oviedo-Trespalacios, O., & Rakotonirainy, A. (2020). Drivers' gap acceptance behaviours at intersections: A driving simulator study to understand the impact of mobile phone visual-manual interactions. *Accident Analysis and Prevention, 138,* 10. doi:10.1016/j.aap.2020.105486	Australia	HMI	Simulator driving study, decision tree analysis **Aim:** Investigate the impact of mobile phone use behaviours and driver characteristics on 'gap acceptance'. **Conditions:** 2 intersection x 2 gap size x 3 mobile phone conditions within-subject repeated measure design. **Measures:** Driving performance variables at four test intersections. Variables included approach speed, reaction distance, maximum deceleration, stop location, waiting time, gap taking or not, post-encroachment time, distance to front vehicle, maximum acceleration, crossing completion time. **Participants:** 41 experienced drivers. **Limitations:** Sample size was small; conditions were controlled and may not be ecologically valid (true to life).	A series of risk compensation behaviours were observed in the study. Compared to non-distracted drivers, distracted drivers adopted a larger maximum deceleration rate when approaching and stopped further away from the intersection. Distracted drivers tended to wait longer at the intersection before crossing and kept longer distance with the lead vehicle after crossing. Compensation behaviours were observed even when there was no sudden road hazard, particularly during more complex conditions (e.g., turning rather than driving straight at intersections). These behaviours did not contribute to the safety of traffic efficiency. Gap acceptance did not vary across the conditions. Younger drivers showed more aggressive driving styles.	None specifically mentioned.

Table B.2: Technological distractions – Driver Assist Systems (DAS)

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2015	Vecovski, V., Wall, J., Young, K. L., & Tyler, P. (2015). *Maximising positive driver behaviour change and minimising driver distraction in the deployment of Cooperative Intelligent Transport Systems.* Paper presented at the 1st Australasian Road Safety Conference, Gold Coast, Australia.	Australia	DAS HMI	Trial of dedicated short-range communications (DSRC) in 60 fleets of heavy vehicles – the Cooperative Intelligent Transport Initiative (CITI). 7-inch tablet that communicates safety messages to drivers Driver training to heavy vehicle drivers.	The trial was designed to learn about the deployment of DAS in fleet vehicles.	None specifically mentioned.
2015	Zeeb, K., Buchner, A., & Schrauf, M. (2015). What determines the take-over time? An integrated model approach of driver take-over after automated driving. *Accident Analysis and Prevention, 78*, 212-221. doi:10.1016/j.aap.2015.02.023	Germany	DAS Multitask	Driving simulator study **Aim:** Trial of driver take-over in highly automated driving system. **Conditions:** Critical emergency situation take over request. **Measures:** gaze behaviour, reaction time. **Participants:** 89 participants. **Limitations:** Drivers were novices at using DAS. Simulators do not provide real crash risk which may have influenced driver behaviour.	Glances at secondary tasks were more than 11 times longer during automated driving than manual driving on average. Drivers glance time to the road varied extensively, perhaps indicating differences between high risk and low risk drivers. Similarly, reaction times (brake times) varied between high risk and low risk drivers. The authors suggest that cognitive processes and not motor processes determine take-over performance.	None specifically mentioned.
2016	Zeeb, K., Buchner, A., & Schrauf, M. (2016). Is take-over time all that matters? The impact of visual-cognitive load on driver take-over quality after conditionally automated driving. *Accident Analysis and Prevention, 92*, 230-239. doi:10.1016/j.aap.2016.04.002	Germany	DAS HMI	Driving simulator fitted with conditionally automated driving system with lateral and longitudinal guidance **Aim:** Examine how different secondary tasks impact on take-over performance. **Conditions:** Take-over request after emailing, reading the news, watching a video while driving, and no distraction. Two safety critical incidents groups and two control groups (no safety critical incidents). **Measures:** Take-over time, eyes of the road gaze measure, lateral and longitudinal deviations. **Participants:** 79 light vehicle drivers **Limitations:** Sample size was small.	Time until the drivers' hands touched the steering wheel (take-over time): no difference between distracted and non-distracted drivers. Deviation from lane centre (take-over performance or quality): distracted drivers showed more lateral deviation than non-distracted drivers suggesting cognitive control rather than manual ability was affected. An unexpected finding was that writing an email did not affect performance. A possible reason for this is explained by Malleable Attentional Resource theory that posits more demanding cognitive workload tasks create heightened alertness and, paradoxically, increases driver attentiveness. Lastly, experience with DAS decreased delays in reaction times until a baseline was established. The authors propose this reflects a period of adaptation to new technology rather than a practice effect.	Multiple resource theory Malleable attentional resource theory

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2017	Chang, C. -C., Boyle, L. N., Lee, J. D., & Jenness, J. (2017). Using tactile detection response tasks to assess in-vehicle voice control interactions. *Transportation Research Part F-Traffic Psychology and Behaviour, 51*, 38-46. doi:10.1016/j.trf.2017.06.008	USA	DAS HMI Methodology	Driving simulator study using voice controlled in-vehicle information system (IVIS) **Aim:** Examine the cognitive workload associated with voice over IVS. **Conditions:** Voice tasks (radio, navigation, calendar scheduling task). **Measures:** Tactile Detection Response Task protocol software trial and driver reaction time. **Participants:** 48 drivers. **Limitations:** Low ecological validity.	The study examined differences in cognitive workload for three voice tasks. The navigation and calendar tasks had longer response times and misses when compared to the radio task. Navigation and calendar tasks require a greater cognitive workload than radio tasks. Cognitive workload is a function of the amount of information drivers are required to recall. The Visual Control System (VCS) sometimes produced time delays, but this did not appear to effect reaction time as it did not increase cognitive load.	None specifically mentioned.
2017	Kuehn, M., Vogelpohl, T., Vollrath, M., & National Highway Traffic Safety Administration. (2017). *Takeover Times in Highly Automated Driving (Level 3).* Paper presented at the 25th International Technical Conference on the Enhanced Safety of Vehicles, Detroit, Unites States.	USA	DAS Multitask HMI	Driving simulator study under three driving condition (automated, semi-automated, and manual) **Aim:** Understand when full physical and cognitive control returns after a vehicle take-over request. **Conditions:** Two secondary tasks (reading and playing an immersive visual display game). **Participants:** 60 light vehicle drivers **Measures:** Reaction times, eye-tracking distances. **Limitations:** None mentioned.	Results showed that on average drivers in the automated driver condition took 5 seconds longer to take control of the vehicle. However, there was great individual variables in both the automated and manual condition groups. Although participants in the automated driving condition group generally took longer to react, the automated system was able to successfully control the vehicle until take-over was complete. Both complete automation and partial automation resulted in longer reaction times. Authors warn that automated functions must remain for a suitable period of time after a safety critical event warning.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2017	Lubbe, N. (2017). Brake reactions of distracted drivers to pedestrian forward collision warning systems. *Journal of safety research, 61*, 23-32. doi:10.1016/j.jsr.2017.02.002	Germany, Sweden	DAS HMI	High fidelity driving simulator study with pedestrian forward collision warning (FCW) systems **Aim:** Quantify brake reaction time and brake behaviour over a range of conditions **Conditions:** 13 test conditions with 6 control conditions **Measures:** Collisions, brake initiation, gaze direction, brake reaction time, brake deceleration and jerk, vehicle speed. **Participants:** 58 light vehicle drivers **Limitations:** Relatively small participant size, no psychosocial characteristics were collected. Simulators have relatively low ecological validity. Test-speed was low (30km/h) and could therefore exaggerate safety effect.	Results showed that brake pulse warnings resulted in the lowest number of collisions. No benefit was seen for a heads-up display (HUD) collision warning when compared to audio-visual warning only. Authors recommend an audio-visual warning combined with a brake pulse system to maximise safety.	None specifically mentioned.
2017	Naujoks, F., Purucker, C., Wiedemann, K., Neukum, A., Wolter, S., & Steiger, R. (2017). Driving performance at lateral system limits during partially automated driving. *Accident Analysis and Prevention, 108*, 147-162. doi:10.1016/j.aap.2017.08.027	Germany	DAS HMI	Driving simulator study, questionnaires **Aim:** Assessment of driving and traffic situations with system take over requests (TORs). **Conditions:** Automated 'system limit' scenarios, a range of distraction conditions and control. **Measures:** Lateral control of vehicle **Participants:** 34 drivers. **Limitations:** None mentioned.	Results varied over conditions, however all drivers managed to retain lateral control of vehicle under all driving scenarios. Some participants did not report the correct reason for the system take over requests (TORs) in critical driving situation. Authors propose that automated systems should provide additional information about the reason for the TOR.	None specifically mentioned.
2017	Navarro, J., Deniel, J., Yousfi, E., Jallais, C., Bueno, M., & Fort, A. (2017). Influence of lane departure warnings onset and reliability on car drivers' behaviors. *Applied Ergonomics, 59*, 123-131. doi:10.1016/j.apergo.2016.08.010	France	DAS HMI	Driving simulator study **Aim:** Assess effects of auditory Lane Departure Warning Systems (LDWS), missed warnings, driver performance and acceptance. **Conditions:** Reading distraction tasks with full or partial lane departure warnings (audible), control condition. **Measures:** Duration of lateral excursions (lane departures), steering reaction time. **Participants:** 46 drivers. **Limitations:** Simulator studies do not provide naturalistic driving environments.	A general improvement was detected when using the lane departure warning system (LDWS) although a slight learning effect was noted (drivers reaction improved with exposure). Partial LDWs were judged more trustworthy than full LDWs giving a clear advantage to more frequent warnings. When system failure occurred (missed warnings) driver performance was not significantly worse than without LDWS in place.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2018	Cunningham, M. L., & Regan, M. A. (2018). Driver distraction and inattention in the realm of automated driving. *IET Intelligent Transport Systems, 12*(6), 407-413. doi:10.1049/iet-its.2017.0232	Australia	DAS	Review of the literature (elaboration from a conference paper). No methodology was provided. Authors provided definitions and explanations of terms in vehicle automation (4 levels) and 3 definitions of driver inattention. A range of countermeasures and mitigation strategies are listed.	Vehicle automation: no automation, (1) function specific automation, (2) combined function automation, (3) limited self-driving automation, (4) self-driving automation Driver inattention: (1) driver-restricted inattention (e.g., fatigue), (2) driver-mis prioritised (driving function) attention, (3) driver diverted attention (secondary tasks) Authors explain that automation can induce all three levels of DA. Future research direction is suggested	None specifically mentioned.
2019	Benloucif, M. A., Sentouh, C., Floris, J., Simon, P., & Popieul, J. C. (2019). Online adaptation of the Level of Haptic Authority in a lane keeping system considering the driver's state. *Transportation Research Part F-Traffic Psychology and Behaviour, 61,* 107-119. doi:10.1016/j.trf.2017.08.013	France	DAS	Driving simulator study, driver comfort and workload scale **Aim:** Investigate the effects of lane keeping assist system that match driver distraction state. **Conditions:** Distracted (texting task) and fatigued driving with two variables. 1) continuous lane keeping assist (LKA) (2) adaptive lane keeping assist (ALKA **Measures:** Driver-state measured by eye gaze, eye lid change, blinking, and head position monitoring system **Participants:** 13 driver participants. **Limitations:** None mentioned.	The authors found continuous LKA was beneficial but could be intrusive and authoritarian. The literature review showed that resuming control after continuous LKA took more time (as the driver was more distracted) and increased crash risk. Adaptive LKA showed comparable safety benefits. Moreover, drivers stated they retain more control and consequently remained more involved (less distracted) in the driving task. Taking back control from an automated task was quicker and therefore reduced crash risk The monitoring system was successful at detecting changing mental states, however questions remain about the intrusiveness of monitoring systems.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2019	Gaspar, J. G., & Carney, C. (2019). The Effect of Partial Automation on Driver Attention: A Naturalistic Driving Study. *Human factors, 61*(8), 1261-1276. doi:http://dx.doi.org/10.1177/ 0018720819836310	USA	DAS Multitask HMI	Naturalistic driving study **Aim:** Investigate how drivers deploy visual attention in a partially automated vehicle. **Conditions:** Autopilot (AP) for both lateral and longitudinal control of vehicle. In-vehicle cameras and microphones. Manual driving control condition. **Measures:** Eye-glance behaviour off the road (out of vehicle and towards in-vehicle instrumentation) and towards in-vehicle instrumentation. **Participants:** 10 drivers (age range 25-65) **Limitations:** Small sample size, certain conditions were mandated (no passengers, food/drinks, no handheld phone use.	On average AP was engaged 79% of time. Glance distribution was nearly identical with and without AP. The away from forward roadway glance time substantially increased with partial automation. The maximum total eyes of the road time (TEORT) associated with a single glance cluster increased, suggesting a potential increase in severely long glance interaction. Authors note that participants may have chosen to use AP when more comfortable with road and traffic conditions. However, the results suggest that drivers may become complacent (engage in more distractions) when driving with partial automation.	None specifically mentioned.
2019	He, D., & Donmez, B. (2019). Influence of Driving Experience on Distraction Engagement in Automated Vehicles. *Transportation Research Record, 2673*(9), 142-151. doi:10.1177/0361198119843476	Canada	DAS Age HMI	Driving simulator study (manual mode and automated mode) **Aim:** Compare secondary-task behaviours of novice and experienced drivers in manual and automated driving scenarios. **Conditions:** Manual driving and automated driving. Both conditions were performed with/without secondary task (manual entry on laptop). **Measures:** Cameras captured visual attention. Electrocardiogram and GSR sensor captured heart rate and skin response. **Participants:** 64 drivers (32 novices) **Limitations:** Information about experience with automation was not collected.	During manual drives older drivers had a higher number of glance rates but shorter duration of glances compared to novice drivers. During automated drives both older and novice drivers engaged with the secondary task more frequently than the manual stage. However, novice drivers had a higher level of interaction than experienced drivers. Novice drivers also glanced at the laptop for longer. Both age groups engaged more with the secondary task in the automated phase than the manual phase. The authors note that practice over the two phases may have affected the findings.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2019	Hidalgo-Muñoz, A. R., Jallais, C., Evennou, M., Ndiaye, D., Moreau, F., Ranchet, M., Derollepot, R., & Fort, A. (2019). Hemodynamic responses to visual cues during attentive listening in autonomous versus manual simulated driving: A pilot study. *Brain and cognition, 135*, 103583. doi:10.1016/j.bandc.2019.103583	France	DAS HMI Mind-wandering	Driving simulator study, self-report questionnaire with scale **Aim:** Investigate responses to visual stimuli in manual and automated vehicles in distracted and non-distracted individuals. **Conditions:** Manual drive, fully autonomous drive. Both drives with similar auditory and visual stimuli. The auditory stimulus was a range of interesting short narrations and included emotional content. **Measures:** Self-report scale on attention/inattention (MAAS) to the auditory narration, clinical measures for cardiac activity, clinical measures for brain activity through blood flows (hemodynamic response).. **Participants:** 12 drivers (age = 20-43). **Limitations:** This was a pilot study with few participants that tested an experimental design.	The study found that visual cues (brake lights from lead vehicle) result in different brain activity in manual and automatic driving. Listening to auditory stimuli (a radio broadcast) influences the attentional processing of these visual cues. Manual driving resulted in more attention to the driving task than autonomous driving. The self-report questionnaire (scale) showed mind-wandering was more prevalent in autonomous driving. Interestingly, mind wandering was reduced when listening to the auditory broadcast in both manual and autonomous modes.	None specifically mentioned.
2019	Lu, Z., Zhang, B., Feldhütter, A., Happee, R., Martens, M., & De Winter, J. C. F. (2019). Beyond mere take-over requests: The effects of monitoring requests on driver attention, take- over performance, and acceptance. *Transportation Research Part F: Traffic Psychology and Behaviour, 63*(0), 22-37. Retrieved from https://doi.org/10.1016/j.trf.2019.03.018	The Netherlands	DAS HMI Multitask	Driving simulator study, self-report questionnaire **Aim:** Evaluate variable monitoring request (MR) and take over requests (TOR) in autonomous driving scenarios. **Conditions:** Distraction task with: (1) MR before a possible TOR (2) TOR only (3) MR only **Measures:** Eye-tracking, response time after MR and TOR and control, subjective evaluations. **Participants:** 38 (age between 21-57yrs). **Limitations:** Only one safety critical scenario was presented. Trial was relatively short.	Results showed the MR + TOR improved driver response time to safety critical events. Self-report evaluations were positive for MR + TOR combinations. MRs did not produce an overresponse rate (e.g., unnecessary braking) instead the driver's attention was returned to the road in preparation for the TOR. MRs on their own (without follow up TOR) increased driver response times. The authors speculate this is because the driver was conditioned to only react to a TOR, resulting in delayed driver action.	Various constructs – e.g. workload and trust

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2020	Cabrall, C. D. D., Stapel, J. C. J., Happee, R., & De Winter, J. C. F. (2020). Redesigning Today's Driving Automation Toward Adaptive Backup Control With Context-Based and Invisible Interfaces. *Human factors, 62*(2), 211-228. doi:10.1177/0018720819894757	The Netherlands	DAS HMI	Driving simulator study **Aim:** Investigate driver monitoring system (DMS) designed to adaptively back up distracted drivers with autonomous driving. **Conditions:** Driving automation triggers with a range of back up control conditions. Drivers engaged in a non-driving related task (NDRT). **Measures:** Eye-tracking, eye gaze measures, lateral and longitudinal vehicle position. **Participants:** 91 drivers. **Limitations:** None stated.	Results showed dangerous levels of distraction during NDRTs (after a period of a couple of minutes of task engagement). Hands-on the wheel requirement while automated driving reduced crash risk, however the effect waned after the first warning. This reflects the concept of 'cry wolf' Monitoring driver eye position plus context automation backup showed the most promise. An invisible (not user activated) take over control reduced critical safety events more than an alert to driver system.	None specifically mentioned.
2020	Kohl, J., Gross, A., Henning, M., & Baumgarten, T. (2020). Driver glance behavior towards displayed images on in-vehicle information systems under real driving conditions. *Transportation Research Part F-Traffic Psychology and Behaviour, 70*, 163-174. doi:10.1016/j.trf.2020.01.017	Germany	DAS Theory	Naturalistic driving study - real world driving scenario **Aim:** Investigate the effect of displaying graphical and photographic images during driving **Conditions:** (1) Visual display unit (head unit) with slide show images of song cover art. (2) Contact pictures of incoming calls. The driver was instructed to disregards calls (press button on steering wheel) (3) Control/baseline with no distractions. **Measures:** Glance duration, total eyes off the road time (TEORT), glance proportions. **Participants:** 28 drivers (18-62 years old). **Limitations:** Cognitive load was not increased by the study conditions.	Results showed that visual displays do not adversely affect drivers more than baseline condition (no visual displays). Participants did not exhibit longer glance durations, nor TEORT or longer glance proportions that the control condition (no visual distractions). The authors relate the findings to the three models/theory of attention.	Filter model of selective attention (Broadbent 1958) Attenuated model (Treisman 1964) SEEV model (Wickens, Hellenberg, Goh, Xu & Horrey 2001)

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2020	Raddaoui, O., & Ahmed, M. M. (2020). Evaluating the Effects of Connected Vehicle Weather and Work Zone Warnings on Truck Drivers' Workload and Distraction using Eye Glance Behavior. *Transportation Research Record: Journal of the Transportation Research Board*. Retrieved from https://doi.org/10.1177/0361198120910743 https://trid.trb.org/view/1691952	USA	DAS	Driving simulator study - connected vehicle (CV) pilot **Aim:** Quantify workload demands from HMI systems. **Conditions:** Exposure to weather and work zone warning systems. **Measures:** Eye-tracking glance behaviour, cognitive/visual workload. **Participants:** 20 truck drivers. **Limitations:** Small sample, limited experiment time, constrained experimental conditions.	Results show that weather warnings did not increase visual/cognitive demand and glance behaviour was relatively short. Work zone warnings increased relative visual/cognitive workload and glance behaviour was longer. Authors suggest that workload warning were too complex, resulting in cluttered HMI. Findings were applied to stakeholder truck warning systems.	None specifically mentioned.
2020	Weber, B., Dangelmaier, M., Diederichs, F., & Spath, D. (2020). User rating and acceptance of attention-adaptive driver safety systems. *European Transport Research Review, 12*(1), 12. doi:10.1186/s12544-020-00414-w	Germany	DAS	Driving simulator study, participant self-report questionnaires – a qualitative study **Aim:** Test safety and driver acceptance of the Stopping Distance Shortening system (SDS) – an adaptive driver safety system. **Conditions:** Two driver state adaptive versions (adaptive and high end adaptive) and one non-adaptive version. **Participants:** 72 drivers. **Limitations:** None stated.	The research did not test safety differences between the different system variants. Self-report questionnaires showed • a preference for the two adaptive systems in the distracted driving condition. • a preference for the non-adaptive system in the attentive driving condition. The two adaptive systems provided more frequent warnings than the non-adaptive version however the non-adaptive version provided earlier warnings overall. Overall, the adaptive high-end system was preferred by 50% of the test participants. The authors propose that adaptive systems should be used as these provide more warnings and therefore better safety outcomes.	None specifically mentioned.

Table B.3: Multitasking general studies

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Borowsky, A., Horrey, W. J., Liang, Y., Garabet, A., Simmons, L., & Fisher, D. L. (2015). The effects of momentary visual disruption on hazard anticipation and awareness in driving. *Traffic Injury Prevention, 16*(2), 133-139. doi:10.1080/15389588.2014.909593	USA	Rapid resumption Hazard anticipation	Driving simulator study **Aim:** Explore the effect of in-vehicle glances on the top-down processes that guide the detection and monitoring of hazards on the forward roadway. **Measures:** Gazes were recorded using eye-tracking equipment. **Conditions:** Six participants were momentarily interrupted by a visual secondary task prior to the occurrence of a potential hazard and 6 were not. **Participants:** 12 experienced drivers. Mean age of the interrupted group was 39.7 years (31–48). The mean age of the no interruption group was 42.2 years (range 33–49 years). **Limitations:** The present study did not include a simple visual occlusion without any secondary task The interruption was not self-paced could have an effect.	Eye movement analyses showed that interrupted drivers often failed to continue scanning for a potential hazard when their forward view reappeared, especially when the potential threat could not easily be localized. Drivers' self-appraisal of workload and performance of the driving task indicated that drivers in the interruption condition reported workload levels lower than and performance equal to drivers in the no interruption condition.	
2015	Cortens, B., Trick, L. M., & Nonnecke, B. (2015). *Impact of Key Size on Touchscreen Performance and Driving.* Paper presented at the Transportation Research Board 94th Annual Meeting, Washington DC, United States. [Abstract only]	USA	Touchscreens Hazard response times	Driving simulator study **Aim:** Determine how best to design touchscreens to minimize the physical and mental demands of their use. **Measures:** Key size and the context of use (touchscreen use while parked as compared to driving). speed and accuracy of keypad use, hazard response times, steering variability while driving, perceived workload. **Limitations:** Limited information.	Results indicated that key size had different effects depending on context of use Keypad performance increased significantly as key sizes increased from small to large, driving performance was equivalent between small and large key sizes and the highest physical workload associated with mid-sized rather than small keys.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Farmer, C. M., Klauer, S. G., McClafferty, J. A., & Guo, F. (2015). Secondary behavior of drivers on cell phones. *Traffic Injury Prevention, 16*(8), 801-808. doi:10.1080/15389588.2015.1020422	USA	Reaction time Safety	Field driving study **Aim:** Determine whether cell phone use by drivers leads to changes in the frequency of other types of potentially distracting behaviour. **Participants:** 105 volunteer subjects were monitored over a 1 year period. **Limitations:** There was not always a clear view of the driver's eyes, especially at night or in bright sunlight. Glance coding was somewhat subjective. Other relevant secondary activities that were not coded.	Drivers spent 42% of the time engaging in at least one secondary activity. - drivers were talking on a cell phone 7% of the time, - interacting in some other way with a cell phone 5% of the time, and - engaging in some other secondary activity (sometimes in conjunction with cell phone use) 33% of the time. Other than cell phone use, the most common secondary activities were: - interacting with a passenger (12% of driving time), - holding but not otherwise interacting with an object (6%), and - talking/singing/dancing to oneself (5%).	None specifically mentioned.
2015	Fitch, G. M., Bartholomew, P. R., Hanowski, R. J., & Perez, M. A. (2015). Drivers' visual behavior when using handheld and hands-free cell phones. *Journal of Safety Research, 54,* 105.e29-108. doi:10.1016/j.jsr.2015.06.008	USA	Visual attention Integrated cell phones	Field driving study **Aim**: Investigate driver distraction and how the use of handheld (HH), portable hands-free (PHF), and integrated hands-free (IHF) cell phones affected the visual behaviour of motor vehicle drivers. **Measures:** Driver behaviour from video recordings. **Participants:** 204 drivers (63% female). Mean age = 41 years. **Limitations:** Did not examine focus beyond eyes on/off road.	Visual-manual subtasks performed on handheld, portable hands-free, and integrated hands-free cell phones were found to significantly increase drivers' mean percent Total eyes-off-road time. Conversing on handheld cell phone was found to significantly decrease drivers' mean percent Total eyes-off-road time, indicating that drivers looked at the forward roadway more often. No significant differences in percent Total eyes-off-road time were found for drivers conversing using portable hands-free or integrated hands-free cell phones. The mean total eyes-off-road time durations for visual-manual subtasks performed on a handheld cell phone were significantly longer than the mean Total eyes-off-road time durations on either integrated hands-free or portable hands-free cell phones.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	He, J., Chaparro, A., Wu, X., Crandall, J., & Ellis, J. (2015). Mutual interferences of driving and texting performance. *Computers in Human Behavior, 52,* 115-123. doi:10.1016/j.chb.2015.05.004	USA	Mobile devices Lane Change Task	Driving simulator study **Aim:** Study the mutual influences of driving and texting. **Measures:** Driving experience. Lane deviation and standard deviation of lane deviation were used. For the texting task, the dependent variables consisted of task completion time, key entry per second, texting task completion time, texting errors, input time interval, standard deviation of input time interval, and device stability. **Conditions:** Baseline driving-only condition, two dual-task conditions, in (1) drive + text one hand (2) drive + text two hands; two texting-only conditions texting task with either**:** (1) one or (2) two hands. **Participants:** Twenty-eight participants (16 female). Mean age = 22.14 years (18 -35, SD = 4.64) **Limitations:** Unrepresentative sample.	Concurrent texting impaired driving by increasing the lane deviation. Driving impaired texting by increasing texting completion time, texting errors, and key entry time intervals, and reduced key entry speed. Texting behavioural data collected can be used to distinguish texting while driving from texting-only condition with an accuracy of 88.5%.	Theory of dual-task performance.
2015	Irwin, C., Monement, S., & Desbrow, B. (2015). The influence of drinking, texting, and eating on simulated driving performance. *Traffic Injury Prevention, 16*(2), 116-123. doi:10.1080/15389588.2014.920953	Australia	Mobile phone Eating	Driving simulator study **Aim**: Further explore and compare the effects of a variety of distraction tasks (i.e., text messaging, eating, drinking) on simulated driving. **Measures:** Driving performance measures via the simulator. **Conditions:** The distraction treatments**:** (1) drinking; (2) drinking and eating; and (3) drinking and text messaging, (4) baseline. **Participants:** Twenty-eight (13 female). Mean age**:** 28.4 ± 4.6 (25–40). **Limitations:** The driving simulator avoiding any of the natural forces that might occur when operating a motor vehicle impacting lateral driving.	Compared to baseline driving, driving tasks involving texting and eating were associated with significant impairment in: - driving performance measures for SDLP, - number of lane departures, and - auditory reaction time. Participants' subjective ratings indicated that they perceived the texting while driving condition to be the most difficult despite similar magnitudes of impairment observed with the eating while driving condition.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Le, P., Hwang, J., Grawe, S., Li, J., Snyder, A., Lee, C., & Marras, W. S. (2015). Biomechanical patterns of text-message distraction. *Ergonomics, 58*(10), 1690-1700. doi:10.1080/00140139.2015.1030459	USA	Texting Cell phone distraction	Driving simulator study **Aim:** Identify biomechanical measures that can distinguish texting distraction in a laboratory simulated driving environment. **Measures:** Dependent variables consisted of biomechanical moments, head displacement and the length of time to complete each task. **Conditions:** Three independent variables were tested: task (texting, visual targeting, weighted and non-weighted movements), task direction (front and side) and task distance (close and far). **Participants:** Sixteen subjects (6 males and 10 females) from the local university population for the study. Mean age = 23 years (20 – 29). **Limitations:** The study was run under laboratory conditions and may change results, including individual biomechanical signatures. Task execution time was measured directly from the initiation of the task to the end of the task. Under naturalistic conditions, it is not clear a priori.	Peak moments during texting were only distinguishable from visual targeting. Peak head displacement and cumulative biomechanical exposure measures indicated that texting can be distinguished from other tasks. Therefore, it may be useful to take into account both temporal and biomechanical measures when considering warning systems to detect texting distraction.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Liang, Y., Horrey, W. J., & Hoffman, J. D. (2015). Reading text while driving: Understanding drivers' strategic and tactical adaptation to distraction. *Human Factors, 57*(2), 347-359. doi:10.1177/0018720814542974	USA	Time-sharing behaviour Secondary task initiation	Field study (test track experiment) **Aim:** Investigate how drivers adapt secondary-task initiation and time-sharing behaviour when faced with fluctuating driving demands. **Measures:** Secondary-task behaviour. **Conditions:** 4 types of driving demands**:** (1) baseline, (2) narrow lane, (3) pace clock, (4) combined. Three message format (1) no message, (2) paragraph, (3) parsed. Two distances from the demand zone when the message was available (1) near, (2) far. **Participants:** Seventeen healthy drivers (10 females), Mean age = 45.4 (25 - 55 SD = 6.6). **Limitations:** The introduction of a task deadline could have impacted how drivers approached the task. The driving situations were fixed, and so the location of demands was generally predictable and well anticipated.	In all conditions, drivers started reading messages (drivers' first glance to the display) before entering or before leaving the demand zone but tended to wait longer when faced with increased driving demands. For task initiation, drivers avoid transitions from low to high demands; however, they are not discouraged when driving demands are already elevated. Drivers adjust time-sharing behaviour according to driving demands while performing secondary tasks. Nonetheless, such adjustment may be less effective when total demands are high.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Morris, A., Reed, S., Welsh, R., Brown, L., & Birrell, S. (2015). Distraction effects of navigation and green-driving systems – results from field operational tests (FOTs) in the UK. *European Transport Research Review, 7*(3), 1-9. doi:10.1007/s12544-015-0175-3	UK	Eyes-off-road-time Glance behaviour	Field driving study **Aim:** Investigate the glance behaviours of drivers, assessed from video data, when using a navigation device (study 1) and a green-driving advisory device (study 2). **Measures:** Glance duration to specific areas extracted from video data. **Conditions:** Experiment 1: Using a navigation device: (1) no (baseline), (2) yes Experiment 2: Using the Foot-LITE (navigation) device: (1) without using (baseline) and (2) with. **Participants:** Experiment 1: A total of 78 participants However, from the 78 participants, a smaller sample of participants (n=10) (6 male, 4 female) had an average age of 42 (S.D.=12.9). Experiment 2: In total 40 novice users of a prototype GDS device. **Limitations:** Baseline was directed by an experimenter who was present in the passenger seat. Within-subjects order was the same each time.	In study 1, the percentage of eyes off road time for drivers was much greater in the experimental (with device) condition compared to the baseline condition (14.3 % compared to 6.7 %) but whilst glances to the navigation device account for the majority of the increase, there are very few which exceed 2 s. In study 2, the total number of glances made was similar for each condition. Drivers in study 2 spent on average 4.3% of their time looking at the system, at an average of 0.43s per glance; no glances exceeded 2s.	None specifically mentioned.
2015	Olivieri, D., Chekaluk, E., & Irwin, J. (2015). *Music and driving behaviour.* Paper presented at the 4th International Conference on Driver Distraction and Inattention, Sydney, Australia.	Australia	Music listening Mood-arousal hypothesis	Driving simulator study **Aim:** Provide further support for either competing hypotheses: information-distraction hypothesis or the mood-arousal hypothesis. **Measures:** Questionnaire for: age, gender, licence type, years of driving experience, frequency of driving, number of on road collisions , and number and type of driving infringements. Simulator for driving performance. **Conditions:** Completed four driving tasks on a driving simulator whilst listening to different musical segments. **Participants:** 50 participants (35 females). Mean age = 19.94(18-30, SD = 2.91). **Limitations:** Music listened to was not self-selected. Limited generalisability to other musical genres.	Although there was no effect of music with respect to collisions, a higher proportion of drivers proceeded through red lights whilst listening to preferred compared to non-preferred music. The influence of music on speed and lane deviation depended upon whether: - the music was preferred or non-preferred, - the lyrics of the musical stimuli were present, and - the music was associated with violent lyrical content.	Hockey's (1997) compensatory control model.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Rumschlag, G., Palumbo, T., Martin, A., Head, D., George, R., & Commissaris, R. L. (2015). The effects of texting on driving performance in a driving simulator: The influence of driver age. *Accident Analysis and Prevention, 74,* 145-149. doi:10.1016/j.aap.2014.10.009	USA	Driving performance Texting and driving	Driving simulator study **Aim:** Examine the influence of driver age and other factors on the disruptive effects of texting on simulated driving behaviour. **Measures:** Several factors on driving performance. Texting factors, including text task duration, texting skill level (subject-reported), texting history (#texts/week), driver gender and driver age. **Participants:** 50 participants (27 female). Mean age = 34.5 (SD = 11.7). **Limitations:** Did not control for time spent looking at phone while texting (glances).	Cell phone texting during simulated driving increased the frequency and severity of Lane Excursions. The frequency and severity of Lane Excursions were correlated with the duration of the texting task but not with driver age for those self-identified as non-skilled texters. The frequency and severity of Lane Excursions were not correlated with the duration of the texting task, but were correlated with driver age for those self-identified as skilled texters.	None specifically mentioned.
2015	Saifuzzaman, M., Haque, M., Zheng, Z., & Washington, S. (2015). Impact of mobile phone use on car-following behaviour of young drivers. *Accident Analysis and Prevention, 82,* 10-19. doi:10.1016/j.aap.2015.05.001	Australia	Car-following Mobile phone use	Driving simulator study **Aim:** To investigate the impact of mobile phone conversations on car-following behaviour. **Measures:** Driving performance including compared to a lead vehicle (average speed, average spacing, average speed difference, average time headway, fluctuation in speed, fluctuation in spacing, cceleration noise, speed, spacing and time headway profile), driver demographics. **Conditions:** Three phone placement conditions**:** (1) baseline condition (without any phone conversation), (2) handsfree phone and (3) handheld phone. **Participants:** 32 (18 – 26) participants. The participants were on average 21.47 (SD 1.98) years old and split evenly by gender. **Limitations:** Limited generalisability because of age.	Distraction caused by mobile phone conversation while driving affects car following. Drivers showed risk-compensatory behaviour when distracted. Distracted drivers had more fluctuation in speed, spacing and acceleration noise. Experienced drivers kept smaller time headway than provisional drivers.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Samuel, S., & Fisher, D. L. (2015). Evaluation of the minimum forward roadway glance duration. *Transportation Research Record,* (2518), 9-17. doi:10.3141/2518-02	USA	Eye tracking Glances	Driving simulator study **Aim:** Determine how long between glances inside the vehicle to perform a secondary task does a driver need to glance toward the forward roadway to detect threats present in or emerging from the forward roadway. **Measures:** The eye tracker was used to collect eye behaviours, Car velocity was also collected via the simulator. **Participants:** 45 younger drivers (between ages 18 and 20 years) with an average age of 19.3 years (SD = 0.831). **Limitations:** A small set of hazard anticipation scenarios was used for evaluation, limiting generality. No measurement was made of hazard mitigation, yet ultimately it is the ability of drivers to mitigate crashes that is important.	Drivers in both conditions of alternating views were found to detect far more hazards when the forward roadway duration between two in-vehicle glances was the longest (4 s). The decrease in hazard detection during the shorter roadway durations was a consequence of the drivers' having to devote more resources to their driving while they switched their attention between the primary (driving) and secondary (in-vehicle) tasks. Type of processing was found to have an effect, with a larger percentage of the hazards detected in scenarios involving bottom-up processing (compared with top-down), while there was no significant effect found for eccentricity (central versus peripheral).	None specifically mentioned.
2015	Strayer, D. L., Cooper, J. M., Turrill, J., Coleman, J. R., & Hopman, R. J. (2015). Measuring cognitive distraction in the automobile III: a comparison of ten 2015 in-vehicle information systems.	USA	In-Vehicle Information System Cognitive workload	Field driving study **Aim:** Examine the impact of In-Vehicle Information System (IVIS) interactions on the driver's cognitive workload. **Measures:** Cognitive workload, Detection Response Task performance. **Conditions:** (age) x 10 (vehicle) X 3 (condition: single-task, IVIS, and OSPAN conditions) x 2 (session) **Participants:** 257 subjects, 130 females). Mean age = 44 (21 - 70). **Limitations:** Single cognitive workload measure with possible problematic methodology.	The cognitive workload of In-Vehicle Information Systems were found to be moderate to high, averaging 3.34 on a 5-point scale and ranged from 2.37 to 4.57. The workload experienced by older drivers was significantly greater than that experienced by younger drivers performing the same operations. Practice did not eliminate the interference from IVIS interactions. IVIS interactions that were difficult on the first day were still relatively difficult to perform after a week of practice. There were long-lasting residual costs after the IVIS interactions had terminated.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Strayer, D. L., Turrill, J., Cooper, J. M., Coleman, J. R., Medeiros-Ward, N., & Biondi, F. (2015). Assessing cognitive distraction in the automobile. *Human Factors, 57*(8), 1300-1324. doi:10.1177/0018720815575149	USA	Cognitive distraction Visual scanning behaviour	Driving simulator study **Aim:** Establish a systematic framework for measuring and understanding cognitive distraction in the automobile. **Measures:** Primary, secondary, subjective, and physiological measures were collected and integrated into a cognitive distraction scale. **Conditions:** Eight in-vehicle tasks commonly performed by the driver of an automobile: Interaction with: (1) none (baseline), (2) Radio, (3) Book on tape, (4) Passenger, (5) Hand-held phone, (6) handsfree phone, (7) speech-to-text phone, (8) OSPAN. **Participants:** Thirty-eight participants (20 men and 18 women) from the University of Utah participated in the experiment. Participants ranged in age from 18 to 30 years, with an average age of 22.2 years. **Limitations:** The cognitive distraction scale does not directly measure visual/manual sources of distraction. Driver distraction subscales may be overly simplistic.	In-vehicle activities, such as listening to the radio or an audio book, were associated with a low level of cognitive workload. Conversation activities of talking to a passenger in the vehicle or conversing with a friend on a handheld or hands-free cell phone were associated with a moderate level of cognitive workload. Using a speech-to-text interfaced e-mail system involved a high level of cognitive workload.	None specifically mentioned.
2015	Thapa, R., Codjoe, J., Ishak, S., & McCarter, K. S. (2015). Post and during event effect of cell phone talking and texting on driving Performance—A driving simulator study. *Traffic Injury Prevention, 16*(5), 461-467. doi:10.1080/15389588.2014.969803	USA	Cell phone effect Driver performance	Driving simulator study **Aim:** Analyse the post-event effect of cell phone usage (texting and conversation) in order to verify whether the distracting effect lingers after the actual event has ceased. **Measures:** Surrogate measures used to represent lateral and longitudinal control of the vehicle. **Conditions:** 3 × 8 repeated measures design with duration of the event as a between-subjects factor (3 levels) and event as a within-subjects factor (8 levels). **Participants:** 36 participants (6 female). Mean age = 28.44 years (SD = 9.26 years). **Limitations:** There are numerous distracting sources that are assumed to have a major impact on driving performance which were not controlled for.	Results suggest that there was no significant decrease in driver performance (both lateral and longitudinal control) during and after the cell phone conversation. For the texting event, there were significant decreases in driver performance in both the longitudinal and lateral control of the vehicle during the actual texting task. The diminished longitudinal control ceased immediately after the texting event but the diminished lateral control lingered for an average of 3.38 s. The number of text messages exchanged did not affect the magnitude or duration of the diminished lateral control.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Tivesten, E., & Dozza, M. (2015). Driving context influences drivers' decision to engage in visual–manual phone tasks: Evidence from a naturalistic driving study. *Journal of Safety Research, 53,* 87-96. doi:10.1016/j.jsr.2015.03.010	Sweden	Mobile phone Decision making	Field driving study **Aim:** Investigate how the driving context influences drivers' decisions to engage in VMphone tasks in naturalistic driving. **Measures:** Video, vehicle signals, and map data were used to classify driving context. **Participants:** 198 drivers (43% female). Mean age = 45.3 years (SD = 10.8 years). **Limitations:** Recording is active only while the ignition is turned on so no pre-trip preparations and tasks performed info. Three analysts performed the video coding. There were some situations where they coded differently.	Drivers were more likely to perform visual–manual phone tasks when standing still. Phone tasks were less likely in the presence of passengers, high speed, and sharp turns. Task timing was influenced by lane change and turning manoeuvres. Task timing was influenced by time headway to the lead vehicle.	None specifically mentioned.
2015	Xiong, H., Bao, S., Sayer, J., & Kato, K. (2015). Examination of drivers' cell phone use behavior at intersections by using naturalistic driving data. *Journal of Safety Research, 54,* 89-93. doi:10.1016/j.jsr.2015.06.012	USA	Drivers' cell phone use Driving safety	Field driving study **Aim:** Examine drivers' behaviours and associated factors for cell phone use while driving using naturalistic driving. **Measures:** Driving speeds in all sections. **Conditions:** Driving speed while 1) using a cell phone, 2) conducting a conversation or 3) completing visual/manual tasks (3) baseline 1**:** normal driving condition, which only excludes driving while using a cell phone or baseline 2**:** driving-only condition, which excludes all types of secondary tasks). **Participants:** 108 participants equally distributed in three age groups: “younger” (20–30 years old), “middle-aged” (40–50 years old), and “older” (60–70 years old). **Limitations:** Did not consider significant driving performance measures.	Drivers drove slower when using a cell for both conversation and visual/manual (VM) tasks compared to baseline conditions. With regard to cell phone conversations, - drivers were more likely to drive faster during the daytime compared to nighttime driving and - drive slower under moderate traffic compared to under sparse traffic situations. With regard to VM tasks, there was a significant interaction between traffic and cell phone use conditions. - maximum speed with VM tasks was significantly lower than that with baseline conditions under sparse traffic conditions. - maximum speed with VM tasks was slightly higher than that with baseline driving under dense traffic situations.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Yang, Y., Wong, A., & McDonald, M. (2015). Does gender make a difference to performing in-vehicle tasks*? IET Intelligent Transport Systems, 9*(4), 359-365. doi:10.1049/iet-its.2013.0117			Field driving study **Aim:** Describe the gender differences in driving and visual behaviour observed under a high mental workload. **Participants:** 34 drivers. **Limitations:** None mentioned.	The results show that female participants tended to drive more attentively in baseline driving than males, but they were also more affected by the higher workload. Female drivers adopted a more conservative coping strategy to compensate for the higher workload, as identified by increased headways and more stable lateral control. Male drivers eye movements revealed significant gaze concentration and less mirror-checking high mental workload than female drivers. Study concludes: This suggests that male drivers may be less aware of the impact of mental distractions on their driving performance and visual behaviour and adopt a simplification strategy to cope with the extra workload.	
2016	Borowsky, A., Horrey, W. J., Liang, Y., Garabet, A., Simmons, L., & Fisher, D. L. (2016). The effects of brief visual interruption tasks on drivers' ability to resume their visual search for a pre-cued hazard. *Accident Analysis and Prevention, 93,* 207-216. doi:10.1016/j.aap.2016.04.028	USA	Hazard anticipation Brief visual interruptions	Driving simulator study **Aim:** Explore the effect of different types of visual tasks inside the vehicle on the top-down processes that guide the detection and monitoring of road hazards after the driver glances back towards the road. **Measures:** Eye tracking system. **Conditions:** 4 levels of in-vehicle visual interruption:(1) Visual interruptions comprised of spatial, driving unrelated, tasks; (2) visual interruptions comprised of non-spatial, driving unrelated, tasks;(3)visual interruptions with no tasks added; and (4) no visual interruptions. **Participants:** 56 experienced drivers. Mean age = 39 years (SD=6). Each condition included 14 drivers, (7 female). **Limitations:** Visual only tasks were visual-manual. Did not control for potential training effect.	In visual interruption conditions drivers glancing on the forward road way was momentarily interrupted just after the potential hazard first became visible by the occurrence of an in-vehicle task lasting two seconds. In the no interruptions condition, the driver could not see the potential hazard after it just became visible because of obstructions. Study concluded the results show that the presence of an interruption (as opposed to an obstruction) negatively impacted drivers' ability to anticipate the potential hazard.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Haque, M., Ohlhauser, A. D., Washington, S., & Boyle, L. N. (2016). Decisions and actions of distracted drivers at the onset of yellow lights. *Accident Analysis and Prevention, 96,* 290-299. doi:10.1016/j.aap.2015.03.042	USA	Mobile phone Risk compensation	Driving simulator study **Aim:** Examine the decisions and actions of distracted drivers during the onset of yellow lights. **Measures:** Explanatory variables included age, gender, cell phone use, distance to stop-line, and speed. **Participants:** 20 male novice drivers of 16–17 years old and 49 adult participants - divided into three age groups: younger (18–25, 9 female), middle aged (30–45, 8 female), and older (50–60, 6 female). **Limitations:** Based on a re-analysis of existing data and as such. Significant differences between novice drivers and other age groups not controlled for.	Older drivers had a higher yellow light running risk while distracted. Drivers were more likely to run yellow lights when the driving speed increases. Female drivers were more likely to run through the yellow light.	None specifically mentioned.
2016	Haque, M., Oviedo-Trespalacios, O., Debnath, A. K., & Washington, S. (2016). Gap acceptance behavior of mobile Phone–Distracted drivers at roundabouts. *Transportation Research Record, 2602*(1), 43-51. doi:10.3141/2602-06	Australia	Gap acceptance behaviour Roundabouts	Driving simulator study **Aim:** Examine the gap acceptance behaviour of distracted young drivers at roundabouts. **Measures:** Driver demographics, driving behaviour around each section (including reaction distance). **Conditions:** Three phone conditions: (1) baseline (no phone conversation), (2) a hands-free phone conversation, and (3) a handheld phone conversation. **Participants:** A total of 32 (50% males) young drivers. Mean age 21.5 years (18 - 26, SD 1.99). **Limitations:** Gap sizes were programmed to proportionately increase leading to predictability not seen in real life. Tasks were not self-paced.	Distracted drivers started responding to the gap acceptance scenario when they were closer to the roundabout and they approached the roundabout at slower speeds. Distracted drivers decelerated at faster rates to reduce their speeds before gap acceptance compared with non-distracted drivers. The safety margin at various gap sizes between the driven vehicle and the conflicting vehicle for distracted drivers were smaller across different gap sizes and suggest that a smaller safety margin was accepted by distracted drivers compared with non-distracted drivers.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Kountouriotis, G. K., & Merat, N. (2016). Leading to distraction: Driver distraction, lead car, and road environment. *Accident Analysis and Prevention, 89,* 22-30. doi:10.1016/j.aap.2015.12.027	UK	Lead car Gaze	Driving simulator study **Aim:** Further understand the interaction between the effect of visual and non-visual distraction tasks on lateral control in driving, and examine the influence of road geometry. **Measures:** Driving metrics: Standard Deviation of Lateral Position (SDLP), steering wheel reversal rates equal or greater to three degrees (SRRs), mean speed, and mean headway. In terms of eye-movements, Standard Deviation of Yaw angle (SD Yaw), (lateral scanning pattern of the scene). **Conditions:** Three factors were considered for each experiment (lead car, load, and task). *Experiment 1:* Two levels of lead car (1) lead car, (2) no lead car. Two levels of road (1) straight, (2) curved Three levels of task (1) baseline, (2) arrows, (3) numbers *Experiment 2:* Two levels of lead car (1) lead car, (2) sinusoidal lead car. Two levels of road (1) straight, (2) curved. Three task levels (1) baseline, (2) arrows, (3) numbers. **Participants:** Experiment 1: 15 participants (8 male) Mean age = 29.6 ± 10.73 years Experiment 2: 15 participants (8 female). Mean age = 33.4 ± 8.03 years. **Limitations:** Small sample size.	In conditions without a lead car: - visual distraction was found to increase variability in both gaze patterns and steering control, - non-visual distraction reduced gaze and steering variability In the conditions where a lead car was present there was no significant difference from baseline. The lateral behaviour of the lead car did not have an effect on steering performance, a finding which indicates that a lead car may not necessarily be used as an information point.	Multiple Resource Theory. Working Memory Model (Baddely, 1992). The Active Gaze model of steering. Two-point model of steering.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Kountouriotis, G. K., Spyridakos, P., Carsten, O. M. J., & Merat, N. (2016). Identifying cognitive distraction using steering wheel reversal rates. *Accident Analysis and Prevention, 96,* 39-45. doi:10.1016/j.aap.2016.07.032	UK	Cognitive load Steering	Driving simulator study **Aim:** Examine the effects of visual and non-visual dis-tractions during driving. **Measures:** Driver demographics, Secondary task performance, Gaze concentration, speed, Standard deviation of lateral position, Steering wheel reversal rates, Steering wheel acceleration, Steering entropy. **Conditions:** Three secondary tasks (two visual tasks and one non-visual task) were implemented in this experiment, as well as a baseline condition (Baseline) which involved only driving. **Participants:** 16 participants (8 male). Mean age was 35.12 ± 9.95 years. **Limitations:** Small sample size.	Compared to baseline driving, non-visual (cognitive) distraction resulted in: - improved lane keeping performance - increased gaze concentration towards the centre of the road, - increase in steering wheel reversal rates, - steering wheel acceleration, and - steering entropy. When the visual task is presented centrally, - drivers' lane deviation reduces (similar to non-visual distraction), - whilst measures of steering control, overall, indicated more steering activity, compared to baseline. When using a visual task that required the diversion of gaze to an in-vehicle display, but without a manual element, - lane keeping performance was similar to baseline driving.	Information processing models, e.g. Wickens' (2002) Multiple Resource Theory, Baddeley's (1992) Working Memory Model.
2016	McNabb, J., & Gray, R. (2016). Staying connected on the road: A comparison of different types of smart phone use in a driving simulator. *PloS One, 11*(2), e0148555-e0148555. doi:10.1371/journal.pone.0148555	USA	Smart phone Self-paced	Driving simulator study **Aim:** Compare the effects of four different smart phone tasks on car-following performance. **Measures:** Brake reaction times, time headway (TH) variability, gaze and manual interaction behaviour. Questionnaire data: mental, physical and temporal demand, performance, required effort and overall frustration. **Conditions:** Phone tasks: 2 x 2 factors + baseline: interaction medium (text vs image) and task pacing (self-paced vs experimenter-paced). **Participants:** 18 undergraduates from Arizona State University. Mean age = 20.4 (18–22). **Limitations:** Drivers in the present experiment were fully expecting the lead car to stop suddenly. Possible uncontrolled differences between tasks.	Brake reaction times were significantly greater in the text-based conditions compared to both the image-based conditions and the baseline. There was no significant difference between BRTs in the image-based and baseline conditions and there was no significant effect of task-pacing. Similar results were obtained for Time Headway variability. These results are consistent with the picture superiority effect found in memory research and suggest that image-based interfaces could provide safer ways to "stay connected" while driving than text-based interfaces.	Dual coding theory.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Sanbonmatsu, D. M., Strayer, D. L., Biondi, F., Behrends, A. A., & Moore, S. M. (2016). Cell-phone use diminishes self-awareness of impaired driving. *Psychonomic Bulletin & Review, 23*(2), 617-623. doi:10.3758/s13423-015-0922-4	USA	Multi-tasking Self-regulation	Driving simulator study **Aim:** Examine the impact of multitasking on self-awareness of performance. **Measures:** Participants survey of their demographics driving practices and beliefs. Driving errors. **Conditions:** Two levels of phone use: (1) baseline (no use), (2) use phone while driving. **Participants:** 100 undergraduates (67 females and 33 males) participated in the Institutional Review Board- approved study for extra course credit. They were randomly assigned to either the cell-phone group or a control group that did not use a cell phone. The undergraduates ranged in age from 18 to 41 years, with an average age of 21.8 years. **Limitations:** Non-representative sample.	Participants who talked on a cell phone made more serious driving errors than control participants. Control participants' assessments of the safeness of their driving and general ability to drive safely while distracted were negatively correlated with the actual number of errors made when they were driving. Cell-phone participants' assessments of the safeness of their driving and confidence in their driving abilities were uncorrelated with their actual errors.	None specifically mentioned.
2016	Watson, J. M., Memmott, M. G., Moffitt, C. C., Coleman, J. R., Turrill, J., Fernández, Á., & Strayer, D. L. (2016). On working memory and a productivity illusion in distracted driving. *Journal of Applied Research in Memory and Cognition, 5*(4), 445-453. doi:10.1016/j.jarmac.2016.06.008	USA	Working memory Cognitive control	Driving simulator study **Aim:** Examine whether individuals who use cell phones while driving rely on reconstructive processes in memory due to divided attention, making them more susceptible to errors, yielding an effect of multitasking that, may diminish productivity rather than increase it. **Measures:** Participants' age and gender, driving performance, brake reaction time, and their adherence to the prescribed following distance. DRM memory task results. **Conditions:** Three within-subject conditions: (1) single-task driving in a high-fidelity simulator, (2) single-task memory including encoding and retrieval using the Deese–Roediger–McDermott false memory paradigm, and (3) a dual-task combination of both the driving and memory tasks. **Participants:** 23 participants (10 female) from the University of Utah. Mean age 23.26 (18 - 40) **Limitations:** Non-representative sample.	The effects of divided attention in working memory were bidirectional, impairing both driving and episodic memory performance, likely due to competition for limited resources needed to successfully maintain task goals related to driving or memory alone. Under dual-task conditions, participants became increasingly reliant on reconstructive, error-prone processes in memory, with high levels of false recall. Study concluded the results indicate there is a productivity illusion associated with distracted driving in that individuals wrongly believe that combining cell phones with driving will make them more productive.	Not specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Xiong, H., Narayanaswamy, P., Bao, S., Flannagan, C., & Sayer, J. (2016). How do drivers behave during indecision zone maneuvers*? Accident Analysis and Prevention, 96*, 274-279. doi:10.1016/j.aap.2015.04.023	USA	Indecision zone Yellow signal indication	Driving simulator study **Aim:** Examine drivers' behaviour during yellow signal indication manoeuvres through a driving simulator study. **Measures:** Predictors included age group (young: 18–25 years; middle: 30–45 years; and older: 50–60 years), gender, pedal condition and time-to-stop line (TTSL), drivers' response (0 = stop or 1 = go) to a yellow signal indication, drivers' traversing yellow signal indication behaviour (0 = fast go or 1 = slow go). **Conditions:** Three levels of distraction condition: (1) baseline [no call], (2) outgoing call, and (3) incoming call. Three different secondary task conditions: (1) handheld device (HH) (2) hands free (HF), (3) head set (HS). **Participants:** 49 participants (23 females). Three age groups: 18 in young age group (18–25 years old), 17 in middle-aged group (30–45 years old), and 14 in old age group (50–60 years old). **Limitations:** Likely observer effect. Participants did not feel any time pressure which may exist in real life travelling.	Drivers' decision on stopping or not at a yellow signal indication was associated with different variables including age, distraction, pedal conditions, and time to stop line. Distracted drivers' insensitive behaviour was also captured from the significant interaction effect between time to stop line and distraction conditions, which implied that intersection related crash risk may increase when drivers were distracted.	Fuzzy logic modelling distance.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Young, K. L., Stephens, A. N., Stephan, K. L., & Stuart, G. W. (2016). In the eye of the beholder: A simulator study of the impact of google glass on driving performance. *Accident Analysis and Prevention, 86,* 68-75. doi:10.1016/j.aap.2015.10.010	Australia	Google glass Head mounted display	Driving simulator study **Aim:** Examine the performance and safety implications of using Google Glass while driving. **Measures:** Driver demographics, driving performance, number of reading and texting errors. **Conditions:** Participants completed four runs: (1) baseline (driving only), (2) using Glass (no reading), (3) reading with Glass (4) reading with the phone. **Participants:** 20 licensed drivers (4 female). Mean age = 32.2 (22–47, SD = 6.3). **Limitations:** Small sample. Limited testing of Google Glass features.	Drivers' lane keeping and sign detection were significantly impaired by the texting task. The performance decrements observed were similar across Glass and the phone. Glass was rated as less demanding than the phone, potentially encouraging its use when driving.	None specifically mentioned
2017	Ashley, G., Osman, O. A., Ishak, S., Codjoe, J., & Transportation Research Board. (2017). *Effect of Secondary Tasks and Driver Behavior on Crash and Near-Crash Risk: Naturalistic Driving Study.* Paper presented at the Transportation Research Board 96th Annual Meeting, Washington DC, United States. [Abstract only]	Likely USA	Cell phone Intersections	Field driving study **Aim:** Investigate the effect of secondary tasks and driver behaviour on crash and near-crash risk at controlled/ uncontrolled intersections and non-intersections. **Participants:** Naturalistic driving data. **Limitations:** Little information.	Cell phone use by drivers at controlled intersections increased the chances of violating traffic rules. Distracted driving increased the likelihood of drivers committing traffic violations at controlled and uncontrolled intersections. Speeding, illegal passing and distraction were found to have been significant contributors to crashes/near-crashes at all three location types studied. At non-intersections, holding cell phones was identified by both models as a factor which increased crash and near-crash risk.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Beckers, N., Schreiner, S., Bertrand, P., Mehler, B., & Reimer, B. (2017). Comparing the demands of destination entry using Google Glass and the Samsung Galaxy S4 during simulated driving. *Applied Ergonomics, 58,* 25-34. doi:10.1016/j.apergo.2016.05.005	USA	Attention Workload	Driving simulator study **Aim:** Compare Google Glass to voice and touch-entry on a smartphone during driving. **Measures:** Task completion time, driving performance, Detection Response Task, and glance behaviour metrics. **Conditions:** Base + three different destination entry methods: (1) voice entry using Google Glass XE11, (2) both voice entry using Samsung Galaxy S4, (3) touch entry using Samsung Galaxy S4. **Participants:** 24 participants (12 female). Mean age 25.0 (SD 2.6). **Limitations:** Testing started after participants practiced and became proficient in the tasks rather than testing their original ability. Small sample size.	All three interactions showed some level of demand compared to “just driving”. Voice-based interaction with both devices had less impact than the smartphone touch interface. In the voice-based interaction, Google Glass induced higher Detection Response Task miss-rates but for less time.	None specifically mentioned.
2017	Gao, J., & Davis, G. A. (2017). Using naturalistic driving study data to investigate the impact of driver distraction on driver's brake reaction time in freeway rear-end events in car-following situation. *Journal of Safety Research, 63,* 195-204. doi:10.1016/j.jsr.2017.10.012	USA	Rear-end event Reaction time	Field driving study (SHRP 2 NDS) **Aim:** Understand the mechanism by which driver distraction, defined as secondary task distraction, could influence crash risk, as indicated by a driver's reaction time, in freeway car-following situations. **Measures:** Reaction time (Time gap between the time point when leader vehicle's brake light first went on and that when the follower driver first swerved or braked, whichever came first, as response to leader driver's brake), gender, age, environmental factors, distraction factors. **Participants:** 130 rear ending events were extracted from the NDS database. **Limitations:** Limited situation kinematic information. Sample size limited some analyses	Driver distraction duration was the primary direct cause of the increase in reaction time, with other factors having indirect effects mediated by distraction duration. . The longer distraction duration, the distracted status when a leader braked, and engaging in auditory-visual- manual secondary task tended to result in longer reaction times.	Brill (1972) provided a car following model.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Gao, J., & Davis, G. A. (2017). Using Naturalistic Driving Study Data to Investigate the Impact of Driver Distraction on Drivers' Reaction Time in Freeway Rear-Ending Events. *Transportation Research Circular* [abstract] [same as above]			[same as above]		
2017	Horrey, W. J., Lesch, M. F., Garabet, A., Simmons, L., & Maikala, R. (2017). Distraction and task engagement: How interesting and boring information impact driving performance and subjective and physiological responses. *Applied Ergonomics, 58,* 342-348. doi:10.1016/j.apergo.2016.07.011	USA	Task engagement/ interest Pupillometry	Driving simulator study **Aim:** Examine the impact of task engagement/interest on performance. **Measures:** Driving performance was recorded along with drivers simultaneously being monitored using near-infrared spectroscopy, heart monitoring and eye tracking systems. **Conditions:** While driving, drivers listened to: (1) boring, (2) interesting or (3) no auditory material. **Participants:** 31 participants (13 female). Mean age 37 years (25 – 55, SD = 8.5). **Limitations:** Interesting and boring material may not have differed in other areas. Participants may have predicted a surprise memorisation test after hearing the audio.	Drivers exhibited less variability in lane keeping and headway maintenance for both auditory conditions. Response times to critical braking events were longer in the interesting audio condition. Drivers perceived the interesting material to be less demanding and less complex, although the material was "objectively matched for difficulty". Drivers showed a reduced concentration of cerebral oxygenated hemoglobin when listening to interesting material, compared to baseline and boring conditions, yet they exhibited superior recognition for this material.	O'Brien and Toms (2008) proposed a model of task engagement.
2017	Oviedo-Trespalacios, O., Haque, M., King, M. J., & Washington, S. (2017). Effects of road infrastructure and traffic complexity in speed adaptation behaviour of distracted drivers. *Accident Analysis and Prevention, 101,* 67-77. doi:10.1016/j.aap.2017.01.018	Australia	Behavioural adaptation Environmental complexity	Simulated driving study **Aim:** Investigate behavioural adaptation of distracted drivers under different traffic and environmental complexity. **Conditions:** 7 scenarios were considered which differed by: types of urbanization, types of traffic interaction, types of road geometry, types of adjacent traffic. **Participants:** 32 young drivers (18-26 years; 50% males). **Limitations:** Little information.	Distracted drivers selected slower driving speeds but the difference in speed adaptation was not significantly different across handheld and hands-free phone conditions. The speed adaptation model suggests that road traffic complexity plays a vital role in speed adaptation behaviour of distracted drivers Driver characteristics like age, attitude towards mobile phone use, and driving experience are significant moderators of behavioural adaptation	Speed adapatation model.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Oviedo-Trespalacios, O., King, M. J., Haque, M. M., & Washington, S. (2017). Risk factors of mobile phone use while driving in Queensland: Prevalence, attitudes, crash risk perception, and task-management strategies. *PloS One, 12*(9), e0183361-e0183361. doi:10.1371/journal.pone.0183361	Australia	Mobile phone use Task-management strategies	Anonymous survey **Aim:** Investigate characteristics of usage, risk factors, compensatory strategies in use and characteristics of high-frequency offenders of mobile phone use while driving. **Measures:** Demographic characteristics, mobile phone use (talking, texting/browsing) while driving, attitudes and risk perception towards mobile phone distracted driving, task-management strategies in mobile phone distracted driving. **Participants:** 484 drivers (34.9% males and 49.8% aged 17 - 25). **Limitations:** Self-report measurements. Sample limits generalisability. Significant environmental factors not controlled.	At least one of every two motorists surveyed reported engaging in distracted driving. Attitudes towards mobile phone usage were more favourable for talking than texting or browsing with participants being unable to acknowledge the increased crash risk associated with answering and locating a ringing phone in contrast to other tasks such as texting/browsing. Lowering the driving speed and increasing the distance from the vehicle in front were the most popular task-management strategies for talking and texting/browsing while driving. Keeping the mobile phone low (e.g. in the driver's lap or on the passenger seat) was the favourite strategy used by drivers to avoid police fines for both talking and texting/browsing.	Behavioural adaptation theory “driver behaviour models”. Minimum required attention (MiRA) theory).
2017	Razi-Ardakani, H., Kermanshah, M., Mahmoudzadeh, A., & Transportation Research Board. (2017). *Crash Type Analysis Using Nested Logit Model: Special Focus on Distraction-Related Factors.* Paper presented at the Transportation Research Board 96th Annual Meeting, Washington DC, United States. [Abstract only]	USA	Cognitive distractions Crashes	Cohort Field driving study data analysis **Aim:** Study the factors such as driver's characteristics, environmental conditions, and vehicle's characteristics, that affecting different crash types with a special focus on distraction parameters. **Measures:** Driver’s characteristics, environmental conditions, and vehicle's characteristics. Distraction factors divided into five groups of: (1) cell phone usage, (2) cognitive distractions, (3) passengers distracting the driver, (4) outside events attracting the driver’s attention, and (5) in-vehicle activities. The crash types divided into two main groups, (2) single-vehicle crashes, and (2) two-vehicle crashes. **Participants:** Crashes that occurred in the USA into accounts”. **Limitations:** None mentioned.	All of the tested distraction-related factors increase: - the probability of run-off-road crashes, - collision with a fixed object, and - rear-end crashes. Cognitive distraction increases the probability of collision with a pedestrian. Distractions caused by passengers or out-of-vehicle events increase the probability of sideswipe crashes.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Schneidereit, T., Petzoldt, T., Keinath, A., & Krems, J. F. (2017). Using SHRP 2 naturalistic driving data to assess drivers' speed choice while being engaged in different secondary tasks. *Journal of Safety Research, 62,* 33-42. doi:10.1016/j.jsr.2017.04.004	Germany	Self-regulatory behaviour Speed adjustment	Field driving study (SHRP 2 naturalistic driving study) **Aim:** Investigate if secondary task engagement results in speed adjustment also under naturalistic conditions. **Measures:** Driving speed before, during, and after texting, smoking, eating, and adjusting/monitoring radio or climate control . **Participants:** 403 free flow driving on the interstates/ highways episodes of the SHRP 2 naturalistic driving study. **Limitations:** The strict requirements for episode inclusion might have introduced certain biases. The reality of some secondary task engagement was complicated and may not have been fully controlled for.	Data showed some indication for speed adjustment for texting, especially when driving with high speed. However, the effect sizes were small and behavioural patterns varied considerably between drivers. The engagement in the other tasks did not influence drivers' speed behaviour significantly. Study concluded: While drivers might indeed reduce speed slightly to accommodate for secondary task engagement, other forms of adaptation (e.g., strategic decisions) might play a more important role in a natural driving environment.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Strayer, D. L., Cooper, J. M., Turrill, J., Coleman, J. R., & Hopman, R. J. (2017). The smartphone and the driver's cognitive workload: A comparison of Apple, Google, and Microsoft's intelligent personal assistants. *Canadian Journal of Experimental Psychology, 71*(2), 93-110. doi:10.1037/cep0000104	USA	Cognitive workload Divided attention	Field driving study **Aim:** Examine the impact of voice-based interactions using 3 different intelligent personal assistants (Apple's Siri, Google's Google Now for Android phones, and Microsoft's Cortana) on the cognitive workload of the driver. **Measures:** Cognitive workload was derived from primary task performance through video analysis, secondary-task performance using the detection response task (DRT), and subjective mental workload. **Conditions:** 5 (condition) x 3 (age groups) mixed within and between subjects design was used. Within-subject conditions (1) single-task, (2) Apple's Siri, (3) Google's Google Now, (4) Microsoft's Cortana, and (5) OSPAN task. The 3 between-subjects age groups: (1) 21–34 years, (2) 35–53 years, and (3) 54–70 years. **Participants:** Experiment 1: 31 participants (15 females). Mean age 42 years (21 - 70). Experiment 2: 34 participants (15 females) Mean age 42.5 (22-70). **Limitations:** Did not control for participants' previous familiarity with personal assistants.	Workload was significantly higher than that measured in the single-task drive. There were systematic differences between the smartphones: The Google system placed lower cognitive demands on the driver than the Apple and Microsoft systems, which did not differ. The difference in mental workload between the smartphones was associated with: - the number of system errors, - the time to complete an action, and - the complexity and intuitiveness of the devices.	Salvucci's (2006) threaded cognition model. Multiple-resource models.
2017	Wagner-Greene, V. R., Wotring, A. J., Castor, T., Kruger, J., Mortemore, S., & Dake, J. A. (2017). Pokémon GO: Healthy or harmful? *American Journal of Public Health, 107*(1), 35-36. doi:10.2105/AJPH.2016.303548	USA	Pokémon GO	Convenience sample survey **Aim:** Better understand the actual health behaviours of Pokémon GO players. **Participants:** 662 adult players **Limitations:** The local convenience sample while playing the game (not a representative sample). Very little information. Self-reported behaviours.	Participants reported playing the game while: - driving (27%), - biking (43%), - walking (without paying attention; 32%), Men were more likely to play while driving or biking, play in areas where they do not feel safe, and enter private property to catch Pokémon. Players who were aged 24 years or younger were also more likely to engage in these risky behaviours than were their older counterparts	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Ye, M., Osman, O. A., & Ishak, S. (2017). Accounting for driver distraction and socioeconomic characteristics in a crash risk index: Naturalistic driving study. *Transportation Research Record, 2659*(1), 204-211. doi:10.3141/2659-22	USA	Crash risk Socioeconomic characteristics	Field driving study (SHRP 2 Naturalistic Driving Study data) **Aim:** Estimate the crash risk associated with the socioeconomic characteristics of drivers and their tendency to experience distracted driving using a crash risk index (CRI). **Measures:** Socioeconomic attributes, secondary tasks with high crash risk (found through data analysis of SHRP 2). **Participants:** SHRP 2 Naturalistic Driving Study data. **Limitations:** Only the first observed secondary task was considered (SHRP 2 NDS data identified up to three secondary tasks in the order in which they occurred).	CRI is proposed on the basis of a grading system composed of three main measures: the crash risk associated with performing secondary tasks while driving, the effect of socioeconomic attributes on the likelihood of engagement in secondary tasks, and the effect of specific categories within each socioeconomic attribute on the likelihood of drivers being involved in secondary tasks. The study found the highest risk were - single - male - age between 30 -34	None specifically mentioned
2017	Ye, M., Osman, O. A., Ishak, S., & Hashemi, B. (2017). An ANN Model for Detecting Secondary Tasks from Driving Behavior Attributes: A Naturalistic Driving Study [Abstract only]	USA	ANN model Secondary tasks	Field driving study (data analysis from Second Strategic Highway Research Program (SHRP 2) Naturalistic Driving Study (NDS)) **Aim:** Develop a model for detecting the likelihood of a driver's involvement in secondary tasks from distinctive attributes of driving behaviour. **Measures:** Speed, longitudinal acceleration, lateral acceleration, yaw rate, and throttle position were used to describe the driving behaviour. Secondary tasks: calling, texting, and passenger interaction.	The results show that the developed ANN models were able to detect the drivers' involvement in: - calling (96.3% accurate) - texting, (95.6% accurate) - passenger interaction (95.2% accurate) Study concluded: The results show that the selected driving performance attributes were effective in detecting the associated secondary tasks with driving behaviour.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Chen, H. -Y. W., Hoekstra-Atwood, L., & Donmez, B. (2018). Voluntary- and involuntary-distraction engagement: An exploratory study of individual differences. *Human Factors, 60*(4), 575-588. doi:10.1177/0018720818761293	Canada	Voluntary distraction Involuntary distraction	Driving simulator study **Aim:** Explore individual differences in voluntary and involuntary driver distraction engagement. **Measures:** Distraction engagement, glance data, driving performance. Self-reported driver characteristics. **Conditions:** Distraction type (three levels): (1) none (baseline) (2) voluntary (3) involuntary **Participants:** 36 participants (18 females). Mean age = 29.1 (25 - 39, SD = 3.76). **Limitations:** Some excluded data due to participant actions Limited by sample size. The design prevented voluntary and involuntary distraction direct comparison.	Study concluded voluntary and involuntary distractions are likely driven by different attentional mechanisms. There was no correlation observed between voluntary and involuntary engagement. Demographic factors (age group, gender, and mileage) were predictive of engagement in voluntary distraction but not involuntary distraction. Voluntary and involuntary distractions both delayed accelerator release times in response to lead-vehicle braking events.	Trick and Enn's (2009) framework differentiating attentional process in driving is mentioned in the introduction.
2018	Feng, F., Bao, S., Hampshire, R. C., & Delp, M. (2018). Drivers overtaking bicyclists—An examination using naturalistic driving data. *Accident Analysis and Prevention, 115,* 98-109. doi:10.1016/j.aap.2018.03.010	USA	Vulnerable road users Bicycle	Field driving study **Aim:** Study driver-bicyclist interactions from a driver's perspective by using in-vehicle sensory data from naturalistic driving studies. **Measures:** Drivers' overtaking manoeuvre, left-side lane marking types, presence of bike lanes or paved shoulders, presence of left-side traffic, lane width, and driver distraction. **Participants:** 4789 bicyclist-detection events. **Limitations:** Lack of certain sensors, important factors extracted subjectively or excluded. Sample mainly from the Ann Arbor area in the United States.	When a bike lane or paved shoulder was present, a dashed non-centre line (i.e., a dashed line separating two lanes in the same direction) was associated with: - significantly less vehicle lane-crossing and - closer distance to the bike lane/ shoulder compared to a solid centreline 7.8% of the overtaking occurred when the drivers were distracted within five seconds prior to passing bicyclists. From a bicyclist's perspective, that translates to one overtaken by a distracted driver for every thirteen times they are overtaken. Drivers manipulating a cell phone were associated with significantly less vehicle lane-crossing when overtaking bicyclists.	Schindler and Bast's (2015) driver's manoeuvre model.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Kircher, K., & Ahlstrom, C. (2018). Evaluation of methods for the assessment of attention while driving. *Accident Analysis and Prevention, 114*, 40-47. doi:10.1016/j.aap.2017.03.013	Sweden	Minimum required attention Spare capacity	Field driving study **Aim:** Evaluate different methods that can be used to assess attention, first theoretically, and then empirically in a controlled field study and in the laboratory. **Measures:** Driving behaviour, eye movement, occlusion. **Conditions:** Three on-road conditions were: (1) baseline, (2) driving with eye tracking and self-paced visual occlusion, (3) driving while thinking aloud. Two laboratory conditions: (1) describing how attention should be distributed on a motorway, and (2) thinking aloud while watching a video from the baseline drive. **Participants:** 6 driving instructors (two female). Mean age 35 (27 - 46, SD = 7.2). **Limitations:** Very small sample. Somewhat poor car situation and position information.	Visual occlusion, especially in combination with eye tracking, was appropriate for assessing spare capacity. The think aloud protocol was appropriate to gain insight about the driver's actual mental representation of the situation at hand. Expert judgement in the laboratory was not reliable for the assessment of drivers' attentional distribution in traffic.	Theory of Minimim Required Attention (MiRA).

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Lee, J. Y., Lee, J. D., Bärgman, J., Lee, J., & Reimer, B. (2018). How safe is tuning a radio?: Using the radio tuning task as a benchmark for distracted driving. *Accident Analysis and Prevention, 110*, 29-37. doi:10.1016/j.aap.2017.10.009	USA	Crash risk Radio tuning	Field driving study **Aim:** Take the glance patterns for manual radio tuning tasks from an on-road experiment and apply these patterns to lead-vehicle events observed in naturalistic driving studies. **Measures:** Driver characteristics, glance characteristics, driving performance. **Conditions:** Task 1: to turn on the radio, switch to FM2, and tune to 100.7. Task 2: to turn on the radio, switch to FM1, and tune to 95.3. A 60 s window of glances was selected for one baseline driving and two radio tuning trials. **Participants:** 30 younger drivers (15 female). Mean age 24.1 (SD =2.8). 22 older drivers (9 female). Mean age 66.3 (SD =2.4). **Limitations:** Model issues - drivers' responses to avoid crashes and driving conditions were simplified. - likely biased towards shorter distances.	The counterfactual simulation showed that off-road glances transform some near-crashes that could have been avoided into crashes. Glance patterns observed in on-road radio tuning experiment produced 2.85–5.00 times more crashes than baseline driving	None specifically mentioned.
2018	Mulvihill, C., Horberry, T., Fitzharris, M., Lenne, M. G., Kuo, J., Riquelme, N., Wood, D., & Peden, M. (2018). *The efficacy of driver performance and subjective measures for investigating fatigue and distraction: a simulator study.* Paper presented at the Australasian Road Safety Conference, Sydney, Australia.	Australia	Drowsy Monitoring technology	Driving simulator study **Aim:** Sub-set of results from an ongoing collaborative research program to develop and evaluate driver state monitoring technology to reduce road trauma. **Conditions:** Within participants 2 (drowsy or alert) x 2 (distraction or baseline). **Participants:** 70 drivers. **Limitations:** Little explanation of measures, including 'crashes'.	Results show that under the drowsy condition, drivers experienced a higher: - proportion of lane exceedances - crashes - likelihood to self-report higher levels of subjective sleepiness. Under the distraction condition, drivers experienced a higher: - proportion of lane exceedances - crashes - likelihood to self-report lower levels of subjective sleepiness.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Nilsson, E. J., Aust, M. L., Engström, J., Svanberg, B., & Lindén, P. (2018). Effects of cognitive load on response time in an unexpected lead vehicle braking scenario and the detection response task (DRT). *Transportation Research. Part F, Traffic Psychology and Behaviour, 59,* 463-474. doi:10.1016/j.trf.2018.09.026	Sweden	Automatic and controlled performance Traffic safety	Driving simulator study **Aim:** Investigate physiological effects of secondary task execution during driving. **Measures:** Experiment 1: response times in the detection response task. Experiment 2: brake response times. **Conditions:** Two cognitive loading levels (1) with (2) without (baseline). **Participants:** *Experiment 1:* 16 males participated in experiment 1. Mean age = 43.4 years (36 – 50, SD = 4.1). *Experiment 2:* 24 males participated in test series 1. Mean age 41 years (35 – 49, SD = 4). 26 males participated in test series 2. Mean age 44 years (35 – 50, SD = 4). **Limitations:** Sample used males only. It was not possible to perform both experiments in the same simulator. Differences in experimental setup and fidelity between simulators might influence behaviours in response tasks	Detection Response Task response times increased with increased level of cognitive load. Brake response times were unaffected by cognitive load.	Multiple Resource Theory. Traditional cognitive resources theories generally mentioned. Traditional information processing (resource and bottleneck) models generally mentioned.
2018	Nowosielski, R. J., Trick, L. M., & Toxopeus, R. (2018) Good distractions: Testing the effects of listening to an audiobook on driving performance in simple and complex road environments. *Accident Analysis and Prevention, 111,* 202-209. doi: 10.1016/j.aap.2017.11.033	Canada	Fatigue Boredom	Driving simulator study **Aim:** Investigate whether an audiobook could be used to improve driving performance in under-stimulating environments. **Measures:** Driving performance was measured in terms of braking response time to hazards, speed, standard deviation of speed, standard deviation of lateral position. **Conditions** 2 x 2 roads: (1) simple or (2) complex roads. Driving while listening to an audiobook (1) no or (2) yes. **Participants:** 38 (22 female) undergraduates in a Psychology course. Age mean = 18.94 years (SD = 1.35). **Limitations:** Time between hazards may have been too short to assess some driving elements. Complex to simple roads differed in a large variety of ways making it unclear which aspects of the drive produced the effects.	Braking times to hazards were higher on the complex drive than the simple one, though the effects of secondary tasks such as audiobooks were especially deleterious on the complex drive. On the simple drive, driving while listening to an audiobook lead to faster response time to hazards. Evidence that individuals with high OSPAN scores had faster response times to hazards when listening to an audiobook.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Owens, J. M,. Tefft, B. C., Guo, F., Fang, Y., Perez, M. A., McClafferty, J. A., & Dingus, T. A. (2018). *Crash Risk of Cell Phone Use While Driving: Case-Crossover Study of SHRP 2 Naturalistic Driving Data.* Paper presented at the Transportation Research Board 97th Annual Meeting, Washington DC, United States.	USA	Cell phone use Crash involvement	Field driving study (Data from Second Strategic Highway Research Program, SHRP2) **Aim:** Investigate the relationship between cell phone use and crash risk using data from the Second Strategic Highway Research Program Naturalistic Driving Study. **Measures:** Cell phone use, crash involvement, and traffic and environmental conditions were assessed using in-vehicle video. **Participants:** Data from Second Strategic Highway Research Program, SHRP2. 566 severe, moderate, and minor crashes matched to 1,749 segments of ordinary driving. **Limitations:** The strict matching criteria imposed for baselines resulted in low statistical power for several comparisons. SHRP 2 NDS oversampled younger and older drivers.	Visual-manual tasks overall and texting in particular were associated with significantly elevated incidence of crash involvement relative to driving without performing any observable secondary tasks. The increase in the incidence of crash involvement associated with visual-manual tasks was greater for crashes in free-flow traffic conditions and in types of crashes in which the subject driver generally played a clear role than for all crash types taken together.	None specifically mentioned.
2018	Risteska, M., Donmez, B., Chen, H. -Y. W., & Modi, M. (2018). Prevalence of engagement in single versus multiple types of secondary tasks: Results from the naturalistic engagement in secondary task (NEST) dataset. *Transportation Research Record, 2672*(37), 1-10. doi:10.1177/0361198118791394	USA	Multiple secondary tasks Naturalistic engagement	Field driving study (Data from Second Strategic Highway Research Program, SHRP2) **Aim:** Investigate engagement in single vs. multiple types of secondary tasks in distraction-affected, safety-critical events, and baselines reported in the Naturalistic Engagement in Secondary Tasks (NEST) dataset. **Measures:** SHRP2 NDS factors. Main predictors: event type (safety-critical events, baseline), environmental demand, GPS speed, and driver age. **Participants:** Approximately 3,400 drivers between 2010 and 2013 from SHRP2 NDS. **Limitations:** Data limitations for concluding whether there are patterns that may explain task such groupings. The limited sample size of the prevented making conclusions about the different multiple task combinations.	Engagement in multiple secondary task types is more prevalent in distraction-affected, safety-critical events than base events Drivers 65 years and over were less likely to engage in multiple types of secondary tasks than younger drivers.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Skrypchuk, L., Mouzakitis, A., Mehler, B., Reimer, B., Langdon, P., & Clarkson, P. J. (2018). *How Does In-Vehicle Task Awareness Affect Driver Attention Management in a Multitasking Situation?.* Paper presented at the Transportation Research Board 97th Annual Meeting, Washington DC, United States. [Abstract only]	Likely USA	AttenD algorithm Non-driving activities	Experimental study **Aim:** Understand how drivers manage their attention towards varying driving demands when exposed to a range of non-driving activities and evaluated using a modified AttenD algorithm. **Conditions:** Drivers drove in either a (1) busy or (2) quiet driving environment. **Participants:** 50 experienced drivers. **Limitations:** None mentioned.	The more awareness a driver has of a non-driving activity can result in significant attentional focus improvements when analysed using a modified AttenD algorithm. Increased awareness towards in-vehicle tasks had a positive impact on attentional management when concurrent activities are active; improving a driver's ability to focus on the road.	None specifically mentioned.
2018	Wandtner, B., Schömig, N., & Schmidt, G. (2018). Effects of non-driving related task modalities on takeover performance in highly automated driving. *Human Factors, 60*(6), 870-881. doi:10.1177/0018720818768199	Germany	Human-automation interaction vehicle automation	Driving simulator study **Aim:** Evaluate the impact of different non-driving related tasks on takeover performance in highly automated driving. **Measures:** Dependent variables were timing and quality aspects of drivers' takeover reaction. **Conditions:** 2 × 5 mixed design. Within-participants factor included type of non-driving related task (baseline without task, auditory vocal, visual-vocal, visual-manual mounted, and visual-manual handheld), and the between participants factor was the design of a takeover request (task lockout vs. no task lockout). **Participants:** 30 participants (15 women). Mean age = 29.17 age (SD = 6.38). **Limitations:** The tasks differed significantly from expected real life tasks. Participants differed from general pop in age and annual mileage.	A visual-manual texting task degraded performance the most, particularly when performed handheld. Takeover performance with an auditory-vocal task was comparable to a baseline without any task. Task lockout was associated with faster hands-on-wheel times but not altered brake response times. A non-driving related task lockout was highly accepted by the drivers and showed moderate benefits for the first takeover reaction.	Wickens' (2002) multiple Resource Theory.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Žuraulis, V., Nagurnas, S., Pečeliūnas, R., Pumputis, V., & Skačkauskas, P. (2018). The analysis of drivers' reaction time using cell phone in the case of vehicle stabilization task. *International Journal of Occupational Medicine and Environmental Health, 31*(5), 633-648. doi:10.13075/ijomeh.1896.01264	Lithuania	Cell phone Reaction time	Controlled circuit driving **Aim:** Analyse the driver's psychophysiological qualities such as complex reaction and individual ability to control the vehicle that has suddenly lost its stability. **Measures:** Driver characteristics, driver's behaviour: - reaction to stimuli, expressed as the average reaction time and possible errors, - vehicle control (position in the driving lane, distance in the front, speed changes), - vision, - working load. **Conditions:** Participants do both: (1) baseline (2) handheld phone use. **Participants:** 56 participants Mean age 34.56 years (24-49 SD = 9.42). **Limitations:** Circuit driving differs from natural driving and may impact results. Observer effect.	When stabilizing a vehicle movement, the complex reaction time of a vehicle driver speaking on a mobile phone is increased by 18.1% as compared with the conventional driving by a driver not speaking on a phone. Speaking on a phone while driving increases the driver's reaction time and mental workload.	None specifically mentioned.
2019	Bowden, V. K., Loft, S., Wilson, M. D., Howard, J., & Visser, T. A. W. (2019). The long road home from distraction: Investigating the time-course of distraction recovery in driving. *Accident Analysis and Prevention, 124*, 23-32. doi:10.1016/j.aap.2018.12.012	Australia	Detection response task Driver safety	Driving simulator study **Aim:** Determine whether post-distraction impairment is greater, and/or distraction recovery slower, when a distracting task shares more resource requirements with the primary task of driving safely. **Measures:** Driver characteristics, detection response task response times, driving quality . **Conditions:** Three types of distraction: (1) cognitive only, (2) cognitive + visual, (3) cognitive + visual + manual. **Participants:** 165 undergraduate students (95 female). Mean age = 19 years (SD = 5.1). **Limitations:** Sample unrepresentative of general population. Task and simulated environment significantly different to real life.	Each additional level of distraction further slowed Detection Response Task response times and increased speed variability during 0–10 s post-distraction. Lane position maintenance from 0 to 10 s post-distraction was only impaired when the distraction included a manual component. While participants in all three conditions exhibited some degree of post-distraction impairment, only those in the cognitive + visual + manual condition reduced their speed during the time when distracted.	Multiple Resource Theory

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Cvahte Ojsteršek, T., & Topolšek, D. (2019). Influence of drivers' visual and cognitive attention on their perception of changes in the traffic environment. *European Transport Research Review, 11*(1), 1-9. doi:10.1186/s12544-019-0384-2	Slovenia	Cognitive attention Visual attention	Cross sectional survey. **Aim:** Evaluate selected visual and cognitive distractions that the driver is faced with, and on their influence on detecting and perceiving changes in the traffic environment. **Measures:** Driver characteristics and driving experience of their most often taken driving route. **Participants:** 213 drivers (38.4% male). Mean age = 25.32 (18 - 60 years, SD = 6.06). **Limitations:** Model is based on self-evaluation of general driving experience rather than on external objective evaluation.	The most negative impacts on drivers' perception of crucial changes in the traffic environment were: - thinking about personal problems, - thinking about chores - thinking about errands. - thinking about roadside advertisements - looking at advertisements - looking at the natural environment.	None specifically mentioned.
2019	Dingus, T. A., Owens, J. M., Guo, F., Fang, Y., Perez, M. A., McClafferty, J. A., Buchanan-King, M., & Fitch, G. M. (2019). The prevalence of and crash risk associated with primarily cognitive secondary tasks. *Safety Science, 119,* 98-105. doi:10.1016/j.ssci.2019.01.005	USA	Cognitive distraction Secondary task	Field driving study **Aim:** Expand on previous risk estimations of primarily cognitive secondary tasks. **Measures:** Prevalence of drivers' engagement in primarily cognitive secondary activities (by in-vehicle cameras and other sophisticated data collection equipment as part of the Second Strategic Highway Research Program Naturalistic Driving Study). **Participants:** 3454 drivers. **Limitations:** Cognitive distraction was difficult to analyse/ detect. The degree to which off-road glances affect drivers' involvement in a crash when performing primarily cognitive secondary tasks was not considered.	Primarily cognitive secondary tasks are not associated with an increased risk relative to all driving but are associated with a significantly increased crash risk relative to model driving. Primarily cognitive secondary tasks were observed in 20.0% of select driving references Interacting with a passenger composed the majority of the primarily cognitive secondary tasks in which drivers engaged. Talking/listening on a hands-free cell phone did not have an increased crash risk.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Ebadi, Y., Fisher, D. L., & Roberts, S. C. (2019). Impact of cognitive distractions on drivers' hazard anticipation behavior in complex scenarios. *Transportation Research Record, 2673*(9), 440-451. doi:10.1177/0361198119846463	USA	Cell phones Cognitive distraction	Driving simulator study **Aim:** Determine whether cognitive distractions associated with cell phone use affect hazard anticipation, not only at intersections but also in other scenarios which contain latent hazards. **Measures:** Driver characteristics, glances at multiple target zones hazards could emerge from. **Conditions:** (2 x 18). Each participant did 18 scenarios . (1) hands-free mock cell phone task. (2) non hands-free mock cell phone task. **Participants:** 24 participants. Mean age 24.79 age (19–31, SD = 2.97). **Limitations:** Limited by simulator. Previous experience with hands-free cell phone conversation while driving was not controlled.	It was determined that the proportion of anticipatory glances toward potential hazards was reduced significantly for all scenarios when drivers were engaged in a mock cell phone task. The significant reduction when drivers were engaged in a mock cell phone task is seen both at work zones and at marked midblock crosswalks, scenarios which often endanger vulnerable road users.	Wickens and Hollands' (2000) Multiple Resource Model. Theory of hazard anticipation (Crundall et al., 2011).
2019	Kidd, D. G., & Chaudhary, N. K. (2019). Changes in the sources of distracted driving among Northern Virginia drivers in 2014 and 2018: A comparison of results from two roadside observation surveys. *Journal of Safety Research, 68,* 131-138. doi:10.1016/j.jsr.2018.12.004	USA	Cell-phone Text	Roadside observational study **Aim:** Replicate a 2014 observation study to examine whether the prevalence of distracted driving overall and of individual secondary behaviours has changed. **Measures:** Driver characteristics, observed secondary activities. **Participants:** 14,485 observations in 2014 (39.8% female, 3.3% < 20 years, 84.6% 20 – 59 years, 12.2% 60+ years) , 11,837 observations in 2018 (45.7% female, 3.6% < 20 years, 82.4% 20 – 59 years, 14.1% 60+ years). **Limitations:** Observations were conducted in only one area of Virginia. Some activities were difficult to observe and record.	There was no evidence that distracted driving has become more common in recent years, but the prevalence of some secondary behaviours has changed. The 57% increase in the likelihood of cell-phone manipulation in 2018 relative to 2014. Although cell-phone use was frequently observed in 2014 and 2018, collectively, other non-cell-phone secondary behaviours were more prevalent.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Kim, K., Ghimire, J., Pant, P., & Yamashita, E. (2019). Self-reported handheld device use while driving. *Accident Analysis and Prevention, 125,* 106-115. doi:10.1016/j.aap.2019.01.032	USA	Handheld device use Accident analysis	Cross sectional survey **Aim:** Identify the experiences, practices, and attitudes of handheld device use while driving. **Measures:** Questions related to: background (age, gender, education, vehicle type, etc.), handheld device use while driving and perceptions, been in an accident or received a citation for handheld device use, whether they lived in states with strong or weak handheld device use laws. **Participants:** 337 respondents (144 female). **Limitations:** Self-reported data. Hard-to-reach motorists who may not necessarily respond to the web-based survey.	Self-reporting of 59% use of handheld mobile phones while driving with state bans on texting and the use of handheld mobile phones while driving. Older drivers are least likely to engage in these behaviours, compared to younger drivers and adult drivers.	None specifically mentioned.
2019	Lacherez, P., Virupaksha, S., Wood, J. M., & Collins, M. J. (2019). The effects of auditory satellite navigation instructions and visual blur on road hazard perception. *Accident Analysis and Prevention, 125,* 132-137. doi:10.1016/j.aap.2019.01.025	Australia	Blur Satellite navigation	Experiment **Aim:** Examine the effects of auditory distraction might interact with other sensory impairments, such as vision impairment. **Measures:** Hazard Perception Test (incl. hazard recognition, response times). **Conditions:** Different levels of refractive blur: (1) control, (2) +0.50 DS, (3) +1.00 DS and (4) +2.00 DS. **Participants:** 20 current drivers (mean age of 29.4 ± 3.2 years). **Limitations:** The conditions could not be fully counterbalanced. Participants adapted to a given level of blur (real life levels may have less impact).	Hazard perception response times increased significantly with increasing blur. There was a significant increase in response times to hazards in the presence of the auditory navigation instructions. The combined effect of blur and auditory instructions was additive, with the worst performance being in the presence of both blur and auditory instructions.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Née, M., Contrand, B., Orriols, L., Gil-Jardiné, C., Galéra, C., & Lagarde, E. (2019). Road safety and distraction, results from a responsibility case-control study among a sample of road users interviewed at the emergency room. *Accident Analysis and Prevention, 122,* 19-24. doi:10.1016/j.aap.2018.09.032	France	Road safety Traffic crash responsibility	Cross sectional survey **Aim:** Investigate the association between distraction behind the wheel and risk of being responsible for a road traffic crash in a responsibility case-control study. **Measures:** Participant characteristics, 4 external distraction variables: visual distraction, manual distraction, auditory distraction, and verbal interaction. **Participants:** 1912 (746 female) admitted to the emergency department in the previous 72 hours for injury sustained in a road traffic crash, were aged 18 years or older, were drivers, and were able to answer the interviewer. **Limitations:** Data self-reported. Sometimes difficult to determine if the activity involved one or more forms of distraction.	A significantly increased risk of being responsible for a road traffic crash was associated with the exposure to - activities that take drivers' eyes off the road and - activities that take drivers' hands off the wheel. No significant associations were found for: - verbal interaction and - listening to the radio and/or singing.	None specifically mentioned.
2019	Perlman, D., Samost, A., Domel, A. G., Mehler, B., Dobres, J., & Reimer, B. (2019). The relative impact of smartwatch and smartphone use while driving on workload, attention, and driving performance. *Applied Ergonomics, 75,* 8-16. doi:10.1016/j.apergo.2018.09.001	USA	Workload Detection response task	Driving simulator study **Aim:** Compare the impact of using a smartwatch to initiate phone calls on driver workload, attention, and performance to smartphone visual-manual (VM) and auditory-vocal (AV) interfaces. **Measures:** Data was collected on variables corresponding to three areas of interest: workload, distraction, and driving performance. **Conditions:** Call while driving using three pieces of equipment: (1) smartphone visual-manual interface and (2) smartphone auditory-vocal interface (3) smartwatch auditory-vocal interface. **Participants:** 36 (18 female) experienced drivers. 18 in the younger age group (20 – 29), 18 in the older ager group (55 – 69). **Limitations:** Testing limited to the Android devices. Task tested does not necessarily equate with equal performance on a different task.	When compared to using a primary VM interface, AV interfaces are generally associated with: - lower off-road visual demand, - lower self-reported workload ratings, and - better remote detection task response than. some possible advantages were observed for the voice-based smartphone interface over the voice-based smartwatch interface. E.g.: - a shorter task completion time, - fewer off-road glances, and - higher successful call completion rate Moreover, significant differences were not seen between the two voice-based interfaces on self-reported workload, remote detection task responsiveness, driving performance, and most off-road glance metrics.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Wundersitz, L. (2019). Driver distraction and inattention in fatal and injury crashes: Findings from in-depth road crash data. *Traffic Injury Prevention, 20*(7), 1-6. doi:10.1080/15389588.2019.1644627	Australia	Fatal crashes In-depth road crash investigation	Cohort data analysis **Aim:** Investigate the contribution of driver distraction and inattention within fatal and injury crashes using recent in-depth road crash investigation data. **Measures:** Crash case notes reviewed. Crash characteristics. **Participants:** 186 fatal and injury crashes in South Australia investigated from 2014 to 2018. **Limitations:** Small sample of crashes, and the sample is biased toward higher severity crashes and those that occur during the day. Though this does limit the generalisability of findings.	31.3% showed evidence of driver inattention contributing to the crash. The most common subtypes of inattention were distraction (13.8% of all crashes) and driver mis-prioritised attention (8.1%). The majority of distractions were cognitive (64%) and voluntary (77%) in nature.	None specifically mentioned.
2019	Young, K. L., Osborne, R., Koppel, S., Charlton, J. L., Grzebieta, R., Williamson, A., Haworth, N., Woolley, J., & Senserrick, T. (2019). What contextual and demographic factors predict drivers' decision to engage in secondary tasks? *IET Intelligent Transport Systems, 13*(8), 1218-1223. doi:10.1049/iet-its.2018.5546	Australia	Driver characteristics Initiation of secondary tasks	Field driving study **Aim:** Study driver engagement in secondary tasks during every day driving and examine the role that various driver characteristics and driving context variables play in influencing the initiation of secondary tasks. **Measures:** Driver characteristics, driving context, secondary tasks. **Participants:** 186 randomly selected trips from the Australian Naturalistic Driving Study. **Limitations:** Only a fraction of the available data set was coded and analysed in this study. Th secondary task data and associated contextual factors was only coded for the point at which the secondary tasks were initiated, not for the entire duration.	Secondary task engagement when driving is highly prevalent, with drivers spending ~ 45% of their driving time engaging in potentially distracting tasks. Drivers make a number of strategic decisions regarding when to engage, such as waiting until the vehicle is stationary; however, they do not appear to consider some contextual factors that may impact risks, such as weather and light conditions.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Young, K. L., Osborne, R., Koppel, S., Charlton, J. L., Grzebieta, R., Williamson, A., Haworth, N., Woolley, J., & Senserrick, T. (2019). What are Australian drivers doing behind the wheel?: An overview of secondary task data from the Australian naturalistic driving study. *Journal of the Australasian College of Road Safety, 30*(1), 27-33. doi:10.33492/JACRS-D-18-00085 (Young – 2019 [2])	Australia	Secondary tasks Road safety	Field driving study **Aim:** Examine patterns of secondary task engagement (e.g., mobile phone use, manipulating centre stack controls) during everyday driving trips to determine the type and duration of secondary tasks. **Measures:** Driver characteristics, driving context secondary tasks. **Participants:** 117 different drivers (45% males) were observed during the coded trips. Mean age = 46.7 years (SD = 12.3 years). **Limitations:** Only a fraction of the available data set was coded and analysed. The secondary task data and associated contextual factors was only coded to the point at which the secondary tasks were initiated, not for the entire duration.	Drivers engage in a secondary task every 96 seconds, on average It is not unusual for drivers to engage in multiple tasks at once Drivers were significantly more likely to initiate a secondary task when stationary Only 5.9% of the secondary tasks events were associated with a driving incident.	None specifically mentioned.
2020	Bálint, A., Flannagan, C. A. C., Leslie, A., Klauer, S. G., Guo, F., & Dozza, M. (2020). Multitasking additional-to-driving: Prevalence, structure, and associated risk in SHRP2 naturalistic driving data. *Accident Analysis and Prevention, 137*, 105455-105455. doi:10.1016/j.aap.2020.105455	USA	Secondary task Multitasking Crash risk	Field driving study **Aim:** 1) analyse the extent to which drivers engage in multitasking additional-to-driving (MAD) under various conditions, 2) specify odds ratios (ORs) of crashing associated with MAD, and 3) explores the structure of MAD. **Measures:** Data from the SHRP2 database. **Participants:** 3,546 drivers from six locations around the U.S., ranging in age from 16 to 98 years. **Limitations:** Complex secondary tasks are coded as a single task in the original database.	The number of secondary tasks that the drivers were engaged in differs substantially for different event types. The ORs of MAD indicate an elevated risk for all safety-critical events, with the greatest increase in the risk of rear-end striking crashes. The results are similar independently of whether secondary tasks are defined according to SHRP2 or general task groups. Concludes: The results confirm that the reduction of driving performance from MAD observed in simulator studies is manifested in real-world crashes as well.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Catalina, C. A., García-Herrero, S., Cabrerizo, E., Herrera, S., García-Pineda, S., Mohamadi, F., & Mariscal, M. A. (2020). Music distraction among young drivers: Analysis by gender and experience*. Journal of Advanced Transportation, 2020,* 1-12. doi:10.1155/2020/6039762	Spain	Music Speed infraction	Driving simulation study **Aim:** Quantify the probability of committing a speed infraction by young drivers and to investigate to what extent listening music could affect young drivers' emotions as well as their driving performances at the wheel. **Measures:** Included type of music whilst driving, gender of drivers, and drivers' driving experiences. **Participants:** 19 drivers aged between 20 and 28 years. **Limitations:** Small sample. Young only, limiting generalisability. Did not discuss sample familiarity with music genres.	Regardless of the type of music that is listened while driving, the probability of committing a slight infraction on speed is 3% higher than driving without music. For serious infringement of the speed, compared to driving without music: - listening to sad music increased by 2% compared to and - listening to happy music by 5.5%. Listening to relaxing music or not listening to music at all reduced the probability of committing a serious excess in speed for both genders. However, women had a lower chance of driving to an adequate speed when they listen to music.	None specifically mentioned
2020	Ebadi, Y., Pai, G., Samuel, S., & Fisher, D. L. (2020). Impact of cognitive distractions on drivers' hazardous event anticipation and mitigation behavior in Vehicle–Bicycle conflict situations. *Transportation Research Record, 2674*(7), 504-513. doi:10.1177/0361198120923660	USA	Vehicle–bicycle collisions Hazardous events	Driving simulation study **Aim:** Examine glance and vehicle behaviours of participants who glance towards latent hazardous events involving bicyclists. **Measures:** Glance characteristics and simulated car velocity at different points in simulation. **Conditions:** Baseline non-distraction group and cognitive distraction group. **Participants:** Baseline non-distraction: 20 participants (10 males, 10 females). Mean age 24.6 years (SD=4.02). Cognitive distraction group: 20 participants (17 males, three females) Mean age 25.25 years (SD=3.56). **Limitations:** Distinctly different groups. Did not collect info on participants' expertise with cell-phone use	Distracted drivers made shorter glances toward the latent hazardous events when compared with their non-distracted counterparts. There was no difference in vehicle velocity between distracted and non-distracted drivers near the potential strike zones.	None specifically mentioned

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Fakhrmoosavi, F., Kavianipour, M., Savolainen, P. T., & Gates, T. J. (2020). Comparisons in cell phone use rates between talking and manually manipulating the handheld device. *Transportation Research Record, 2674*(11), 235-244. doi:10.1177/0361198120943589	USA	In-vehicle distractions Cell phone use	Cross sectional observation study **Aim:** Investigate the rate of cell phone use under various settings through a state-wide direct observation survey. **Measures:** Cell phone use, gender, age, race, seatbelt use, passenger, vehicle use, environment characteristics. **Participants:** 179,806 (41% female). **Limitations:** Observations near intersections only. The census data used to guide selection represent the community and not the roads.	Cell phone use is generally higher among female drivers and use rates consistently decrease with age. The prevalence of cell phone use is also shown to vary significantly depending on the manner of use. Use rates are shown to differ based on changes in the driving environment, suggesting potential risk compensation on the part of motorists. The results also show a significant correlation in use rates at the same sites over time, which is reflective of important unobserved site specific factors.	None specifically mentioned
2020	Fancello, G., Adamu, M., Serra, P., & Fadda, P. (2020). Comparative analysis of the effects of mobile phone use on driving performance using ANOVA and ANCOVA. *IET Intelligent Transport Systems, 14*(9), 993-1003. doi:10.1049/iet-its.2019.0638	Italy	Smartphone Driver experiences	Driving simulator study **Aim:** Investigate the extent to which several combinations of factors related to the driver, the driving environment and the specific smartphone usage may affect driving performance. **Measures:** Driver profile, the driving environment and smartphone use and characteristics. **Participants:** 40 participants with a valid driving licence (13 female). Age between 20 – 65 years. **Limitations:** Tests done in the exact same order.	Age significantly affected driving behaviour; older drivers tend to reduce their speed when using smartphones. The risk of collision increases for all age groups when using smartphones. Drivers tend to increase their speed during a phone conversation.	None specifically mentioned

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Lobo, A., Ferreira, S., & Couto, A. (2020). Exploring monitoring systems data for driver distraction and drowsiness research. *Sensors (Basel, Switzerland), 20*(14), 3836. doi:10.3390/s20143836	Portugal	Drowsiness Retrospective data	Field driving study **Aim:** Understand driver inattention using monitoring systems. **Measures:** Driver's profile and trip characteristics (e.g., driving time, average speed, and breaking time and frequency). **Conditions:** Drivers' historical travel data defined two groups with different mobility patterns (short-distance and long-distance drivers) through a cluster analysis. **Participants:** 330 drivers. **Limitations:** It was not possible to access to all the information including that used in the distraction and drowsiness classification algorithms. Some real-time data about the driver's physiological state and the characteristics of the road environment was lost.	Long-distance drivers, typically associated with professionals, are less prone to distraction and drowsiness than short-distance drivers. The driving time increases the probability of inattention, while the breaking frequency is more important to mitigate inattention than the breaking time. Higher average speeds increase the inattention risk, being associated with road facilities featuring a monotonous driving environment.	None specifically mentioned.
2020	Onate-Vega, D., Oviedo-Trespalacios, O., & King, M. J. (2020). How drivers adapt their behaviour to changes in task complexity: The role of secondary task demands and road environment factors. *Transportation Research. Part F, Traffic Psychology and Behaviour, 71,* 145-156. doi:10.1016/j.trf.2020.03.015	Australia	Task complexity Road environment	Driving simulator study **Aim:** Investigate the impact of different sources of task complexity such as driving demands and secondary task demands on driver behaviour. **Measures:** A variety of variables used to estimate driving behaviour. **Conditions:** Different sources of task complexity, including mobile phone use while driving (i.e., calling and texting) and different road environments (i.e., straight segments, curves, hills, tunnels, and curves on hills). **Participants:** 35 holders of a valid Australian driver's license (13 female). Mean age 22.9 years (18 - 29). **Limitations:** The simulation may lack the complexity present in real-life roads. Is specific to suburban roads in Queensland, Australia reducing generalisability.	The results indicated that drivers are likely to overcorrect position in the vehicle lane in the presence of pedestrians and oncoming traffic. The effect of road geometry on driver behaviour was found to be greater than the effect of mobile phone distraction. Curved roads and hills were found to significantly influence preferred speeds and lateral position. Drivers under visual-manual distraction had a higher standard deviation of speed and lateral position compared to the cognitive distraction and the non-distraction condition	Fuller's (2006) Task-Capability Interface (TCI).

Table B.4: Prevalence studies

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Dozza, M., Flannagan, C. A. C., & Sayer, J. R. (2015). Real-world effects of using a phone while driving on lateral and longitudinal control of vehicles. *Journal of Safety Research, 55,* 81-87. doi:10.1016/j.jsr.2015.09.005	USA	Lateral control Longitudinal control	Field driving study **Aim**: Assess the extent to which using a phone changes lateral or longitudinal control of a vehicle. **Measures**: Driving and video data. **Participants**: 91 drivers. 35 were 20-30, 34 were 40-50, and 22 were 60-70. **Limitations**: The field nature of the data, resulting in many variables not controlled. (b The IVBSS dataset were volunteers and drove mostly in a specific geographical location (southeast Michigan). (c) our analysis methodology depended on subjective evaluations.	Younger drivers: - are more likely to use a phone while driving than older and middle-aged drivers. - exhibited smaller safety margins while using a phone. - did not experience more severe lateral/ longitudinal threats than older and middle-aged drivers, probably because of faster reaction times. While manipulating the phone (i.e., dialling, texting), drivers exhibited larger lateral safety margins and experienced less severe lateral threats than while conversing on the phone. Longitudinal threats were more critical soon after phone interaction, suggesting that drivers terminate phone interactions when driving becomes more demanding.	None specifically mentioned.
2015	Farmer, C. M., Klauer, S. G., McClafferty, J. A., & Guo, F. (2015). Relationship of near-Crash/Crash risk to time spent on a cell phone while driving. *Traffic Injury Prevention, 16*(8), 792-800. doi:10.1080/15389588.2015.1019614	USA	Phone use Crash	Field driving study **Aim**: Examine the relationship between cell phone usage while driving and risk of a crash or near crash. **Measures**: Crashes, near crashes, times spent interacting with a cell phone. **Participants**: 105 drivers (66 male). Ages ranged from 18 to 68 (median age = 33). **Limitations**: Participants were not representative: young, high-mileage drivers, and metropolitan area. Crashes tend to be rare, necessitating the use of subjective near crashes as a surrogate.	Drivers in the study spent 11.7% of their driving time interacting with a cell phone, primarily: - talking on the phone (6.5%); or - simply holding the phone in their hand or lap (3.7%). The risk of a near-crash/crash event was approximately 17% higher when the driver was interacting with a cell phone. The amount of driving time spent interacting with a cell phone did not affect a driver's overall near-crash/crash risk. Drivers compensate somewhat for the distraction by conducting some of the more demanding tasks, such as reaching for or dialling a cell phone, at lower speeds.	None specifically mentioned

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Horsman, G., & Conniss, L. R. (2015). Investigating evidence of mobile phone usage by drivers in road traffic accidents. *Digital Investigation, 12*(1), S30-S37. doi:10.1016/j.diin.2015.01.008	UK	Mobile phone forensics Direct activity Passive activity	Phone forensics case study **Aim**: Provide an analysis of phone residual data sources and potential use. **Limitations**: Did not discuss possible manipulation/resistance to manipulation of files. Did not discuss current files' configuration staying unaltered in official updates/ new models.	CurrentPowerlog.powerlog and Android's buffer logs, can be retrieved for the purposes of identifying potential causal factors. Activity recorded in these areas could highlight a driver's direct or passive activity on their handset.	None specifically mentioned.
2015	Huisingh, C., Griffin, R., & McGwin, G., Jr. (2015). The prevalence of distraction among passenger vehicle drivers: A roadside observational approach. *Traffic Injury Prevention, 16*(2), 140-146. doi:10.1080/15389588.2014.916797	USA	Observational Roadside	Cross-sectional observational study **Aim**: Estimate the prevalence and characteristics of driver distraction. **Measures**: Any sources of distraction, driver characteristics (incl: the estimated age, gender and race), vehicle and traffic, road type **Limitations**: Each observation was made by an individual. These estimates reflect daytime driver distraction only, specifically during morning and lunch hour traffic a single county in Alabama and no randomisation.	The prevalence of distracted driving was 32.7%. Among those involved in a distracting activity, the most frequently observed distractions included: - interacting with another passenger (53.2%, where passengers were present), - talking on the phone (31.4%), - external-vehicle distractions (20.4%), - and texting/dialling a phone (16.6%). The prevalence of talking on the phone was higher among females than males (38.6% vs. 24.3%), whereas external vehicle distractions were higher among males than females (25.8% vs. 24.3%). Drivers <30 years were observed being engaged in any distracting activity the most frequently.	None specifically mentioned

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Huth, V., Sanchez, Y., & Brusque, C. (2015). Drivers' phone use at red traffic lights: A roadside observation study comparing calls and visual–manual interactions. *Accident Analysis and Prevention, 74,* 42-48. doi:10.1016/j.aap.2014.10.008	France	Traffic light Use strategy	Roadside cross-sectional observational study **Aim**: Investigate the existence of a phone use strategy at the red traffic light and to test its effectiveness. **Measures**: Phone use, a vehicle type, gender and estimated age category (< 30, 30-50, > 50), drivers' situation awareness, traffic light signal **Participants**: N=124 phone users and a corresponding control group of non-users were observed. **Limitations**: Human observers leading to possible inaccuracy. The taxonomy of phone uses remained relatively unspecific. The presence of observers could change the behaviour of drivers.	Strategic phone use behaviour was detected for visual-manual interactions. Visual-manual interactions, compared to calls, were more likely to be: - initiated at the red traffic light - tend to be stopped before the vehicle moves off Traffic light situations do not seem to allow effective application of phone use strategies, although drivers attempted to do so for the most demanding phone use mode	None specifically mentioned
2015	Kumfer, W., Wei, D., & Liu, H. (2015). Effects of demographic and driver factors on single-vehicle and multivehicle fatal crashes investigation with multinomial logistic regression. *Transportation Research Record, 2518*(2518), 37-45. doi:10.3141/2518-05	USA	Fatality Analysis Reporting System (FARS). Fatal crash	Cohort data analysis **Aim**: Seek to identify the driver behaviour and demographic factors that affected the likelihood of a multivehicle or single-vehicle fatal crash. **Measures**: Fatality Analysis Reporting System (FARS) data, (large number of variables). **Participants**: 15,096 cases. Fatality Analysis Reporting System (FARS) database for case listings from six states: California, Michigan, New York, North Carolina, Texas, and Washington. **Limitations**: Each model created produced different significant and contradictory models. Did not explore more/ solve.	Each model created produced different significant demographic or driver variables, many being unique or contradictory to the expected results of other research. Gender was significant only for the full and urban models and likely not an important variable for determining crash outcomes in rural areas. Distracted driving and failing to make avoidance manoeuvres were notably significant across various roadway types.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Prat, F., Planes, M., Gras, M. E., & Sullman, M. J. M. (2015). An observational study of driving distractions on urban roads in spain. *Accident Analysis and Prevention, 74,* 8-16. doi:10.1016/j.aap.2014.10.003	Spain	Cell phone Secondary tasks	Cross-sectional observational study **Aim**: Investigate the prevalence of driver engagement in secondary tasks and possible differences. **Measures**: Recording distracted behaviours, drivers' gender and approximate age group **Participants**: 6578 drivers were observed. **Limitations**: Difficulty in observing some secondary activities. The presence of passengers in the car was not recorded and thus could not be controlled for.	Nearly 20% of the drivers observed were engaged in some type of secondary task, with the most common being: - conversing with a passenger (11.1%), - smoking (3.7%) and - talking on a handheld mobile phone (1.3%). Younger drivers, and to a lesser extent middle-age drivers, were significantly more likely to be observed engaged in a technological distraction than older drivers. Non-technological distractions were significantly predicted by day of the week, time of the day and location.	None specifically mentioned.
2015	Sullman, M. J. M., Prat, F., & Tasci, D. K. (2015). A roadside study of observable driver distractions. *Traffic Injury Prevention, 16*(6), 552-557. doi:10.1080/15389588.2014.989319	UK	Cell phone Driver characteristics	Cross-sectional observational study **Aim**: Investigate the prevalence of observable distractions while driving and the effect of drivers' characteristics and time-related variables on their prevalence. **Measures**: The definitions of driver distractions. Observed driver distractions. **Participants**: 10,984 drivers observed at 4 randomly selected locations in St. Albans, UK. **Limitations**: Some distractions may have been underestimated, particularly those that are less conspicuous or drivers may have tried to hide. The estimation of age is subjective and based solely on physical appearance. All observations took place at St. Albans.	16.8% of drivers were engaged in a secondary task with the most common being: - talking to passengers (8.8%), - smoking (1.9%), and - talking on a hands-free mobile phone (1.7%). The overall pattern for age was that middle-aged and older drivers were less likely to be distracted than younger drivers.	None specifically selected.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Dingus, T. A., Guo, F., Lee, S., Antin, J. F., Perez, M. A., Buchanan-King, M., & Hankey, J. M. (2016). Driver crash risk factors and prevalence evaluation using naturalistic driving data. *Proceedings of the National Academy of Sciences - PNAS, 113*(10), 2636-2641. doi:10.1073/pnas.1513271113	USA	Crash lead-up Naturalistic driving Crash risk	Field driving study **Aim**: Evaluate risk factors during the seconds leading up to a crash. **Measures**: Forward roadway, driver's face, driver's interactions with the steering wheel, GPS, passive cabin alcohol presence, an incident push button. **Participants**: 3,542 (1,703 female drivers and 1,559 male drivers, 280 drivers chose not to provide gender information). **Limitations**: Participants may have forgotten to push the incident button. The long operation time means potential participants may not have joined due to participants: - believing they are poor drivers, or - did not value the area.	Drivers were engaging in distracting activities more than 50% of the time, resulting in a crash risk that is 2.0 times higher than model driving. Actively interacting with an adult or teenaged passenger is the most prevalent individual activity, but it has a relatively low associated risk. Interacting with a handheld cell phone occurs more than 6% of the time, with a risk that is 3.6 times higher than model driving. Driving while observably emotionally agitated increases the risk of a crash by 9.8 times.	None specifically mentioned.
2016	Eluru, N., & Yasmin, S. (2016). Disentangling the influence of cell phone usage in the dilemma zone: An econometric approach. *Accident Analysis and Prevention, 96,* 280-289. doi:10.1016/j.aap.2015.11.036	USA	Cell phone usage Dilemma zone	Driving simulator study (model development) **Aim**: Examine how cell phone use influences the driver manoeuvre decision at the intersection (stop or cross) and the eventual success of the manoeuvre. **Measures**: Driver characteristics, Cell phone attributes, and Driving attributes. **Participants**: 47% female. - Young (age 18–25): 37% - Middle-aged (age 30–45): 35% - Older (age 50–60): 27% **Limitations**: Little info on participants.	Stop/cross: under no call, the probability of crossing drops with higher distance and lower speeds. Stop failure: with increasing distance from the stop line, the risk of failure decreases at a much smaller rate for Call scenario within coming call being the most likely for failure compared to no call. Cross failure - the no-call scenario has the lowest failure rate. - the handheld scenarios with incoming and outgoing calls have increased failure to cross.	None specifically mentioned

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Rupp, M. A., McConnell, D. S., & Smither, J. A. (2016). Examining the relationship between action video game experience and performance in a distracted driving task. *Current Psychology, 35*(4), 527-539. doi:10.1007/s12144-015-9318-x	USA	Videogame playing	Cross-sectional study **Aim**: Assess the hypothesis that experienced action video game players will exhibit superior performance in a distracted driving task. **Conditions**: hours of action video gameplay. **Participants**: 36 adult males with normal or corrected to normal visual acuity, colour vision, and contrast sensitivity participated in the study. **Limitations**: There are likely real differences between experienced AVG players and non-players but inconsistencies in recruitment methods. Additionally, while our study was not a game training study and utilised action game experience as a subject variable.	Action video game experience was associated with: - fewer lane deviations during driving - fewer driving errors - recalling more details of the distracting conversation - reporting lower workload while driving Action video game experience was <u>not</u> associated with: - fewer lane deviations while distracted - better driving performance while distracted - improved cognitive ability	Self determination theory mentioned in the discussion
2016	Vollrath, M., Huemer, A. K., Teller, C., Likhacheva, A., & Fricke, J. (2016). Do German drivers use their smartphones safely?—Not really. *Accident Analysis and Prevention, 96,* 29-38. doi:10.1016/j.aap.2016.06.003	Germany	Situational influences Driver characteristics	Cross-sectional observational study **Aim**: Produce reliable data on driving distractions **Measures**: Four categories of distractions were looked for: Handheld phoning, Hands-free phoning, using the smartphone, eating/ drinking/ smoking. **Participants**: 11,837 drivers in three big German cities. **Limitations**: Sample significantly limited by location. Observations were only made in good weather conditions and mostly in daylight. Observations are in general also limited to secondary tasks that actually can be observed.	High rate of texting while driving was found (4.5%) compared to other international studies. There was some indication that drivers adapt their secondary task activities to the requirements of the driving task, however, these adaptations were not very strong.	None specifically mentioned

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	O'Connor, S. S., Shain, L. M., Whitehill, J. M., & Ebel, B. E. (2017). Measuring a conceptual model of the relationship between compulsive cell phone use, in-vehicle cell phone use, and motor vehicle crash. *Accident Analysis and Prevention, 99*(Pt A), 372-378. doi:10.1016/j.aap.2016.12.016	USA	Vehicle crashes Cell phone use	Cross-sectional survey **Aim**: Investigate a conceptual model regarding the direct and indirect effect of compulsive cell phone use and impulsive personality traits on crash risk. **Measures**: Inc: cell phone use, impulsivity, and history of motor vehicle crash. **Participants**: 307 students (59.63% female) enrolled in undergraduate psychology courses at a university in the southern United States. Mean age 19.43 years (SD = 2.58). **Limitations**: This study is limited to an undergraduate student population (significant generalisation problems). Data was reliant on self-report.	Anticipation of incoming cellular contacts (calls or texts) is associated with greater in-vehicle phone use but was not associated with increasing risk of previous motor vehicle crash. Greater in-vehicle cell phone use and impulsive traits are associated with elevated risk of motor vehicle crashes.	None specifically mentioned.
2017	Precht, L., Keinath, A., & Krems, J. F. (2017). Identifying the main factors contributing to driving errors and traffic violations – results from naturalistic driving data. *Transportation Research. Part F, Traffic Psychology and Behaviour, 49,* 49-92. doi:10.1016/j.trf.2017.06.002	Germany	Driver behaviour Naturalistic driving	Field driving study **Aim**: Investigate important variables contributing to driving errors and traffic violations. **Measures**: Recorded data consisted of driving parameters. In addition, video views forward, to the rear, on the driver's face, and on the dashboard were captured. **Participants**: The 38 drivers (18 female) were between 16 and 79 years of age. **Limitations**: Even though a large number of naturalistic driving segments was analysed, in terms of participants the sample size was relatively small.	The main factors associated with committed violations were: - anger, - passenger presence, and - persistent individual differences The main factors associated with errors were: - surprise, - high-risk visually distracting secondary tasks, and - the driving task demand of passing through an interchange were. Drivers considered the driving context, particularly when engaging in visually distracting secondary tasks.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Strayer, D. L., Cooper, J. M., Goethe, R. M., McCarty, M. M., Getty, D. J., & Biondi, F. (2017). Visual and cognitive demands of using in-vehicle infotainment systems.	USA		Field driving study **Aim**: Identify which task types are most distracting and what are the sources of distraction. **Measures**: Cognitive demand. The visual/manual demand. A subjective workload measure. Time it took to complete task. **Conditions**: The experimental design was a 4 (Task Type) X 3 (Modality of Interaction) X 30 (Vehicle) factorial **Participants**: 120 participants (54 female) with an age range of 21-36 years (M = 25). **Limitations**: Vehicles often provide more than one way to perform a task and there are often cross-modal interactions. This was not accounted for. Participants were instructed to do certain tasks whereas in the real-world settings, drivers choose if and when to do the tasks.	The audio entertainment In-Vehicle Information Systems (IVIS) task was found to be equivalent to the calling and dialling task type. Most demanding of all IVIS tasks was destination entry for navigation. Using voice-based commands to control IVIS functions resulted in low levels of visual demand. However, the benefits of reduced visual demand were offset by longer interaction times. Found large differences between vehicles in the overall demand of IVIS interactions.	
2018	French, M. T., & Gumus, G. (2018). Watch for motorcycles! the effects of texting and handheld bans on motorcyclist fatalities. *Social Science & Medicine* (1982), 216, 81-87. doi:10.1016/j.socscimed.2018.09.032	USA	Motorcycles Fatality Analysis Reporting System (FARS) State specific	Cross-sectional data analysis design **Aim**: Examine whether motorcyclists may be particularly vulnerable to the risks of distracted driving by others. **Measures**: State-specific characteristics, texting/handheld device laws, and other traffic policies **Participants**: State-specific traffic fatality data in the U.S. (2005–2015, N=550) **Limitations**: Omitted variables, such as state specific fines, police enforcement and cell phone use couldn't be controlled for.	Findings indicate that motorcyclists are at elevated risk of being a victim of distracted driving. The over representation is mainly by multiple-vehicle crashes (e.g., car hitting motorcycle) as opposed to single-vehicle crashes.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Gariazzo, C., Stafoggia, M., Bruzzone, S., Pelliccioni, A., & Forastiere, F. (2018). Association between mobile phone traffic volume and road crash fatalities: A population-based case-crossover study. *Accident Analysis and Prevention, 115,* 25-33. doi:10.1016/j.aap.2018.03.008	Italy	Cell phones Road crashes	Cross-sectional data analysis **Aim**: Assess the relationship between the use of mobile phones at population level and road crash fatalities in large urban areas. **Measures**: Data on road crashes with fatalities in seven Italian metropolitan areas and high resolution mobile phone traffic. **Limitations**: Slight erroneous identification of the crash time could cause a shift in the time slot containing the crash time. Lower mobile phone traffic in some areas leading to possible misclassifications.	Found positive associations with incremental risks between road crashes rates: - 5 calls/100 people (17.2%), - 3 text/100 people (8.4%), and - 40 connections/ 100 people (54.6%) Working days, night time and morning hours were associated with greater phone use and more road accidents. The relationship between mobile phone use and road fatalities at population level is strong.	None specifically mentioned
2018	Kujala, T., & Mäkelä, J. (2018). Naturalistic study on the usage of smartphone applications among Finnish drivers. *Accident Analysis and Prevention, 115,* 53-61. doi:10.1016/j.aap.2018.03.011	Finland	Smartphone Behavioural adaptation	Field driving study **Aim**: Identify how Finnish drivers use their smartphones while on the move. **Measures**: Times that they used their phones, the application used at the time of touch (calls excluded), road type, the location and driving speed. **Participants**: 30 participants. **Limitations**: The greatest limitation was that no data on the congestion traffic density was available. Some inaccuracies to the touch data. Little participant data.	Drivers produced more touches per hour on urban roads, yet the use instances tend to be shorter than on the highway or main roads. By far the highest overall rankings in the number of drivers using, number of uses, and duration per use instance was associated with the WhatsApp messaging service. The findings suggest that the Finnish smartphone heavy users do not decrease their phone use when the demands of the traffic conditions increase.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Li, L., Shults, R. A., Andridge, R. R., Yellman, M. A., Xiang, H., & Zhu, M. (2018). Texting/Emailing while driving among high school students in 35 states, united states, 2015. J*ournal of Adolescent Health, 63*(6), 701-708. doi:10.1016/j.jadohealth.2018.06.010	USA	Cell phone use Teen driving	Cross-sectional or cohort **Aim**: Determine the prevalence and explore individual-and state-level factors associated with texting/emailing while driving (TWD) among adolescent drivers in the United States. **Measures**: The 2015 state Youth Risk Behaviour Survey **Participants**: 195,236 students aged >= 14 years from the 35 participating states. Female 98,722 (49%) 14 year olds: 30,922 (13%) 15 year olds: 52,769 (26%) 16 year olds: 51,363 (25%) 17 year olds: 43,317 (23%) >18 year olds: 16,865 (13%) **Limitations**: 22% of observations were missing data for one or more of the study variables Did not assess cell phone access or ownership. Self-reported.	38% reported texting/emailing while driving (TWD) at least once. TWD prevalence was higher in states with a lower minimum learner's permit age and in states where a larger percentage of students drove. TWD increased substantially with age, and - white students were more likely to engage in TWD than students of all other races/ethnicities. - infrequent seat belt users compared with frequent seat belt users - students who reported drinking and driving	None specifically mentioned.
2018	Owens, J. M., Dingus, T. A., Guo, F., Fang, Y., Perez, M. A., & McClafferty, J. A., (2018). Crash risk of cell phone use while driving: a case-crossover analysis of naturalistic driving data.	Australia	Cell phone use Crash risk	Field driving study (SHRP 2 NDS) **Aim**: Investigate the relationship between cell phone use and crash risk. **Measures**: Driving was monitored using in-vehicle video and other data collection equipment. **Participants**: Data from the Second Strategic Highway Research Program Naturalistic Driving Study. **Limitations**: Data baselines resulted in low statistical power for several comparisons. Oversampled younger and older drivers. Few crashes for analysis.	Visual-manual tasks overall and texting in particular were associated with significantly elevated incidence of crash involvement relative to driving without performing any observable secondary tasks. The increase in the incidence of crash involvement associated with visual-manual tasks was greater for crashes in free-flow traffic conditions and in types of crashes in which the subject driver generally played a clear role than for all crash types taken together.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Parnell, K. J., Stanton, N. A., & Plant, K. L. (2018). What technologies do people engage with while driving and why? *Accident Analysis and Prevention, 111,* 222-237. doi:10.1016/j.aap.2017.12.004	UK	Texting while driving In-vehicle technology	Cross-sectional interview and online survey **Aim**: Identify drivers' self-reported likelihood of engaging with technologies that are now commonly found in modern automobiles. **Measures**: A semi-structured interview allowed drivers to discuss the factors that influence their decision to engage with a variety of different technologies. Online survey asked the drivers' knowledge, tendencies and interpretation of driver distraction and the laws surrounding it. **Participants**: Interviewed 30 (15 female) licensed UK drivers were recruited equally across three age categories (18–30yrs, 31–49yrs, 50–65yrs). 206 (118 female) participants completed the online survey. **Limitations**: Limited sample in the semi-structured interview. All data was self-reported.	Younger drivers and the middle age male group reported themselves to be more likely to engage with technologies while driving than the older age group. Reading text messages was a task more than other handheld mobile phone tasks. - Largely done in a reactionary way (alerted to the text encouraging them to read the text or see who it is from). - Fixing phones for satnav use increased reactionary temptation. Drivers of all age groups tended to report that they are more likely to engage with technologies when stopped at a junction and generally perceived the consequences of their actions to be reduced if they were not performing the act of 'driving'.	Thematic framework developed by Parnell et al. (2018) [Parnell, K.J., Stanton, N.A., Plant, K.L., 2018. Creating the environment for driver distraction: a thematic framework of sociotechnical factors. Appl. Ergon. 68, 213–228.]
2018	Rudisill, T. M., Chu, H., & Zhu, M. (2018). Cell phone use while driving laws and motor vehicle driver fatalities: Differences in population subgroups and location. *Annals of Epidemiology, 28*(10), 730-735. doi:10.1016/j.annepidem.2018.07.015	USA	Fatal outcome Legislation	Cohort data analysis **Aim**: Examine possible factors which moderate the cell phone driving laws association with driver fatalities. **Measures**: State law and policy characteristics inc phone driving laws. Driver fatality counts by state-quarter year. Individuals involved characteristics. **Limitations**: Although this study did control for numerous confounders, there are many others that could not be accounted for. The study design did not permit causal relationships to be determined.	Universal handheld calling bans were associated with: - 10% lower none alcohol-related driver fatalities overall and - up to 13% lower fatalities across all age groups and sexes. Universal texting bans were not associated with lower fatalities overall or for any demographic group. Concluded: Universal handheld calling bans may benefit more types of drivers compared to texting bans.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	White, D. R., Hepworth, D. P., & Zidar, M. S. (2018). Texting and driving: Is it just moral panic? *Deviant Behavior, 39*(11), 1387-1397. doi:10.1080/01639625.2018.1479915	USA	Cell-phone use	Cohort data analysis **Aim**: Examine 11 years of crash data from Kentucky. **Measures**: Contributing human factors category from the database (includes cell-phone use). **Participants**: The Kentucky State Police's open source crash data. **Limitations**: Limited to Kentucky. Data is relying on the word of the driver at fault to describe the events leading up to the collision.	Cell phones are reported as a contributing factor in about 1% of all crashes. Despite the exponential growth of cell phones in American culture, cell phone-related crashes have remained stable over time. The study concludes the cell phone use focus is largely a moral panic.	Moral panic theory Goode and Ben-Yehuda (2009) [Goode, Erich and Nachman Ben-Yehuda. 2009. Moral Panics: The Social Construction of Deviance. Malden, MA: John Wiley and Sons.]
2018	Woods-Fry, H., Vanlaar, W. G. M., Robertson, R. D., Torfs, K., Kim, W., Van den Berghe, W., & Meesmann, U. (2018). Comparison of self-declared mobile use while driving in Canada, the United States, and Europe: Results from the European survey of road users' safety attitudes. *Transportation Research Record, 2672*(37), 74-83. doi:10.1177/0361198118787631	Data from Canada, the United States, and Europe	Handheld mobile E-Survey of Road Users' Attitudes	Cross-sectional data analysis **Aim**: Increase the available knowledge by comparing rates of self-reported handheld mobile use behaviours while driving from three different regions (Canada, the United States, and Europe). **Measures**: Self-declared mobile use personal acceptability, and attitudes toward mobile use while driving through the E-Survey of Road Users' Attitudes (ESRA 1). **Participants**: 1,059 Canadian participants (547). 1,075 American participants (562). 21,184 European participants (10,571) **Limitations**: Self-reported data	Both self-declared behaviours were the lowest in Canada. U.S. drivers' personal acceptability, attitudes, and support for zero-tolerance measures had a significant effect on their self-declared rates of handheld mobile use while driving. Across all regions, a common social phenomenon known as the bandwagon effect was found, as those who agreed that almost all car drivers occasionally talk on a handheld mobile while driving were 2.41 times more likely to report doing so themselves.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Basch, C. H., MacLean, S. A., & Garcia, P. (2019;). Attitudes and behaviors related to distracted driving in college students: A need for interventions in adolescence. *International Journal of Adolescent Medicine and Health, 31*(5) doi:10.1515/ijamh-2017-0069	USA	College students Technology use	Cross-sectional survey. **Aim**: Describe distracted driving behaviours among college students, with a specific focus on attitudes towards and use of social media. **Measures**: (1) basic demographic information. (2) frequency of behaviours during and attitudes towards driving. (3) attitudes towards various statements about safety and risk. **Participants**: 324 students, (60.2% female), aged 71.0% 18–20 years 90.4% reported having a driver's license. **Limitations**: Self-reporting of behaviours. Did not reveal the breakdown of majors other than health. Did not control for student background.	Among students with a driver's license, 95.2% reported engaging in distracted driving behaviours. While driving, it was common for students to: - make or answer phone calls (72.0%), - review or send text messages (54.6%), or - glance at or read automatic notifications (43.3%). - glance at, read, or post to social media while driving (30.7%) Almost all students (91.5%) reported that they believed a hands-free solution is safer than holding the phone while driving, but only 67.9% reported that they usually used a hands-free device.	None specifically mentioned.
2019	Beck, H., McManus, B., Stavrinos, D., & Transportation Research Board. (2019). *Adolescent Distracted Driving Attitudes Influenced by Experience and Individual Differences.* Paper presented at the Transportation Research Board 98th Annual Meeting, Washington DC, United States. [Abstract only]	USA	Adolescent drivers Acceptability	Cross-sectional survey. **Aim**: Examine the attitudes of adolescent drivers about distracted driving and associated issues **Participants**: 302 adolescents (58% female). Mean age = 16.15, (SD = 0.72). 98.3% reported having received a driving permit and 23.8% had received a driver's license.	Accepting handheld phone use increased by 4.7% for every additional month since driving permit acquisition Males believed they were better at texting while driving and multitasking, Higher sensation seeking was associated with acceptance of distracted driving behaviours.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Fatmi, M. R., & Habib, M. A. (2019). Modeling vehicle collision injury severity involving distracted driving: Assessing the effects of land use and built environment. T*ransportation Research Record, 2673*(7), 181-191. doi:10.1177/0361198119849060	Canada	Injury severity Collisions	Cohort data analysis **Aim**: Examine the vehicle occupant injury severity model, particularly focusing on the collisions involving distracted driving **Measures**: Individuals' characteristics, collision characteristics, distraction types, environmental factors, and built environment attributes. **Participants/Data**: The database includes all police-reported collisions that occurred between 2007 and 2011 in the province of Nova Scotia, Canada. **Limitations**: Possible uncontrolled correlations at the macro-level unintentionally. This study does not consider correlations among multiple victims involved in one collision.	Vehicle occupant injury severity was aggravated by: - rain, - curved road, - freeway, - mid-block collisions, - distraction because of inattentiveness, - driver distraction by communication device at a curved road intersection. vehicle occupant injury severity was mitigated by: -higher land use mix, -longer length of sidewalk, and -higher population density mitigate injury severity. Significant heterogeneity is found across the high- and low-risk segments. For instance, straight road alignment is found to yield higher injury severity in the high-risk segment and lower severity in the low-risk segment.	Many driving models mentioned in introduction but not discussed to significant degrees.
2019	Foreman, A. M., Hayashi, Y., Friedel, J. E., & Wirth, O. (2019). Social distance and texting while driving: A behavioral economic analysis of social discounting. *Traffic Injury Prevention, 20*(7), 702-707. doi:10.1080/15389588.2019.1636233	USA	Texting while driving Social discounting Impulsivity	Cross-sectional survey **Aim**: Examine how the relationship of the sender to the driver may affect the decision to text while driving. **Measures**: Their age, gender, years of higher education, years of driving, and whether they had a valid driver's license. Frequency of cell phone use while driving **Participants**: (N = 94) undergraduate students (34 female) who were enrolled in introductory psychology courses. Mean age = 20.0 (SD = 2.9). **Limitations**: Generalisation issues due to sample Data was self-reported.	Participants were more likely to text while driving as the social distance of the sender decreased and the delay to the destination increased. The findings indicate that social distance of the sender is an important factor involved in the decision to text while driving.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Le, B., Figueroa, C., Anderson, C., Lotfipour, S., & Barrios, C. (2019). Determining the incidence of distraction among trauma patients in all modes of transportation. *The Journal of Trauma and Acute Care Surgery, 87*(1), 87-91. doi:10.1097/TA.0000000000002293	USA	Pedestrian distraction Vehicle collision	Cohort data analysis **Aim**: Examine whether distraction is more highly prevalent and widely distributed among all mechanisms of injury and variety of trauma patients. **Measures**: Time of event was performed, examining age, sex, ethnicity, education level, mode of injury and role in the accident (driver, passenger, pedestrian, bicyclist, motorcyclist). **Participants**: 1,316 patients (511 female). 18–24: 284 25–34: 298 35–44: 187 45–64: 317 65 <: 154 **Limitations**: This project was conducted at one medical centre. A number of non-responders unable to complete the survey due to injuries. Self-reported.	The prevalence of distraction was: - 21.73% among drivers, - 9.01% among passengers, - 16.50% among pedestrians, - 20.00% among bicyclists, and - 8.09% among motorcyclists. Significantly increased risk of distraction were found for: - Males as well as all Others gender categories, - Asian/Pacific Islanders trended toward being at greater risk for distraction. - Non-Motorcyclists	None specifically mentioned.
2019	Oviedo-Trespalacios, O., Nandavar, S., Newton, J. D. A., Demant, D., & Phillips, J. G. (2019). Problematic use of mobile phones in Australia…is it getting worse? Frontiers in Psychiatry, 10, 105-105. doi:10.3389/fpsyt.2019.00105	Australia	Internet addiction Cell phone	Longitudinal/ follow up study. **Aim**: Investigate the current problem mobile phone use in Australia and its trends. **Measures**: 27-item Mobile Phone Problem Use Scale. MPPUS assess symptoms of behavioural and technological addiction such as issues of tolerance, escaping from problems, withdrawal, craving, and negative life consequences. **Participants**: 709 participants (344 females). Ages between 18 – 83. **Limitations**: Self-reported. Unequal age and gender distributions.	Problem mobile phone use in Australia increased from the first data collected in 2005. In addition, meaningful differences were found, with females and users in the 18–25 year-old age group showing higher mean Mobile Phone Problem Use Scale (MPPUS) scores. Participants who reported high levels of problem mobile phone use, also reported handheld and hands-free mobile phone use while driving.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Sundfør, H. B., Sagberg, F., & Høye, A. (2019). Inattention and distraction in fatal road crashes – Results from in-depth crash investigations in Norway. *Accident Analysis and Prevention, 125,* 152-157. doi:10.1016/j.aap.2019.02.004	Norway	Fatal road crashes Vulnerable road users (VRU)	Crash database analysis. **Aim**: Conduct a comprehensive mapping of the types of inattention that contribute to fatal road crashes **Measures**: Data from in-depth investigations of all fatal road crashes in Norway between 2011 and 2015 conducted by crash investigation teams of the Norwegian Public Roads Administration. **Limitations**: In many cases, it was difficult to assess the type of inattention being present in a crash. Information about pre-crash driver behaviour may be insufficient for drawing firm conclusion.	Inattention among at-fault drivers of motor vehicles was found to contribute to almost one out of three fatal road crashes with: - About one-third involved pedestrians who were hit by motor vehicles. - Failure to check for information in blind spots or behind other sight obstructions. - Distraction by use of mobile phones (2-4%)	Some current models of driver inattention include expectancy among the factors that determine attention. For example, Regan and Strayer (2014) describe "driver neglected attention" as a result of "faulty expectations about the driving situation" (p. 6).
2020	Ismaeel, R., Hibberd, D., Carsten, O., & Jamson, S. (2020). Do drivers self-regulate their engagement in secondary tasks at intersections? an examination based on naturalistic driving data. *Accident Analysis and Prevention, 137,* 105464-105464. doi:10.1016/j.aap.2020.105464	UK, data from (UK, Germany, France, Poland and the Netherlands)	Self-regulation Intersections Secondary tasks	Field driving study **Aim**: Explore the prevalence and characteristics of engagement in secondary tasks whilst driving through intersection. **Measures**: Video recordings of in-vehicle and external scenes were coded for precisely defined categories of secondary tasks and related contextual variables. **Participants**: 163 participants (78 female). Age mean 43.9 (SD = 13.1, 18 – 80). Distributed across five countries (the UK, Germany, France, Poland and the Netherlands). **Limitations**: Sample didn't constitute a representative sample. Sample size of intersection cases within each driver was small (10 intersections per driver).	Nearly one-quarter of the total driving time at intersections was spent on secondary activities. Drivers were less likely to occupy themselves with secondary tasks when their vehicles were moving than when they were stationary. Elderly drivers showed less inclination to perform secondary tasks than did younger drivers. Lastly, drivers tended to perform secondary tasks less frequently: - at intersections managed by traffic signs than those controlled by traffic lights - when they did not have priority compared to when they had priority - in adverse weather conditions compared to fine weather conditions	None specifically mentioned.

Table B.5: Professional and fleet drivers

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2015	Fitch, G. M., Hanowski, R. J., & Guo, F. (2015). The Risk of a Safety-Critical Event Associated with Mobile Device Use in Specific Driving Contexts. *Traffic Injury Prevention, 16*(2), 124-132. doi:10.1080/15389588.2014.923566	USA	Professional drivers Mobile phones	Naturalistic driving study **Aim:** Explore drivers' mobile phone use in specific driving contexts. **Conditions:** Safety critical events (SCEs) across a range of driving contexts. **Measures:** 6s window (before, during, and after SCE) of video and sensor data, comparison between professional drivers and non-professional light vehicle drivers. **Participants:** 2 existing datasets of SCEs. **Limitations:** There were relatively few videos of texting and dialling, potentially exaggerating findings.	Visual-manual tasks (texting and dialling) increase crash risk. Commercial drivers regulated visual/manual subtasks more than light vehicle drivers. Phone conversations are not associated with increased crash risk for either professional or light vehicle drivers. Most drivers decrease speed to compensate for extra cognitive tasks.	None specifically mentioned.
2015	James, S. M. (2015). Distracted driving impairs police patrol officer driving performance. *Policing: An International Journal of Police Strategies & Management, 38*(3), 505-516. doi:10.1108/pijpsm-03-2015-0030	USA	Professional drivers HMI	Driving simulator study **Aim:** Examine the impact of a text-based distraction task on driving performance. **Conditions:** Fatigued versus non-fatigue. **Task:** Follow a lead vehicle while interacting with Mobile Data Computer (MDC). **Measures:** Lane deviation, lane departure, breaking latency, distance from lead vehicle/collisions **Participants:** 80 police officers. **Limitations:** None mentioned.	Police officers are mostly exempt from distracted driving restrictions. Distraction tasks degrade driving performance. Authors argue police policies, practices, training, and technologies should be adjusted. Failure to adjust practice could result in charges of deliberate indifference and legal liabilities. Limitations: simulator studies provide relative rather than absolute validity which could compromise results.	None specifically mentioned.
2015	Swedler, D. I., Pollack, K. M., & Gielen, A. C. (2015). Understanding commercial truck drivers' decision-making process concerning distracted driving. *Accident Analysis and Prevention, 78,* 20-28. doi:10.1016/j.aap.2015.02.004	USA	Professional drivers HMI Mobile phone	Mixed method research **Aim:** Explore personal and workplace factors that affect truck drivers' distracted driving behaviours. **Conditions:** Self-report surveys. **Measures:** Thematic analysis. **Participants:** 277 truck drivers surveys, 11 interviews (supervisors/managers). **Limitations:** Only surveyed employed truck drivers, small sample size, recall bias.	Results suggest that supervisors, cultural norms, and workforce attitudes are influential in influencing intentions to engage with work related HMI. Authors suggest workplace policies could be expanded to also target intentions to use mobile phones for private use while driving. Qualitative methods provide nuanced examination of factors that influence decision making at both organisational (supervisors) and operational levels (truck drivers).	Theory of planned behaviour

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2015	Wehr, K. (2015). Agency culture and the banality of risk. *Policing: An International Journal, 38*(3), 539-562. doi:10.1108/PIJPSM-03-2015-0025	USA	Professional drivers HMI Mobile phone	Qualitative research **Aim:** Investigate the role of agency culture, training, and supervision play in safety related behaviours. **Conditions:** Self-report questionnaires **Measures:** Thematic analysis **Participants:** 107 police officer and field training officers (FTO) **Limitations:** Small sample of agencies, officers.	Findings suggests police officers' behaviour is subject to *path dependency* - i.e., established work processes, technology (e.g., MDCs), and 'Code 2' culture. Code 2 is an inferred unsanctioned behavioural norm regarding risky behaviours, like driving distracted, fatigued or speeding. The authors argue that change is possible through leadership and concerted effort.	Sociological examination of culture
2016	Harland, K. K., Carney, C., & McGehee, D. V. (2016). Analysis of naturalistic driving videos of fleet services drivers to estimate driver error and potentially distracting behaviors as risk factors for rear-end versus angle crashes. *Traffic Injury Prevention, 17*(5), 465-471. doi:10.1080/15389588.2015.1118655	USA	Professional drivers Multitasking	Naturalist driving study **Aim:** Investigate the prevalence of fleet driver errors prior to crash. **Conditions:** 247 crash videos were reviewed and coded. **Measures:** Environmental conditions, driver age, driver error, driver behaviour, eyes off the road, type of crash. **Limitations:** Only event triggered data was recorded (no baseline data). Speed was not evaluated.	Results suggest environmental factors were not significant. The most common driver errors are inadequate surveillance (71.2%) and distraction or inattention (50.2%). Rear-end crashes are more common than angle crashes. Results differ from previous studies. Authors suggest before and after videos provide more nuanced accounts regarding behavioural and environmental factors.	None specifically mentioned.
2016	National Road Safety Partnership Program. (2016). *A guide to developing an effective policy for mobile phone use in vehicles.* Retrieved from: https://s3-ap-southeast-2.amazonaws.com/cdn-nrspp/wp-content/uploads/sites/4/2017/03/29173432/2374-ARRB-NRSPP_Policy_Guide-FA4.pdf	Australia	Professional drivers	Guide - mobile phone use policy Resource for private and public organisations whose employees use motor vehicles for work purposes. Academic and grey literature, policy template and survey tools.	NRSPP is an Australian partnership of road safety and industry organisations who publish resources on the topic of road safety. The Guide provides organisations with a template Mobile Phone Use Policy.	None specifically mentioned.
2016	Stavrinos, D., Heaton, K., Welburn, S. C., McManus, B., Griffin, R., & Fine, P. R. (2016). Commercial Truck Driver Health and Safety: Exploring Distracted Driving Performance and Self-Reported Driving Skill. *Workplace Health & Safety, 64*(8), 369-376. doi:10.1177/2165079915620202	USA	Professional drivers Mobile phones Mental conditions	Driving simulator study, self-report questionnaires **Aim:** Examine effects of phone use, texting, email, and self-optimism bias of commercial truck drivers. **Conditions:** Series of secondary tasks and baseline (control) scenarios. **Measures:** Demographic profiling, lane deviations, off-road eye glances **Participants:** 50 commercial truck drivers. **Limitations:** Small sample size, laboratory rather than real-world conditions, technological restriction.	Optimism bias (overestimating skill level) was positively associated with more speeding, lane deviations, eye glances off the road, and total violations when compared to participants who rated themselves as 'somewhat skilled'. Texting and emailing result in higher rates of lane deviation than baseline or other dual tasks. Cell phone conversations have lower 'eyes of the road' scores than emailing or texting.	Optimism bias

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2016	Thompson, J., Baldock, M., Raftery, S., Mackenzie, J., Wall, J., & Iwanski, K. (2016). *The Transport for New South Wales FleetCAT (Fleet Collision Avoidance Technology) Trial: drivers attitudes to the technology.* Paper presented at the Australasian Road Safety Conference, Canberra, Australia.	Australia	Professional drivers HMI	Naturalistic driving study, participant questionnaires **Aim:** Trial of driver assistance system **Conditions:** Naturalistic work driving under three, 3-month conditions (1) baseline/no warnings (2) active (3) no warnings> **Measures:** Mobileye 560 CAT system driver log and results from self-report questionnaire. **Participants:** 122 truck drivers **Limitations:** Small sample of government employees (not generalisable)>	A majority of participants said Mobileye driver assist system had potential to reduce likelihood of a crash for other drivers but not for themselves. A majority of participants also felt Mobileye was distracting and would not use it. The authors hypothesise this is an example of optimism bias.	Optimism bias
2016	Zohar, D., & Lee, J. (2016). Testing the effects of safety climate and disruptive children behavior on school bus drivers performance: A multilevel model. *Accident Analysis and Prevention, 95,* 116-124. doi:10.1016/j.aap.2016.06.016	Israel	Professional drivers Contextual factors	Naturalistic driving study and questionnaires **Aim:** Test work safety climate on bus driver driving behaviours. **Conditions:** Naturalistic school bus driving. **Measures:** Video data from inner and outer bus cameras, thematic analysis of questionnaires. **Participants:** 474 school bus drivers **Limitations:** Small sample, not all buses were equipped with cameras, limited cultural setting (results may differ in other regions/countries).	Results showed that a higher-level safety climate mitigated against the effect of driver distraction (disruptive behaviour from children). The authors note that a strong safety climate relies on regular social interaction and shared values. Shared values, in turn, are often implemented through organisational safety policies.	Psychosocial safety climate theory
2017	Jonasson, L.-L., Holgersson, A., Nytomt, M., & Josefsson, K. (2017). Preconditions for district nurses' telephone counselling during call-time in municipal home care: An observational study. *Nordic Journal of Nursing Research, 37*(1), 12-19. doi:10.1177/2057158516658810	Sweden	Professional driver Contextual factors	Observational qualitative content analysis. **Measures:** Inductive thematic analysis, observation. **Participants:** 7 district nurses (DN). **Limitations:** Study cannot be replicated easily.	DNS work across many contexts. Mobile phone use is the primary work tool. Cars are used to travel between clients' homes. DN take calls while driving and also engage in other visual/manual/cognitive tasks while driving. Professional ethics (values) inform work practice. Technology can facilitate practice but also poses threats (risks) to safety. Urgent policy changes are needed to regulate phone counselling when driving cars.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2018	Hsiao, H., Chang, J., & Simeonov, P. (2018). Preventing Emergency Vehicle Crashes: Status and Challenges of Human Factors Issues. *Human factors, 60*(7), 1048-1072. doi:10.1177/0018720818786132	USA	Professional drivers Contextual factors	Academic and grey literature review Fields: Police and law enforcement Fire and rescue Medical The review identified risk factors, control measures, and challenges for emergency driving (ED).	Emergency vehicles are given a 'code 3 running' option (permitted to exceed speed limits, cross stop sign and red lights, use of sirens and warning lights). Risk factors are divided into four categories: driver, vehicle, task, environment and other contextual factors (e.g., laws). Age and gender do not appear to influence risky driving behaviours for ED. Driver overconfidence and 'code 3 running' thinking intensified risky behaviour. Large and heavy vehicles are overrepresented in single vehicle crashes. Task related time pressures is associated with risky driving as is dual/multitasking involving HMI and phones. Traffic complexity, low light environments, and high-speed limits are risk factors for ED.	None specifically mentioned.
2018	Iseland, T., Johansson, E., Skoog, S., & Dåderman, A. M. (2018). An exploratory study of long-haul truck drivers' secondary tasks and reasons for performing them. *Accident Analysis and Prevention, 117,* 154-163. doi:10.1016/j.aap.2018.04.010	Sweden	Professional drivers Multitask Mental conditions	Naturalistic driving study, semi-structured interviews, questionnaires/scales **Aim:** Investigate long haul truck drivers secondary task behaviours, rationale for doing so and associated psychological factors. **Conditions:** overt observations of normal driving. **Measures:** Video and voice recorder during drive, thematic analysis of questionnaires, video and voice recordings. **Participants:** 13 long haul truck drivers. **Limitations:** Observational study may lead to misleading representation of secondary tasks.	Multitasking included personal necessities (e.g., eating and drinking) 33.3%, mobile phone use 25.6%, interaction with vehicle technology 22%, administrative tasks (e.g., paperwork) 7.4%, and other 11%. Reasons for multitasking were boredom and need for social interaction. Drivers said they performed secondary tasks when it was safe to do so. Secondary tasks were used as 'attention enhancers' to relieve fatigue or boredom.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2018	Zahabi, M., & Kaber, D. (2018). Effect of police mobile computer terminal interface design on officer driving distraction. *Applied ergonomics, 67,* 26-38. doi:10.1016/j.apergo.2017.09.006	USA	Professional drivers	Driving simulator study **Aim:** Assess visual behaviour, performance, workload and situation awareness of police officers using MCTs. **Conditions:** MCT design type - standard and enhanced. Enhanced was a significantly simplified design. Hazard exposure- plate number check. **Measures:** Driver performance, eye-tracking, secondary-task time, level of awareness, perceived workload **Participants:** 20 police officers **Limitations:** Simulation does not provide realistic driving scenarios.	Different MCT designs (standard and enhanced) showed no difference in lane deviation or brake time. However, eye tracking measures and secondary task completion time was significant lower in the enhanced MCT condition. Situation awareness showed no significant difference under the two MCT designs. Overall perceived workload was similar across both designs. However, perceived temporal demand (time to perform task) was lower for the enhanced MCT.	None specifically mentioned.
2018	Zahabi, M., & Kaber, D. (2018). Identification of task demands and usability issues in police use of mobile computing terminals. *Applied ergonomics, 66*, 161-171. doi:10.1016/j.apergo.2017.08.013	USA	Professional drivers Multitask HMI	Mixed method research, GOMS analysis, decision tree analysis, heuristic evaluation **Aim:** Identify perceived importance and frequency of mobile computer terminal (MCT) tasks. **Conditions:** MCT tasks **Measures:** Structured field interviews, ‘think aloud’ task observations. followed by hierarchical task analysis. **Participants:** 5 police officers. **Limitations:** Small sample, small number of MCT tasks.	Results revealed MCTs were the most important and frequently used in-vehicle technology. MCTs were the most cognitively demanding secondary task. Many visual/manual/cognitive tasks including scrolling through pages, long term memory tasks, and text input. The authors developed an alternative, simplified MCT design that substantially reduces the visual/manual/cognitive load.	None specifically mentioned.
2019	Claveria, J. B., Hernandez, S., Anderson, J. C., & Jessup, E. L. (2019). Understanding truck driver behavior with respect to cell phone use and vehicle operation. *Transportation Research Part F-Traffic Psychology and Behaviour, 65*, 389-401. doi:10.1016/j.trf.2019.07.010	USA	Professional drivers Contextual factors	Online survey and binary logit modelling framework (binary logistic regression model) **Aim:** Understand factors that influence truck drivers’ decisions to use mobile devices while driving. **Conditions:** Stated-preference survey including sociodemographic factors. **Measures:** Random parameters binary logit model to determine predictive factors. **Participants:** 515 truck drivers **Limitations:** Self-report study may not reflect actual factors.	Findings suggest young, single truck drivers are more likely than older driver to use mobile phones will driving. Higher incomes and previous crash history also increase the likelihood of mobile phone use while driving. Time management strategies (e.g., planning a route in advance and assessing where to park) reduce the occurrence of mobile phone use while driving Management policies like restricting driving hours and mandated rest stops decrease mobile phone use. Likewise, individuals who received safety training were less inclined to use mobile phones while driving. Limitations: self-report surveys may not reflect actual practice	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Behavioural theories/ models/ frameworks
2020	Hammond, R. L., Soccolich, S. A., & Hanowski, R. J. (2019). The impact of driver distraction in tractor-trailers and motorcoach buses. *Accident Analysis and Prevention, 126,* 10-16. doi:10.1016/j.aap.2018.03.015	USA	Professional drivers HMI Mobile phones	Comparison of two previous naturalistic driving studies (Olson et al 2009, Hammond et al 2016) Pre, during, and post SCE analysis **Aim:** Compare driving distracted behaviour of truck drivers and motorcoach drivers. **Measures:** Non-driving and driving related secondary tasks, driving behaviours (e.g., eyes of the road). **Participants:** 203 heavy truck drivers and 65 bus drivers. **Limitations:** Neither studies measured mobile phone use.	Bus drivers engaged in less distracting behaviours than truck drivers. This could be explained by the introduction of mobile phone bans in 2009. Truck drivers recorded more technology based secondary tasks than bus drivers. However, truck drivers use more computer-based devices – e.g. dispatch systems, calculators and cell phones. Bus drivers only use intercom systems to interact with passengers. Length of time 'eyes of the road' measures resulted in similar lane deviations for both truck drivers and bus drivers.	None specifically mentioned.
2020	Lenne, M. G., Kuo, J., Fitzharris, M., Horberry, T., Mulvihill, C., Blay, K., Wood, D., & O'Connell, A. (2019*). Developing Real-Time Solutions for Driver Drowsiness and Distraction Using a World-Leading Driver Behaviour Dataset.* Paper presented in the 41st Australasian Transport Research Forum (ATRF), Canberra, Australia.	Australia	Professional drivers HMI DAS	Research program collaboration between MUARC, Seeing Machines, the Australian Government, Ron Finemore Transport, and Volvo Group Australia. Data analytics, high fidelity simulator study, naturalistic truck driving study, advanced driver monitoring systems (DMSs).	Stages of research are outlined See Mike Lenne video at https://youtu.be/gJA88Z2NR34 Mike announces that Seeing Machines DMS systems are now part of the European Commission's new standard for heavy vehicle fleets and full NCAP ratings for new cars.	None specifically mentioned.
2020	Zahabi, M., Pankok, C., Jr., & Park, J. (2020). Human factors in police mobile computer terminals: A systematic review and survey of recent literature, guideline formulation, and future research directions. *Applied ergonomics, 84,* 14. doi:10.1016/j.apergo.2019.103041	USA	Professional drivers	Systematic review of the literature, online survey of police officers **Aim:** Identify mobile computer terminals (MCTs) human factor issues, design guidelines for enhanced MCT, identify areas for future research. 36 studies were included. **Participants:** 81 police officers. **Limitations:** Only police officers were surveyed. Future studies could include other emergency responder groups. Single officer patrol situation may not be the standard work practice, future studies should include dyads or teams.	Literature review found that MCT improved police officer productivity, however it had no beneficial effect on crime prevention and strategic planning. Several studies found that MCT use decreased police officer's physical comfort (biomechanical issues). The majority of concerns were related to the location of MCT. A majority of the studies found that MCT significantly increased driver distraction. Literature review informed the development of guidelines to improve MCT design. Proposed features include low clutter displays and the development of augmented reality heads-up-displays (AR-HUDs) or wearable devices like Google Glass. Survey results demonstrated police officers mostly agreed with enhanced MCT design.	None specifically mentioned.

Table B.6: Road advertising or 'billboards'

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Decker, J. S., Stannard, S. J., McManus, B., Wittig, S. M. O., Sisiopiku, V. P., & Stavrinos, D. (2015). The impact of billboards on driver visual behavior: A systematic literature review. *Traffic Injury Prevention, 16*(3), 234-239, doi:10.1080/15389588.2014.936407			Systematic literature review		
2015	Kaber, D., Pankok, C., Jr., Corbett, B., Ma, W., Hummer, J., & Rasdorf, W. (2015). Driver behavior in use of guide and logo signs under distraction and complex roadway conditions. *Applied Ergonomics, 47,* 99-106. doi:10.1016/j.apergo.2014.09.005	USA	Billboards Roadway logo signs Glances Fixation	Driving simulator study **Aim**: Assess driver performance and attention allocation in a simulated freeway driving task when exposed to six-panel logo signs, nine-panel logo signs, mileage guide signs, and roadway work zones both with and without an in-car navigation device. **Conditions**: 2x2x2. Signage (1) 6-panel (2) 9-panel. Roadway condition (1) normal (2) construction zone. Navigation system (1) off (2) on. **Participants**: 40 participants (19 female) with an average age of 38.25 (25-59). **Limitations**: The simulation presented a rural highway with standard geometry and signing. The roadway was simulated under daylight conditions and there were few other driver distractions. The guide sign (which participants needed to comprehend) were significantly different from the distracting stimuli (inc colour) and always separate signs.	Mean maximum off-road glance to 6- and 9-panel logo signs to be significantly greater than the mean maximum glance to the guide signs. There was no significant difference in longest glance between the 6- and 9-panel logo signs. Mean fixation frequency to be greater for 6- and 9- panel logo signs than for guide signs. There was no significant fixation frequency difference between the 6- and 9-panel logo signs. Lane deviation to be significantly lower in the presence of a 6- or 9-panel logo sign than for any of the other types of traffic control. Lane deviation was significantly greater in the presence of a guide sign than in the presence of either of the logo signs.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Samsa, C. (2015). Digital billboards ‘down under’. *Are they distracting to drivers and can industry and regulators work together for a successful road safety outcome?.* Paper presented at the 4th International Conference on Driver Distraction and Inattention, Syndey, Australia.	Australia	Billboards Eye-tracking Fixation Driving performance	Field driving study **Aim**: Explore impact of eye fixations by billboard presence and type. **Measures**: Eye fixations (length at least 100ms, number, on or off-road), average and standard deviation of vehicle headway and average standard deviation of lateral position. Billboards (static, digital). **Participants**: 29 normal or corrected to normal sighted (16 female). Mean age 36.1 (25-54 SD = 6.4). **Limitations**: It was unknown exactly where participants directed their fixations when not on the road or why (study states possibly they were looking at a traffic sign). Participants may have also only made these longer glances when driving conditions permitted (when the car was stationary). Sample size and number of variables limited possible comparisons (due to statistical power).	When billboards (both static and digital) were present, the average standard deviation of lane position was significantly larger compared to when on premise signs were present. Average fixation durations was significant when comparing billboards (both static and digital) with on-premise signs. The average fixation durations were well below 0.75s (considered to be the minimum perception-reaction time to an unexpected event by the study). Billboards’ presence compared to on-premise signs did not significantly differ in: - on-road viewing behaviour - average vehicle headway Static compared to digital billboards did not significantly differ in: - on-road viewing behaviour - average fixation durations - average vehicle headway - standard deviation of lane position	None specifically mentioned.
2015	Young, K. L., Stephens, A.N., Logan, D. B., & Lenné, M. G. (2015). *An on-road study of the effect of roadside advertising on driving performance and situation awareness.* Paper presented at the 4th International Driver Distraction and Inattention Conference, Sydney, Australia.	Australia		Conference version of Young, K. L., Stephens: A. N., Logan, D. B., & Lenné, M. G. (2017). Investigating the impact of static roadside advertising on drivers' situation awareness. Applied Ergonomics, 60, 136-145. doi:10.1016/j.apergo.2016.11.009		

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Belyusar, D., Reimer, B., Mehler, B., & Coughlin, J. F. (2016). A field study on the effects of digital billboards on glance behavior during highway driving. *Accident Analysis and Prevention, 88,* 88-96. doi:10.1016/j.aap.2015.12.014	USA	Billboards Eye movement Glances Isolated billboards	Field driving study **Aim:** Examine what impacts number and lengths of glances towards billboards. **Participants:** 123 participants (60 female), drawn from two previous field driving studies (secondary analysis). Two age groups: 63 in 20-29 and 60 in 60-69. **Conditions:** Age group, billboard location (left or right). **Limitations:** Passed the same billboard along the same road (opposite directions) in the same order (billboard right-side first). Different lead up to billboard. Road curves immediately after right side billboard.	Significantly more long glances (>2 sec) passing billboard. Effects did not vary significantly by age. Billboard switching advert resulted in increased long glances towards billboard. Concludes billboards alter driver' attention. Difficulty concluding whether billboards being on the left or right side had an impact due to study limitations.	None specifically mentioned.
2016	Chan, M., Madan, C. R., & Singhal, A. (2016). The effects of taboo-related distraction on driving performance. *Acta Psychologica, 168,* 20-26. doi:10.1016/j.actpsy.2016.03.010	Canada	Billboards Attention Taboo Memory Emotional arousal	Driving simulator study **Aim:** Examine driver distraction associated with billboards with 'shock value' taboo words, positive words and negative words. **Conditions:** Five controls (1) no billboard (2) billboards with taboo words (3) billboards with positive words (4) billboards with negative words (5) billboards with neutral words. **Participants:** 30 introductory psychology students (13 male). Age range of 18 to 35 years. **Limitations:** Billboards were placed on one side with consistent spacing (every 200m). Participants were instructed to focus on billboards. The words had no context so may not have had much impact.	Driving speed was significantly faster in the positive words condition compared to taboo, negative and neutral. Better lane control in the taboo words condition compared to control, positive, and neutral. Study suggests possible cognitive tunnelling. Surprise recall taboo words were recalled more than positive, negative and neutral words. Suggests driving attention was most captured by those words.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Stavrinos, D., Mosley, P. R., Wittig, S. M. O., Johnson, H. D., Decker, J. S., Sisiopiku, V. P., & Welburn, S. C. (2016). Visual behavior differences in drivers across the lifespan: A digital billboard simulator study. *Transportation Research. Part F, Traffic Psychology and Behaviour, 41(A),* 19-28. doi:10.1016/j.trf.2016.06.001	USA	Billboards Eye-tracking Glances Transitioning billboard	Driving simulator study **Aim**: Evaluate the effects of various types of billboards and age on glance behaviour. **Measures**: Percentage of time looking at a billboard when present. Percentage of time looked at billboards throughout the simulation. Number of glances at billboard. Average glance length, glance pattern activity (GPA)(was measured as the number of glances made to any location per unit of time). **Conditions**: The 16-mile drive was further broken into four equal parts: (1) a digital billboard that transitioned at 250 feet away (2) a digital billboard that transitioned at 500 feet away (3) a static billboard (4) a baseline segment (no billboard). **Participants**: 66 participants in three groups: 16–19 years old for teens (N = 20), 35–55 years old for middle adults (N = 21), and 65 and older for older adults (N = 25). **Limitations**: Young group consisted primarily of 18- and 19-year-olds, Some real world billboard characteristics difficult to emulate in the simulator. Did not consider billboard message, size or other specific aspects' impact.	Teens, when compared to the other age groups: - looked at billboards for a significantly greater percentage of time and had significantly longer glances. - had significantly more glances lasting at least 0.75s and glances lasting at least 2.0s than both middle and older age groups. - were less impacted by the size of the sign than other age groups. Percentage of time spent looking at billboards significantly increased as billboard transition time increased, except for older adults, who spent more time looking at static billboards. A marginally significant main effect of billboard type was found for long glances (over 2.0s), suggesting the digital 500- foot transition billboards seemed to evoke more looks than the other types of billboards. The high standard deviations observed in these rates among young drivers may suggest that further sources of individual variability in susceptibility to distraction remain to be identified, even within age/experience groups.	None specifically mentioned
2016	Topolšek, D., Areh, I., & Cvahte, T. (2016). Examination of driver detection of roadside traffic signs and advertisements using eye-tracking. *Transportation Research. Part F, Traffic Psychology and Behaviour, 43,* 212-224. doi:10.1016/j.trf.2016.10.002	Slovenia	Eye-tracking Roadside objects Advertising	Field driving study **Aim**: Test several assumptions regarding drivers' detection and perception of roadside elements. **Participants**: 17 participants (3 female) mean age = 38.35 (19 – 76, SD = 17.26). **Limitations**: Participants did not have the same traffic flow conditions. During the drive, the volunteer was accompanied in the vehicle by a researcher and to give directions to the drivers. Did not comment on glance length. Small sample and limited diversity in the sample and driving conditions.	No significant differences between the detection of traffic signs and age. No significant differences in the detection of advertisements and age. Those who detect more traffic signs also detect more advertisements. There was a positive correlation between the shares of detected street-level advertisements and raised level advertisements. All but one of the 17 volunteers detected and perceived a significantly provocative advertisement in close proximity to the road	None specifically mentioned

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Chrysler, S. T., Carlson, P. J., Brimley, B., & Park, E. S. (2017). Effects of full matrix colour-changeable message signs on legibility and roadway hazard visibility. *Transportation Research Record, 2617*(1), 9-18. doi:10.3141/2617-02	USA	Distracted driver Sponsorship Logo Legibility	Closed course driving study **Aim:** Examine the impact of sponsorship logo on a road sign impacting its legibility. **Conditions:** Four conditions (1) changing text with no sponsor logo (2) changing text with a steady sponsor logo (3). **Participants**: 30 participants (15 female). Two age groups: 18 – 36 years (mean 25.7) and 57 to 85 (mean 70.1). **Limitations:** Number of participants (results suggested some possible effects however were not significant). The study did not measure differences in glance length required or number of glances.	Sponsor logos had no significant effect on the legibility distances of travel time signs. Sponsor logos had no significant effect on legibility distance of safety message signs other than signs with a blue background. Sponsor logos that have a white background on safety message signs with have the shortest legibility distances, but not significantly shorter than those of signs with logos on a dark-coloured background. When a sponsor logo is used, it does not negatively affect object detection for one type of sign message more than for any other sign message.	None specifically mentioned.
2017	Young, K. L., Stephens, A. N., Logan, D. B., & Lenné, M. G. (2017). Investigating the impact of static roadside advertising on drivers' situation awareness. *Applied Ergonomics, 60,* 136-145. doi:10.1016/j.apergo.2016.11.009	Australia	Billboards Verbal Protocol Analysis (PVA) Situation awareness	Field driving study **Aim**: Examined if and how static advertising billboards affect drivers' situation awareness across different driving environments. **Measures**: Verbal Protocol Analysis (VPA). **Conditions**: VPA data were parsed into discrete segments (400 m) surrounding each billboard of interest, and control sections (no billboards). Three driving environments: (1) freeway, (2) retail area and (3) arterial road. **Participants**: 19 fully licensed drivers (12 male). Mean age 30.8 (22-47, SD = 8.0). **Limitations**: Participants were aware that they were being video and audio recorded and this may have changed their driving behaviour. Certain elements of the billboards and driving environment could not be controlled (e.g., weather, traffic density). It was assumed that if the billboards, or other roadway features were not mentioned in the verbal protocols that drivers were not focusing their attention on these elements or were not aware of them.	While the billboards did form a key aspect of driver situation awareness in some situations, this appeared to be heavily moderated by the level of driving demand experienced. There was a strong trend for drivers to mention the billboards in their verbal protocols only when driving demands were low. The presence of static roadside advertising did not appear to alter drivers' awareness of safety-critical elements of the road environment. The only notable difference in drivers' awareness of safety-relevant information was in the freeway environment. Drivers appeared less focussed on their speed and the speed limit in the segments containing the billboards, compared to the control segments. Drivers appeared capable of ignoring the driving-irrelevant information presented by the billboards when driving demands increased and maintaining their awareness of events occurring in the roadway.	None specifically mentioned

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Zahabi, M., Pankok, C., Jr., Kaber, D. B., Machado, P., Lau, M. Y., Hummer, J. E., & Rasdorf, W. (2017). On-road visual sign salience, driver attention allocation, and target detection accuracy. *Transportation Research Record, 2663*(1), 40-47. doi:10.3141/2663-06	USA	Billboard Salience	Driving simulator study **Aim**: Assess the effect of the number of panels and logo format on signage salience, and analysing associations between salience values with target detection accuracy and off-road glance duration. **Measures**: Visual salience (the SUNs method), longest glance duration, and target detection accuracy. **Conditions**: Three common independent variables manipulated: sign type, number of specific service sign panels, and logo format. **Participants**: 120 participants. Three age categories: 18 to 22, 23 to 64, and 65+. Gender was balanced with 20 females and 20 males in each age category. **Limitations**: No in-depth analysis of glances or similar, only longest glance duration. Participants were asked to pay attention to signs (by asking them to search for specific info on the signs).	The study did not reveal a significant relationship between visual salience and attention allocation. Target detection accuracy did not appear to have a significant relationship with salience for the various sign types Findings indicate that salience differed for different signs. In particular, food business signs containing pictorial logos were more salient than gas and attraction and distance guide signs. Increasing the number of specific service sign panels from six to nine per sign significantly increased visual salience. Attraction signs including all pictorial logos were more salient than signs with text-based logos.	Information theory Graph theory Lerner et al.'s driver information load model (Lerner, N. D., R. E., Llaneras, H. W. McGee, S. Taori, and G. Alexander. NCHRP Report 488: Additional Investigations on Driver Information Overload. Transportation Research Board of the National Academies, Washington, D.C., 2003.) All mentioned in introduction only
2017	Marciano, H., & Setter, P. (2017). The effect of billboard design specifications on driving: A pilot study. *Accident Analysis and Prevention*, *104,* 174-184. doi:10.1016/j.aap.2017.04.024	Israel	Billboards Loaded billboards Graphical billboards Text vs graphics	Experimental, exploratory **Aim**: Examine the differing ability of different billboard images to distract people. Categorising billboards into a small number of groups **Conditions**: Created billboard groups: Loaded Billboards, Graphical Billboards, Minimal Billboards **Participants**: 20 university students (11 female). Mean age 23.5 (18-33 SD = 4.0) **Limitations**: Test was abstract. Participants encouraged to pay attention to billboards and were asked about the details of the billboards.	The objective ranking data produced 5 clusters of billboard: **Cluster 1**: near the middle of the range for all measurements. **Cluster 2**: has the highest means for percentage of text, number of medium-sized letters, and number of information items, but also has the lowest means for graphics percentage and number of colours. **Cluster 3**: (labelled Minimal Billboards) had no effect on any of these tasks **Cluster 4**: (labelled Graphical Billboards) yielded deteriorated performance primarily on the colour change identification task. **Cluster 5**: (labelled Loaded Billboards) yielded significantly deteriorated performance on the tracking task. Task resembling the continuous motor tracking component of driving performance deteriorated when billboards were present	"text versus graphics" dichotomy hypothesis

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Costa, M., Bonetti, L., Vignali, V., Bichicchi, A., Lantieri, C., & Simone, A. (2019). Driver's visual attention to different categories of roadside advertising signs. *Applied Ergonomics, 78,* 127-136. doi:10.1016/j.apergo.2019.03.001	Italy	Billboards Visual fixation Eye-tracking	Field driving study **Aim:** Assess a variety of advertising signs impact on drivers' visual attention. **Participants:** 15 participants with 'normal vision'. 5 females (mean age = 24.53 SD = .89). 10 males (mean age = 27.1 SD = 13.08). **Limitations:** Claims experimental design but is quasi-experimental. Did not examine time visual focus on the road. Did not control for impact of previous ads on next and time between.	Visual fixation rate significantly differed with billboards higher than vendor signs, billboards higher than moveable display boards, vendor signs higher than moveable display boards. (Noted by the study: One of the best predictors of both fixation rate and fixation duration was the amount of large-size text included in a roadside advertisement. Billboards and vendor signs tended to have a higher textual content with large-size characters) Ads on the drivers side were looked at significantly more than on the opposite side. Ad fixation duration was significantly higher in rural areas than urban Concludes: Advertising signs other than billboards could have a significant distracting potential. Particularly vendor signs tended to be more frequent than billboards, and in many cases their size, visual complexity, and textual content is higher, created a serious distraction source for drivers.	The SEEV model only mentioned at intro and not further commented on.
2019	Gitelman, V., Doveh, E., & Zaidel, D. (2019). An examination of billboard impacts on crashes on a suburban highway: Comparing three periods—Billboards present, removed, and restored. *Traffic Injury Prevention, 20*(sup2), 1-6. doi:10.1080/15389588.2019.1645330	Israel	Billboard Damage only crashes Injury crashes Legislation impact	Quasi-experimental repeated measures **Aim:** Examine the impact of advertising billboards on crashes. **Conditions:** Three periods (1) billboards visible (2) billboards removed (3) billboards restored. **Participants/ Data:** Crashes in the Ayalon Highway operator's logbook. **Limitations:** Small data for injury and fatal crashes limiting statistical power (fatal crashes were included in injury crashes due to rarity). No mention of other driving changes between the periods or attempts to control them.	During billboard removal there was a significant reduction in: - damage only crashes (40% on areas with greater billboard presence and 30% in the heavy traffic CBD area compared to lighter, quieter area). - Injury crashes (35-40%) During billboard restoration there was a significant increase in: damage only crashes (30-60% on areas with greater billboard presence and 100% on areas in the heavy traffic CBD area compared to lighter, quieter area) Injury crashes were not significant (likely due to a lack of injury crashes in general) However on average there was an increase (40-50%).	None specifically mentioned

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Oviedo-Trespalacios, O., Truelove, V., Watson, B., & Hinton, J. A. (2019). The impact of road advertising signs on driver behaviour and implications for road safety: A critical systematic review. *Transportation Research. Part A, Policy and Practice*, *122,* 85-98. doi:10.1016/j.tra.2019.01.012			Systematic literature review		
2019	Walker, H. E. K., & Trick, L. M. (2019). How the emotional content of roadside images affect driver attention and performance. *Safety Science, 115,* 121-130. doi:10.1016/j.ssci.2019.02.004	Canada	Emotional arousal Billboards Exogenous attention	Driving simulator study **Aim**: Examine whether roadside images would draw the drivers' attention away from the road and how these images would affect performance. **Measures**: Driving speed, steering, hazard response. **Conditions**: Billboard image (control, positive/high arousal, positive/low arousal, negative/high arousal, and negative/low arousal images. **Participants**: 23 licensed undergraduate drivers (9 or 10 female, unclear). Mean age 20.4 (18-36, SD = 4.3). **Limitations**: When asked whether they had seen the images, 'fake' images were reported. Participants may have experienced the emotional images differently. Possible that the billboard frequency may have led some participants to guess their importance.	The emotional content of roadside images can be salient enough to bias exogenous attentional selection Driving speeds were generally faster past billboards than in the areas without them Positive high-arousal and negative low-arousal prompted the greatest variation in steering in the 50-metre period following a billboard. The presence of a roadside image significantly slowed braking response times to central hazards (lead vehicle braking), regardless of image type. There was also an effect of valence of braking response, with response times being slowest when hazards occurred around negative images.	Frederickson's broaden-and build-theory only mentioned in the introduction.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Marciano, H. (2020). The effect of billboard design specifications on driving: A driving simulator study. *Accident Analysis and Prevention, 138*, 105479-105479. doi:10.1016/j.aap.2020.105479	Israel	Billboards Loaded billboard Graphical billboard Minimal billboard	Driving simulator study **Aim**: Explores which billboard characteristics are distracting. **Conditions**: 2 x 2 matrix, perceptual load on the road (1) low, (2) high. perceptual load on by the sides of the road: 1) low, (2) high. Billboards (1) without billboards (2)loaded billboard (3) graphical billboard (4) minimal billboard. **Measures**: Reaction distance: an index that takes into account the speed of the vehicle at the initiation of a critical event and the driver's reaction time to the event. The proportion of collisions: an index of the inability to react properly on time, along with the failure to detect the critical event, in cases when the driver did not notice the event at all. **Participants**: 18 university students (9 female). Mean age 27.2 (22 to 40). **Limitations**: Didn't consider other aspects of billboards, such as size, lateral position, more advanced advertising technologies (e.g., electronic billboards, video-based billboards). Didn't relate to the content of the billboards from the perspective of the message that they attempt to deliver.	Graphical billboards significantly increased the proportion of collisions for events initiated from the sides of the road, when the load was low in both on-road and by the sides. Loaded billboards had a greater impact on driving performance. - increased reaction distance when high load on side of road and low on the road. - increased the probability of collisions when high load on the road with low on sides of the road. Minimal billboards' effect was significantly or nearly significantly evident in four of the eight experimental conditions. - for events initiated from the sides: significantly increased the distance travelled for all conditions except for low load on the road, high load by the sides. - increased the probability of collisions when high load both on-road and by the sides.	None specifically mentioned

Table B.7: Intrapersonal factors and self-regulation

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Chan, M., & Singhal, A. (2015). Emotion matters: Implications for distracted driving. *Safety Science, 72*, 302-309. doi:10.1016/j.ssci.2014.10.002	Canada	Intrapersonal factors Emotional distraction	Driving simulator **Aim:** Identify if emotional related auditory distract has a differential effect on driving behaviours and memory. **Conditions:** 120 words that have an assigned valence from very negative to very positive and an arousal value from not arousing to highly arousing. 40 words were neutral, 40 were negative and 40 were positive. **Participants:** 25 participants (48% female) aged 18 to 30 years. **Limitations:** Simulator driving may not generalise to actual driving.	Driving speeds and lateral control was reduced in the presence of negative words when compared with neutral and positive words. Participants recalled more emotional than neutral words. Auditory distraction during driving can increase cognitive workload and that negative emotional auditory contact can impact on a person's ability to drive safely.	None specifically mentioned.
2015	Kingery, K. M., Narad, M., Garner, A. A., Antonini, T. N., Tamm, L., & Epstein, J. N. (2015). Extended Visual Glances Away from the Roadway are Associated with ADHD- and Texting-Related Driving Performance Deficits in Adolescents. *Journal of Abnormal Child Psychology, 43*(6), 1175-1186. doi:10.1007/s10802-014-9954-x	USA	Intrapersonal factors ADHD Young drivers Mobile phones	Driving simulator **Aim:** Determine whether ADHD and texting related driving impairments are mediated by extended visual glances from the roadway. **Conditions:** (a) no distraction (b) hands-free phone conversation (c) texting condition. **Participants:** 61 adolescents (46% ADHD, 38% female) aged 16 to 17 years with a valid driver's licence. **Limitations:** Simulated drive, conversation and texting conditions may not represent a typical conversation, only captured visual distraction and not cognitive distraction.	Adolescents with ADHD displayed significantly more visual inattention to the roadway. There was increased lane position variability among adolescents with ADHD compared to those without ADHD during the hands-free phone conversation and texting conditions that was mediated by an increased number of extended glances from the roadway. Texting resulted in decreased visual attention to the roadway. Both ADHD and texting impair visual attention to the roadway resulting in increased lane position variability.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Neyens, D. M., Boyle, L. N., & Schultheis, M. T. (2015). The Effects of Driver Distraction for Individuals With Traumatic Brain Injuries. *Human factors, 57*(8), 1472-1488. doi:10.1177/0018720815594057	USA	Intrapersonal factors Traumatic Brain Injuries	Driving simulators, on-road quasi-experiment **Aim:** Evaluate the effects of secondary tasks on the driving performance of individuals with mild traumatic brain injuries. **Conditions:** Both studies (a) selecting a CD from a set of CDS, (b) tuning a specific radio station (c) selecting a monetary amount from an array of coins. **Participants:** Simulator study – 25 right-handed drivers (48% female), on-road study – 16 drivers with a traumatic brain injury (31% female) and 19 control drivers. **Limitations:** possible order effect, only 3 driving performance measures used.	Individuals with Traumatic Brain Injuries spend more time looking at the tasks and making more frequent glances towards the tasks. Even drivers with a mild Traumatic Brain Injury have significantly longer and more glances towards the tasks when compared with a control group.	None specifically mentioned.
2015	Randell, N. J., Charlton, S. G., & Starkey, N. J. (2015). *Curbing the attention-deficit: influences of task demand during on-road driving.* Paper presented at the 1st Australasian Road Safety Conference (2015), Gold Coast, Queensland, Australia.	Australia	Intrapersonal factors ADHD	Naturalistic driving study **Aim:** Assess driving performance amongst medicated and unmedicated ADHD drivers in a real driving task. **Conditions:** 10 driving routes containing urban, residential, rural and highway conditions. **Participants:** 44 licensed drivers – 17 control group (75% female), 15 medicated ADHD group (53% female), 12 unmedicated ADHD group (25% female). **Limitations:** Gender imbalance, task was completed in participants own vehicle.	The driving of the unmedicated ADHD participants was significantly worse than the control and medicated ADHD groups. When compared with the medicated ADHD group, the unmedicated ADHD group demonstrated poor observation and gap selection skills and more frequently travelled at speeds in excess of the speed limit. While control group drivers were able to identify hazards effectively, the responses to those hazards were often less effective than those of ADHD drivers.	None specifically mentioned.
2015	Stavrinos, D., Garner, A. A., Franklin, C. A., Johnson, H. D., Welburn, S. C., Griffin, R., Underhill, A. T., & Fine, P. R. (2015). Distracted Driving in Teens With and Without Attention-Deficit/Hyperactivity Disorder. *Journal of Pediatric Nursing-Nursing Care of Children & Families, 30*(5), E183-E191. doi:10.1016/j.pedn.2015.04.006	USA	Intrapersonal factors ADHD Mobile phones Young drivers	Driving simulator **Aim:** Examine the effect of talking on a mobile phone or test messaging while driving in adolescents with ADHD and those without ADHD. **Conditions:** (a) conversing on a mobile phone (b) text messaging (c) no distraction. **Participants:** 16 adolescents with ADHD (25% female) and 18 control adolescents (22% female) **Limitations:** Small sample size, driving simulator.	Generally, those with ADHD did not differ in regard to driving performance when compared with control participants with the exception of time taken to complete the scenario. Distracted driving impairs the driving performance of adolescent regardless of ADHD status. Texting while driving had the greatest negative impact on driving performance particularly in regard to variability in lane position.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Terry, C. P., & Terry, D. L. (2015). Cell Phone-Related Near Accidents Among Young Drivers: Associations With Mindfulness. *The Journal of Psychology, 149*(7), 665-683.	USA	Intrapersonal factors Young drivers Mindfulness	Online survey **Aim:** Identify the psychological predictors of near crashes related to mobile phone use while driving. **Measures:** Use of a mobile phone while driving, mindfulness, polychronicity, intrusive thinking. **Participants:** 385 university student drivers (48% female). **Limitations:** Participants were recruited from an introductory psychology participant pool, mainly Caucasian students, inexperienced drivers, self-report.	Those who talk or text on their mobile phones more frequently have a higher incidence of near crashes. After controlling for mobile phone use while driving, those who reported more mobile phone related intrusive thoughts experienced more near crashes. Two aspects of mindfulness, acting with awareness and non-judging of inner experience were negatively associated with near crashes.	None specifically mentioned.
2015	Wong, I. Y., Mahar, D., & Titchener, K. (2015). Driven by distraction: investigating the effects of anxiety on driving performance using the Attentional Control Theory. *Journal of Risk Research, 18*(10), 1293-1306. doi:10.1080/13669877.2014.919516	Australia	Intrapersonal factors Personality Anxiety	Experiment **Aim:** Investigate whether the potential mediating influence of processing efficiency on the attentional control functions in the anxiety-driving lapses relationship. **Measures:** Anxiety, driving behaviour questionnaire. **Participants:** 75 Australian drivers (71% female) aged 17 to 47 years **Limitations:** Reliability coefficients for the driving behaviour questionnaire were relatively low, self-report data, possible social desirability bias.	Trait anxiety and processing efficiency of the central executive predicted driving lapses.	Attentional Control Theory
2016	Parr, M. N., Ross, L. A., McManus, B., Bishop, H. J., Wittig, S. M. O., & Stavrinos, D. (2016). Differential impact of personality traits on distracted driving behaviors in teens and older adults. *Accident Analysis and Prevention, 92*, 107-112. doi:10.1016/j.aap.2016.03.011	United States	Intrapersonal factors Personality	Data from the Senior and Adolescent Naturalistic Driving Study (SANDS) **Aim:** Determine the impact of personality on distracted driving behaviours. **Measures:** Demographics, distracted driving, Big Five personality traits. **Participants:** 120 drivers (48 adolescents aged 16 to 19 years – 60% female, 72 older adults aged 65 to 85 years – 56% female). **Limitations:** Low frequency of reported texting and driving in the older adults group which limited analysis, small sample size, social desirability bias.	Personality traits may be important predictors of distracted driving behaviours though specific traits associated with distracted driving may vary across groups. In adolescents, higher levels of openness and conscientiousness were predictive of greater reported texting frequency and interacting with a phone while driving while lower levels of agreeableness was predictive of fewer reported instances of texting and interacting with a phone while driving. In older adults, greater extraversion was predictive of greater reported talking on, and interacting with, a phone while driving.	Big Five Personality traits

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Rupp, M. A., Gentzler, M. D., & Smither, J. A. (2016). Driving under the influence of distraction: Examining dissociations between risk perception and engagement in, distracted driving. *Accident Analysis and Prevention, 97*, 220-230. doi:10.1016/j.aap.2016.09.003	United States	Intrapersonal factors Risk perception	Online survey **Aim:** Examine the factors that influence risk perception of driving while distracted and how often they engage in distracting activities and situations while driving. **Measures:** Driver distraction, sensation seeking, risk taking, demographics and driving habits. **Participants:** 308 university students (69% female) aged between 18 and 50 years. **Limitations:** Females over-represented in sample, young drivers over-represented in sample.	There was a disassociation between individual's perceptions of driving distraction risk and their engagement with distraction. Exposure, perceived knowledge of risks, fairness beliefs and ratings of perceived visual and cognitive demands was associated with risk perception. Risk-seeking traits, how voluntary the task was perceived and previous exposure to a distraction influenced engagement.	None specifically mentioned.
2016	Sanbonmatsu, D. M., Strayer, D. L., Behrends, A. A., Ward, N., & Watson, J. M. (2016). Why drivers use cell phones and support legislation to restrict this practice. *Accident Analysis and Prevention, 92*, 22-33. doi:10.1016/j.aap.2016.03.010	United States	Intrapersonal factors Cognitive dissonance	Survey completed in a laboratory **Aim:** Understand the inconsistency between what drivers do and what they advocate for others (ie. they drive while using mobile phones yet support legislation to limit its occurrence). **Measures:** Driving attitudes, driving abilities, driving behaviours, support for legislation restricting mobile phone use while driving, perceived risks of drinking and driving. **Participants:** 249 undergraduate students ranging in age from 18 to 44 years (57% female) **Limitations:** Data was correlational, self-report data, non-representative sample.	Many drivers believe they can drive safely while using mobile devices yet lack confidence in others ability to do so.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Wandtner, B., Schumacher, M., & Schmidt, E. A. (2016). The role of self-regulation in the context of driver distraction: A simulator study. *Traffic injury prevention, 17*(5), 472-479. doi:10.1080/15389588.2015.1102231	Germany	Intrapersonal factors Self-regulation	Driving simulator experiment **Aim:** Compare drivers' performance when engaged in a system-paced secondary task with a self-paced version of the task and how both differed from baseline driving performance without distraction. **Conditions:** (a) complete tasks under time pressure (b) complete tasks with no time pressure). **Participants:** 39 drivers (31% female) ranging in age from 22 to 44 years **Limitations:** Small sample size, could use other measures such as gaze tracking, driver monitoring systems and physiological measures in future research.	For those who had to complete the tasks under time pressure, distraction was associated with high falls in driving performance. There no effects for the number of collisions probably because of the lower driving speeds while distracted (compensatory behaviour). For those who had to complete the tasks with no time pressure, only small impairments in driving performance were identified.	None specifically mentioned.
2017	Braitman, K. A., & Braitman, A. L. (2017). Patterns of distracted driving behaviors among young adult drivers: Exploring relationships with personality variables. *Transportation Research Part F-Traffic Psychology and Behaviour, 46*, 169-176. doi:10.1016/j.trf.2017.01.015	USA	Intrapersonal factors Personality Perceptions of risk	Online survey **Aim:** Identify naturally occurring profiles of distracted driving, distinguish personality traits associated with these profiles and examine relationships between distracted driving behaviours and perceptions of risk. **Measures:** Distracted driving behaviours, personality characteristics **Participants:** 266 young drivers studying at university. **Limitations:** Small sample size, self-report.	Extraversion is a consistent predictive indicator of distracted driving including in high-risk situations such as inclement weather and in free-flowing, high speed traffic.	Big Five Personality Traits.
2017	Hayley, A. C., de Ridder, B., Stough, C., Ford, T. C., & Downey, L. A. (2017). Emotional intelligence and risky driving behaviour in adults. *Transportation Research Part F-Traffic Psychology and Behaviour, 49*, 124-131. doi:10.1016/j.trf.2017.06.009	USA	Intrapersonal factors Executive ability	Cross-sectional laboratory study **Aim:** Investigate the relationship between age, behavioural manifestations of executive function and self-reported distracted driving behaviours. **Measures:** Executive difficulty, demographics. **Participants:** 13 young adults (19 years – 38% female), 21 middle-age adults (36 to 53 years – 66% female) and 25 older adults (65 to 91 years – 64% female) with a current driver's licence. **Limitations:** Self-report, cross-sectional design, no measure of impulsivity.	While partially accounted for by age, global executive difficulty as uniquely related to engagement in distracted driving behaviours. Older age was associated with fewer weekly self-reported distracted driving behaviours. Higher self-reported executive difficulty was associated with more frequent weekly engagement in distracted behaviour.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Nilsson, E. J., Aust, M. L., Engström, J., Svanberg, B., & Lindén, P. (2018). Effects of cognitive load on response time in an unexpected lead vehicle braking scenario and the detection response task (DRT). *Transportation Research Part F-Traffic Psychology and Behaviour, 59*, 463-474. doi:10.1016/j.trf.2018.09.026	Sweden	Intrapersonal factors Cognitive load	Simulator experiment **Aim:** To test if a cognitively loading task would lead to delayed Detection Response Task response but have no effect on brake responses. **Measures:** Detection Response Task response times and brake response times. **Participants:** Study 1 – 16 males aged from 36 to 50 years, Study 2 – 50 males aged between 35 and 50 years. **Limitations:** Studies were conducted in different simulators.	The Detection Response Task response times increased with increased level of cognitive load. Brake response times were unaffected by cognitive load.	None specifically mentioned.
2019	Fountas, G., Pantangi, S. S., Hulme, K. F., & Anastasopoulos, P. C. (2019). The effects of driver fatigue, gender, and distracted driving on perceived and observed aggressive driving behavior: A correlated grouped random parameters bivariate probit approach. *Analytic Methods in Accident Research, 22*, 15. doi:10.1016/j.amar.2019.100091	USA	Intrapersonal factors Aggressive driving	Driving simulation experiment **Aim:** Provide a thorough investigation of observed and perceived aggressive driving behaviour accounting for the effect of driver fatigue, gender and distracting driving conditions. **Participants:** 41 participants. **Limitations:** None mentioned.	When driving distractions are present, the socio-demographic background of the driver (education level, ethnicity, income level, hometown location) is more influential in determining driving behaviour. The majority of non-distracted single drivers are more likely to perceive their behaviour as aggressive. Distracted drivers are less likely to perceive that they drove aggressively.	None specifically mentioned.
2019	Louie, J. F., & Mouloua, M. (2019). Predicting distracted driving: The role of individual differences in working memory. *Applied Ergonomics, 74*, 154-161. doi:10.1016/j.apergo.2018.07.004	USA	Intrapersonal factors Working memory	Driving simulator **Aim:** Investigate the role of working memory capacity in predicating distracted driving performance. **Conditions:** Drive while completing the grocery list task. **Participants:** 49 participants recruited from a university research pool (61%). **Limitations:** Limitations in instruments used to code braking times.	Participants were slower at braking when a yellow traffic light appeared and during sudden braking events when distracted. The impairing effect of distraction on braking response time was partially mediated by working memory capacity. The impairing effect of distraction was more pronounced for individuals with low working memory capacity than for those with high working memory capacity.	Domain-general theory

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Meldrum, R. C., Boman, J. H., & Back, S. (2019). Low Self-Control, Social Learning, and Texting while Driving. *American Journal of Criminal Justice, 44*(2), 191-210. doi:10.1007/s12103-018-9448-4	USA	Intrapersonal factors Self-control Mobile phones	In-person survey interview **Aim:** Assess if low self-control is associated with the frequency of texting while driving. **Measures:** Texting while driving, self-control, perceptions of other drivers' texting while driving habits, perceptions of best friend texting while driving habits, wrongfulness of texting while driving, demographics. **Participants:** 469 young adults **Limitations:** Convenience sample, cross-sectional design, memory recall error, non-experimental research.	Low self-control is positively associated with the frequency of texting while driving. Association is amplified by an individual's perceptions of the proportion of other drivers who engage in texting while driving but not by the texting and driving of best friends.	Social Learning Theory Self-control theory
2019	Moore, M. M., & Brown, P. M. (2019). The association of self-regulation, habit, and mindfulness with texting while driving. *Accident Analysis and Prevention, 123*, 20-28. doi:10.1016/j.aap.2018.10.013	Australia	Intrapersonal factors Self-regulation Mobile phones	Online survey **Aim:** Explore relationships between trait self-regulation, habitual text messaging, trait mindfulness and frequency of texting while driving. **Measures:** Demographic information, driving experience, frequency of reading and sending text messages, trait self-regulation, habitual texting, trait mindfulness, texting while driving. **Participants:** 170 participants (71.2% female) aged 18 to 66 years. **Limitations:** Possible social desirability bias, cross-sectional design, the overall variance in texting while driving behaviour was low (9%).	Habitual texting behaviour mediate the relationship between trait self-regulation and frequency of texting while driving. Trait mindfulness moderated the relationship between habit and texting while driving so habitual texting was positively related to texting while driving but only for individuals with low to moderate trait mindfulness.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Oviedo-Trespalacios, O., Haque, M., King, M. J., & Washington, S. (2019). "Mate ! I'm running 10 min late": An investigation into the self-regulation of mobile phone tasks while driving. *Accident Analysis and Prevention, 122*, 134-142. doi:10.1016/j.aap.2018.09.020	Australia	Intrapersonal factors Self-regulation Mobile phones	Driving simulator experiment **Aim:** Investigate the influence of driving demands, secondary task characteristics and personal characteristics on behavioural adaptation of mobile phone distracted drivers. **Conditions:** (a) ring a doctor and cancel an appointment (b) text a friend to let them know they would be late (c) share the doctor's phone number with a friend and (d) take a selfie. **Participants:** 35 drivers aged between 18 and 29 years (37% female). **Limitations:** Driving simulator study, sample not representative, artificial tasks may limit generalisability, all mobile phone tasks in this study were voluntary.	Drivers used their mobile phone more when driving demands were low e.g. while stopped at an intersection. Only a small number of drivers pulled over (strategic self-regulation). Beliefs play a role in the decision making of drivers. Beliefs about the likely presence of law enforcement reduce the likelihood of using a mobile phone while driving.	None specifically mentioned.
2019	Shaw, F. A., Park, S. J., Bae, J., Becerra, Z., Corso, G. M., Rodgers, M. O., & Hunter, M. P. (2019). Effects of roadside distractors on performance of drivers with and without attention deficit tendencies. *Transportation Research Part F-Traffic Psychology and Behaviour, 61*, 141-151. doi:10.1016/j.trf.2018.02.013	USA	Intrapersonal factors ADHD	Simulator experiment **Aim:** Identify the influence of roadside distractors on the performance of drivers with and without ADHD. **Conditions:** Five scenarios with four roadside distractors (a) several police cars with flashing lights (b) active work zone (c) crash scene (d) billboard with dynamic graphics. **Participants:** 46 participants aged 18 to 24 years (76% females) **Limitations:** Driving simulator, convenience sample.	Roadside events affect variability of lane position and speed. Drivers with ADHD display more lane position variability than control group drivers. Billboards and work zones have the most significant impacts on inattention.	None specifically mentioned.
2020	Lannoy, S., Chatard, A., Selimbegovic, L., Tello, N., Van der Linden, M., Heeren, A., & Billieux, J. (2020). Too good to be cautious: High implicit self-esteem predicts self-reported dangerous mobile phone use. *Computers in Human Behavior, 103*, 208-213. doi:10.1016/j.chb.2019.09.018	Switzerland	Intrapersonal factors Self-esteem	Survey **Aim**: Evaluate the associations between explicit and implicit self-esteem and dangerous mobile phone use. **Measures:** Implicit self-esteem, explicit self-esteem, mobile phone use **Participants:** 95 French speaking participants (94% female) with a mobile phone aged between 18 and 42 years. **Limitations:** Cross-sectional data, non-representative sample, small sample size.	Younger age, elevated number of daily calls made and high implicit self-esteem are significant predictors of dangerous mobile phone use.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Narad, M. E., Nalepka, P., Miley, A. E., Beebe, D. W., Kurowski, B. G., & Wade, S. L. (2020). Driving After Pediatric Traumatic Brain Injury: Impact of Distraction and Executive Functioning. *Rehabilitation Psychology, 65*(3), 268-278. doi:10.1037/rep0000329	USA	Intrapersonal factors Traumatic Brain Injury Young drivers	Driver simulator experiment **Aim:** Examine the driving performance of young drivers with a history of moderate to severe traumatic brain injury compared with an uninjured control group. **Conditions:** (a) no distraction (b) mobile phone conversation (c) texting **Participants:** People aged 16 to 25 years. 19 with and 19 without a history of traumatic brain injury (37% female). **Limitations:** Simulator, driving scenario only included suburban and urban driving roadways, the uninjured control group included those with limited symptoms of ADHD, small sample size, executive function is complex and may not have been fully encapsulated by the measures in this study.	A history of paediatric traumatic brain injury did not impact driving performance independent of executive function. The effects of distraction was most notable amongst those with higher Global Executive Composite scores.	None specifically mentioned.

Table B.8: Behavioural/cognitive theories

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Guggenheim, N., & Taubman-Ben-Ari, O. (2015). Can friendship serve as an impetus for safe driving among young drivers? *Transportation Research Part F-Traffic Psychology and Behaviour, 30*, 145-152. doi:10.1016/j.trf.2015.02.011	Israel	Theory Young drivers	Semi-structured in-depth interviews **Aim:** Explore relationships among young drivers in the context of driving behaviour. **Measures:** Issues such as biographical data, personal perception of friendship in general, personal perception of young drivers and experiences of driving with friends were included in each interview. **Participants:** 32 single young drivers aged 17 to 24 years able to drive independently and with an unrestricted driving licence. **Limitations:** small and non-representative sample, no indications of the exact frequencies of each perception.	Subjective perceptions of friendship might protect young drivers from distracted and risky driving.	Aristotle's conceptualisation of three types of friendship (reciprocal interests, practical and beneficial interactions)
2015	McDonald, C. C., & Sommers, M. S. (2015). Teen Drivers' Perceptions of Inattention and Cell Phone Use While Driving. *Traffic injury prevention, 16*, S52-S58. doi:10.1080/15389588.2015.1062886	USA	Theory Young drivers Mobile phones	Focus groups **Aim:** Describe adolescent drivers perceptions of mobile phone use while driving in order to inform future interventions to reduce risky driving. **Measures:** The focus group interview guide and analysis was based on the Theory of Planned Behaviour **Participants:** 30 adolescent drivers aged 16 to 18 years who had held a Pennsylvania licence for less than 1 year. **Limitations:** Small predominately white sample that was not representative, some focus groups were smaller than planned due to participants not attending.	It is a norm for adolescents to connect to technology. Interventions that take this into account are more likely to be successful. Adolescents felt that they needed to urgently respond to parental communications. Therefore, parents need to communicate with their child about the expectations of answering a phone call or a text from them while driving. Strategies used by the young driver included turning off the mobile phone, silencing the phone or pulling over to the side of the road to use their phone.	Theory of Planned Behaviour

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Quisenberry, P. N. (2015). Texting and Driving: Can it be Explained by the General Theory of Crime? *American Journal of Criminal Justice, 40*(2), 303-316. doi:10.1007/s12103-014-9249-3	USA	Theory Mobile phones	Cross-sectional survey **Aim:** Test Gottfredson and Hirschi's general theory of crime, with the primary construct of self-control, to identify if there is any effect on texting while driving. **Measures:** Self-control, dangerous driving incidents, frequency of texting while driving, awareness and impact of no texting while driving law. **Participants:** Convenience sample of 227 university students. **Limitations:** Convenience sample makes it difficult to generalise findings.	Findings support General Theory of Crime as higher self-control reduced the amount of texting while driving. The introduction of a law banning texting while driving did not affect the drivers' behaviour. Even those higher in self-control did not change their behaviour as a result of the law. Males had fewer dangerous driving incidents than females.	General Theory of Crime
2016	Chen, H. -Y. W., Donmez, B., Hoekstra-Atwood, L., & Marulanda, S. (2016). Self-reported engagement in driver distraction: An application of the Theory of Planned Behaviour. *Transportation Research Part F-Traffic Psychology and Behaviour, 38*, 151-163. doi:10.1016/j.trf.2016.02.003	Canada	Theory	Online survey **Aim:** Explore the efficacy of the Theory of Planned Behaviour in predicting self-report engagement behaviour in a number of distraction tasks including interacting with a phone, chatting with passengers, having phone conversations, reading roadside advertisements and adjusting the settings of in-vehicle technology. **Measures:** Susceptibility to Driver Distraction Questionnaire (which uses the Theory of Planned Behaviour as framework), the Manchester Driver Behaviour Questionnaire and other personality measures. **Participants:** 578 drivers over the age of 18 (354 males) recruited through online advertisements, email lists and posters around the University of Toronto campus. **Limitations:** Non-random sample, self-report survey, small sample size in the age group of 60 and older.	Self-reported distraction was associated with impulsive, venturesome and sensation-seeking personalities and with higher levels of unsafe driving behaviours. Attitudes, perceived behavioural control and descriptive norms were significant predictors of self-reported distraction after controlling for age and gender. Gender did not predict engage with distraction activities,f but drivers over the age of 60 had slightly lower levels of distraction than those aged 26 to 39.	Theory of Planned Behaviour

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Rowe, R., Andrews, E., Harris, P. R., Armitage, C. J., McKenna, F. P., & Norman, P. (2016). Identifying beliefs underlying pre-drivers' intentions to take risks: An application of the Theory of Planned Behaviour. *Accident Analysis and Prevention, 89*, 49-56. doi:10.1016/j.aap.2015.12.024	United Kingdom	Theory Pre-licensed drivers Mobile phones	Study 1: Qualitative belief elicitation survey Study 2: Quantitative survey **Aim:** Apply the Theory of Planned Behaviour to identify pre-driver beliefs to drive over the speed limit, while over the legal alcohol limit, talking on a mobile phone and while feeling very tired. **Measures:** Belief questions in the main study were based on beliefs identified in the elicitation study, Theory of Planned Behaviour variables and driving intentions. **Participants:** Study 1: 60 students from a sixth form college ranging in age from 16 to 18 years with 53% being female. Study 2: 294 students from five schools and sixth form colleges ranging in age from 16 to 19 with 62% being female. **Limitations:** Reliability of some of the Theory of Planned Behaviour variable was lower than is optimal, focus on pre-drivers means that the outcome measures were intentions to engage in behaviour rather than the actual behaviour.	Study 1 identified two behavioural belief factors related to driving while talking on a handheld mobile phone: dangers including reduced control of the car and advantages, including allowing driver to talk with people and multi-tasking. There were two control belief factors: pressures encouraging phone use such as an emergency and inhibitors to prevent use when driving near pedestrians. Attitudes was a significant predictor of intention to use a mobile phone while driving. The Theory of Planned Behaviour variables predicted 63% of the variance in intentions to drive while talking on a mobile phone.	Theory of Planned Behaviour
2016	Wang, X. (2016). Excelling in multi-tasking and enjoying the distraction: Predicting intentions to send or read text messages while driving. *Computers in Human Behavior, 64*, 584-590. doi:10.1016/j.chb.2016.07.026	USA	Theory Mobile phones	Online cross-sectional survey **Aim:** Examine factors that predicted a person’s intentions to read or send text messages while driving **Participants:** 555 undergraduate students aged between 18 and 30 years. **Limitations:** Cross-sectional survey, convenience sample from one university, there may be a social desirability bias in the results, self-report data.	The integration of attitudinal motivations and the Theory of Planned Behaviour can help understand attitudes and intentions to engage in reading or sending a text message while driving. The Theory of Planned Behaviour explained 63% of the variance in intentions to read or send text messages while driving. Self-efficacy to refrain from texting negatively predicted not reading or sending text messages while driving. Attitudes and self-efficacy combined predicted 53% of the variance in a person’s attitudes towards texting while driving.	Theory of Planned Behaviour Attitude functional theory

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Bazargan-Hejazi, S., Teruya, S., Pan, D., Lin, J., Gordon, D., Krochalk, P. C., & Bazargan, M. (2017). The theory of planned behavior (TPB) and texting while driving behavior in college students. *Traffic injury prevention, 18*(1), 56-62.	USA	Theory Mobile phones	Cross-sectional survey **Aim:** Examine the role of intent and other Theory of Planned Behaviour constructs in predicting college students' willingness to text while driving. **Participants:** 243 university students who were a licensed driver, owned a mobile phone and were at least 18 years old. 68.9% were female. **Limitations:** cross-sectional, more than half of the sample was Hispanic/Latino, nearly 69% were female, social desirability bias.	Attitude is the strongest predictor of intention. Intention mediates the relationship of willingness to text while driving on perceived behavioural control. Over 70% of the sample reported talking on a mobile phone and sending and receiving text messages 'at least a few times' while driving in the past week. Only 27% reported being stopped by police and, of these, only 22% were fined. 47% of the intention to send a text while driving was predicted by the Theory of Planned Behaviour model.	Theory of Planned Behaviour
2017	Johansson, O. J., & Fyhri, A. (2017). "Maybe I Will Just Send a Quick Text..." - An Examination of Drivers' Distractions, Causes, and Potential Interventions. *Frontiers in Psychology, 8*, 15. doi:10.3389/fpsyg.2017.01957	Norway	Theory	Random controlled experiment to test a distraction intervention **Aim:** Explain and reduce drivers' distractions by testing variables suggested the Theory of Planned Behaviour, personality, demographics and the efficacy of an implementation intentions intervention. **Measures:** Demographics, Big Five, Theory of Planned Behaviour, Distracted Behaviour, Second sample only: intervention which was a volitional help sheet. **Participants:** Study 1: 1100 high school students with 208 licensed drivers. Study 2: 414 participants **Limitations:** self-report data, need for follow up testing.	The intervention did not have an effect. Neuroticism significantly predicted distractions.	Theory of Planned Behaviour Big Five personality theory

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Murphy, G., & Greene, C. M. (2017). Load Theory Behind the Wheel; Perceptual and Cognitive Load Effects. *Canadian Journal of Experimental Psychology-Revue Canadienne De Psychologie Experimentale, 71*(3), 191-202. doi:10.1037/cep0000107	USA	Theory	Driving simulator study **Aim:** Differentiate between perceptual load and cognitive load and examine the role of perceptual load in awareness when driving Conditions: Cognitive load (billboards) and perceptual load (finding a red Mercedes sports car). **Participants:** 20 drivers (14 female) with a full driving licence and an average of 5.48 years of driving experience. **Limitations:** Small sample size, simulator may not reflect driving in real life, cognitive load manipulation may have been weak, driver experience not examined.	Perceptual load had a significant effect on reaction time. Cognitive load did not affect response times. Average speed was lower in the high perceptual load task. Load Theory is robust enough to be applied to complex environments.	Perceptual Load Theory
2017	Oviedo-Trespalacios, O., Haque, M., King, M. J., & Washington, S. (2017). Self-regulation of driving speed among distracted drivers: An application of driver behavioral adaptation theory. *Traffic Injury Prevention, 18*(6), 599-605. doi:10.1080/15389588.2017.1278628	Australia	Theory Mobile phones Young drivers	Driving simulator study **Aim:** Apply the driver behavioural adaptation model to investigate the speed adaptation of mobile phone distracted drivers **Conditions:** Three conditions (1) baseline (2) handheld phone use and (3) hands-free phone use. **Participants:** 32 young driver aged 18 to 26 years (50% female). **Limitations:** Participants were unable to control where they used their phone in the simulator task, speed adaptation was measured across the full drive thus environmental complexity was not taken into account, small sample size, simulator may not reflect driving in real life.	Drivers went 2.49 kilometres per hour slower when using their handheld mobile phone and 2.67 kilometres per hour slower when using their mobile phone in a hands-free mode. 16% of drivers did not adapt their speed while having a handheld mobile phone conversation and 19% did not adapt their speed while having a hands free mobile phone conversation. Attitudes towards safety moderated speed adaption for both handheld and hands-free mobile phone use. Individuals with higher levels of sensation-seeking made their speed lower when using a mobile phone.	Driver behavioural adaptation theory

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Sinelnikov, S., & Wells, B. M. (2017). Distracted driving on the job: Application of modified stages of change model. *Safety Science, 94*, 161-170. doi:10.1016/j.ssci.2017.01.007	USA	Theory Mobile phones Professional drivers	Online survey **Aim:** Explore the application of the stages of change model to study the use of mobile phones and other communication devices among employees prohibited from using them while driving on company business. **Measures:** Socio-demographic and work factors, stages of change, factors that affect the stages of change. **Participants:** 181 employees, 78% male, 77% over 46 years of age **Limitations:** self-report data, possible social desirability bias, participants from one company, relatively low response rate.	Even though most participants were aware that they were prohibited from using mobile phones and other electronic communications devices while driving, some continued to do so. Nearly 20% of employees indicated that they had used a mobile phone or other electronic communications device while driving on company time. Individuals in the pre-contemplation stage did not view distracted driving as a safety concern.	Stage of Change Model (modified version of Prochaska's transtheoretical framework)
2017	Tian, Y., & Robinson, J. D. (2017). Predictors of Cell Phone Use in Distracted Driving: Extending the Theory of Planned Behavior. *Health Communication, 32*(9), 1066-1075. doi:10.1080/10410236.2016.1196639	USA	Theory Mobile phones	Online survey **Aim:** Consider the differences in intentions to use mobile phones in different ways while driving (e.g. making phone calls, posting on social media) using the Theory of Planned Behaviour. **Measures:** Past experience, Theory of Planned Behaviour variables, perceived safety of technologies, intentions **Participants:** 326 participants from two universities in the USA. 68.7% female. **Limitations:** Convenience sample, cross-sectional data, measure of past experience could have been improved.	Effectiveness of the Theory of Planned Behaviour predictors varies from behaviour to behaviour. Attitudes toward the distracted driving behaviours was the only variable that consistently predicted each of the six intentions to engage in the associated behaviour. Socio-demographic factors, past experiences and theory of planned behaviour variables predicted: • 42% of the variance in intention to read text messages while driving • 49% of the variance intention to send text messages while driving • 51% of the variance in intention to answer phone calls while driving • 52% of the variance in intention to make phone calls while driving • 56% of the variance in intention to read/view social media while driving • 58% of the variance in intention to post on social media while driving	Theory of Planned Behaviour

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Preece, C., Watson, A., Kaye, S.-A., & Fleiter, J. J. (2018). Understanding the psychological precursors of young drivers' willingness to speed and text while driving. *Accident; analysis and prevention, 117*, 196-204. doi:10.1016/j.aap.2018.04.015	Australia	Theory Young drivers Mobile phones	Online cross-sectional study **Aim:** Identify the association between fatal crashes involving 16 to 19 year old drivers and state-based distracted driving laws. **Measures:** Prototype Willingness Model measures, optimism bias. **Participants:** 183 licensed drivers aged 17-25 years(78% female) **Limitations:** Cross-sectional study, large proportion of participants were students, possible social desirability responses, single-item measures used for some constructs, did not consider actual texting behaviour.	The Prototype Willingness model was effective in explaining the variance in willingness to text while driving and text while stopped (over 30% of variance in both cases). Optimism bias predicted a decrease in young drivers willingness to text while stopped.	Prototype Willingness Model
2018	Trivedi, N., & Beck, K. H. (2018). Do significant others influence college-aged students texting and driving behaviors? Examination of the mediational influence of proximal and distal social influence on distracted driving. *Transportation Research Part F-Traffic Psychology and Behaviour, 56*, 14-21. doi:10.1016/j.trf.2018.04.002	USA	Theory Mobile phones	Self-report online survey **Aim:** Identify if perceived significant other texting behaviours mediated the relationship between perceived risk of texting while driving and reported texting while driving among college students. **Conditions**: Low-risk drivers (never received a traffic citation or crashed) and high-risk drivers (had either received a traffic citation or crashed). **Participants:** 835 undergraduate students who held a driver's licence (63.2% female). **Limitations:** Self-report data, possible recall or social desirability bias, non-representative sample.	The texting behaviour while driving of significant others partially mediate the relationship between perceived risk of texting while driving and texting while driving. This was also found for low risk drivers (females only) and high risk drivers. There was no effect found when considering the texting behaviour of their friends.	Social Norms Theory

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Oviedo-Trespalacios, 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*(0), 113-122.	Australia	Theory In-vehicle information systems	Semi-structured telephone interviews **Aim:** Investigate drivers' engagement with in-vehicle information systems and related risky driving behaviours. **Measures:** Open-ended questions based on the psychological constructs of the Theory of Planned Behaviour **Participants:** 32 participants aged between 19 and 70 years that drove a vehicle within Australia that included an in-vehicle information system (65.6% female). **Limitations:** Participants generally of high socioeconomic status, participants may have faulty memories or be exhibiting a courtesy bias.	Drivers mainly use their in-vehicle information systems for entertainment (e.g. music) and navigation purposes. Participants indicated that safe drivers would avoid or refrain from interacting too much with the in-vehicle information system. More than half of participants had never talked about the safety issues surrounding the use of in-vehicle information systems.	Theory of Planned Behaviour
2019	Shevlin, B. R. K., & Goodwin, K. A. (2019). Past behavior and the decision to text while driving among young adults. *Transportation Research Part F-Traffic Psychology and Behaviour, 60*, 58-67. doi:10.1016/j.trf.2018.09.027	USA	Theory Mobile phones	Series of online surveys completed at one time point **Aim:** Use an extended Theory of Planned Behaviour framework to examine the factors that influence young adults' decision to text while driving. **Measures:** Past distracted driving behaviour, Theory of Planned Behaviour variables, demographics. **Participants:** 232 undergraduate students at a USA university who held a driver's licence. **Limitations:** Focus on self-reported beliefs and habits rather than actual behaviour, inconsistent temporal framing amongst the Theory of Planned Behaviour items, non-representative sample.	Most participants reported both reading (83.5%) and writing (76.6%) a text message while driving in the past 30 days. 6.8% of participants reported that had been involved in a crash related to texting and driving. 2.1% of participants reported that they had been issued a ticket for texting while driving. Traditional Theory of Planned Behaviour variables explained a significant proportion of variance in intentions to text and drive. Past behaviour, self-efficacy and moral norms were strong predictors of intentions to text and drive.	Theory of Planned Behaviour

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Truelove, V., Freeman, J., & Davey, J. (2019). "I Snapchat and Drive!" A mixed-methods approach examining Snapchat use while driving and deterrent perceptions among young adults. *Accident; analysis and prevention, 131*, 146-156. doi:10.1016/j.aap.2019.06.008	Australia	Theory Mobile phones Young drivers	Study 1: Focus groups Study 2: Cross-sectional survey **Aim:** Examine young drivers' perceptions of legal and non-legal deterrents for using a social media app (Snapchat) on a mobile phone while driving. **Measures:** Study 1: Semi-structured interview questions that focused on the legal and non-legal deterrence for illegal phone use while driving as well as identifying the type of social media use that is most prevalent amongst young drivers. Study 2: Snapchat use while driving, classical deterrence items, reconceptualised deterrence items, perceived safety of the behaviour. **Participants:** Study 1: 60 young drivers aged 17 to 25 years old (66% female). Study 2: 503 young drivers aged between 17 and 25 years old (59.6% female). **Limitations:** No rural or remote participants were recruited, self-report data, possible group bias effect for the focus groups, lack of comparison between types of social media.	Snapchat was the social media phone behaviour most engaged in by young adults while driving. They tended to use Snapchat to send a video or a photo of something they saw while driving. The survey indicated that most participants were most likely to use Snapchat while stopped at a red light. Traditional legal deterrence variables did not explain any driving behaviour related to Snapchat use. Vicarious punishment was a predictor of Snapchat use while driving. This means that those who had friends who had used Snapchat while driving and have been caught were less likely to use Snapchat themselves while driving. In contrast, direct punishment (where the driver was caught and punished themselves for Snapchat phone use) were more likely to participate in Snapchat use while driving. Vicarious punishment avoidance (where a friend had used Snapchat and not been caught) and direct punishment avoidance (where the young driver themselves had used Snapchat and not been caught) also increased the likelihood of Snapchat use while driving.	Deterrence Theory

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Tontodonato, P., & Drinkard, A. (2020). Social Learning and Distracted Driving among Young Adults. *American Journal of Criminal Justice, 45*(5), 821-843. doi:10.1007/s12103-020-09516-6	USA	Theory Mobile phones	Online survey **Aim:** Explore how the use of mobile phones while driving has evolved and expanded from texting to include other forms of technological distraction amongst young drivers. **Measures:** Mobile phone use while moving and while stopped, Aker's social learning theory variables, socio-demographic variables. **Participants:** 935 participants who owned a mobile phone and reported having driving experience (74% female). **Limitations:** Non-representative sample, low response rate.	Almost all (92%) of participants reported either reaching for a phone, talking on a phone, reading a text, sending a text, searching or playing audio while moving. When stopped, 96% of participants reported reading, sending texts, using social media, searching for music, talking on the phone, passing one's phone to a passenger or viewing something on a passenger's phone and reaching for a phone. When looking at mobile phone use while moving, perceived benefits accounted for 19% of the variance. Being good at multi-tasking accounted for 4% of the variance. When looking at mobile phone use while stopped, perceived benefits account for 18% of the variance and multi-tasking accounted for 2%.	Aker's social learning theory

Table B.9: Sociodemographic factors

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Barr, G. C., Jr., Kane, K. E., Barraco, R. D., Rayburg, T., Demers, L., Kraus, C. K., Greenberg, M. R., Rupp, V. A., Hamilton, K. M., & Kane, B. G. (2015). Gender differences in perceptions and self-reported driving behaviors among teenagers. *The Journal of emergency medicine, 48*(3), 366. doi:10.1016/j.jemermed.2014.09.055	USA	Gender	Self-report surveys **Aim**: Describe gender differences in young driver perceptions of safe driving behaviour and actual driving behaviour. **Conditions**: Young drivers from four high schools in two states. One state had bans on mobile phone use while the other did not. **Measures**: Knowledge, attitudes, self-reported behaviours of young drivers and their parents. **Participants**: 756 high school students. **Limitations**: Results may not be generalisable as only surveyed two states in USA. Self-report data may be exaggerated.	32% of teenage male drivers said they were extremely safe drivers. In contrast, only 18% of female drivers said they were extremely safe drivers. 91% of females reported always wearing a seatbelt compared to 77% of males. 68% of males reported using a phone while driving compared to 56% of females. The authors conclude that teenage boys perceive themselves to be safe drivers but report engaging in more distracted driving than females. The authors conclude there is an opportunity for gender-specific educations interventions.	None specifically mentioned.
2015	Cuenen, A., Jongen, E. M. M., Brijs, T., Brijs, K., Lutin, M., Van Vlierden, K., & Wets, G. (2015). Does attention capacity moderate the effect of driver distraction in older drivers? *Accident Analysis and Prevention, 77*, 12-20. doi:10.1016/j.aap.2015.01.011	Belgium	Age	Driving simulator study, self-report questionnaire **Aim**: Investigate whether attention capacity has a moderating effect on older drivers. **Conditions**: Two simulator tasks (1) visual distraction, (2) cognitive distraction. Participants were 70 years or older in good health. **Measures:** Speed, lane keeping, following distance, braking behaviour, crashes. Subjective questionnaire with Likert scale. Cognitive ability test. **Participants**: 17 (1) + 35 (2) **Limitations**: Sample size was small and not evenly distributed between cognitive and visual distraction conditions. No comparison with younger drivers. Possible self-selection bias. Low ecological validity for simulator studies.	The study found there was a marginally significant effect of visual distraction on crashes. The number of complete stops at stop signs decreased with cognitive distraction. Lower demand vehicle handling tasks (maintaining speed, lane keeping, and following distance) were not significantly affected by either visual or cognitive distraction. In fact, mean speed decreased when cognitively distracted. Older drivers with lower attention capacity had lower driving performance than those with higher attention capacity in both high and low demand driving tasks. Driving performance sometimes improved during cognitive distraction, particularly during monotonous driving scenarios. Participants consistently overestimated their driving skills. The authors suggest education countermeasures to increase awareness about the effects of distraction are important for older drivers.	Hierarchical control theory

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Donmez, B., & Liu, Z. (2015). Associations of distraction involvement and age with driver injury severities. *Journal of safety research, 52,* 23-28. doi:10.1016/j.jsr.2014.12.001	Canada	Age	Secondary crash data analysis (US) **Aim**: Investigates the associations between the severity of injuries sustained by a driver, type of driver distraction, and driver age. **Conditions**: Two vehicle crashes, 3 driver age groups: <25 (46%), 25-64 (51%), >64 (3%). Distracted driver category compared to baseline (no distraction). **Measures**: Crash outcome, injury severity, weather, road type, distraction type, driver age. **Participants**: US national dataset 2003-2009. **Limitations**: Dataset based on police observations (effect may be greater than reported), data set did not accurately report crash site.	Talking on a cell phone was associated with increased odds of severe injuries for younger and older drivers but was not significant for mid-age drivers. Inattention (lost in thought) and distractions outside the vehicle decreased the odds of severe injuries for all age groups. For older drivers, the highest odds of severe injuries were observed with dialling or texting on a cell phone, followed by in-vehicle sources and talking on the cell phone.	None specifically mentioned.
2015	Engelberg, J. K., Hill, L. L., Rybar, J., & Styer, T. (2015). Distracted driving behaviors related to cell phone use among middle-aged adults. *Journal of Transport & Health, 2*(3), 434-440. doi:10.1016/j.jth.2015.05.002	USA	Age Vehicle as a workplace	Online self-report survey **Aim**: Characterise behaviour and predictors of distracted driving in middle-aged adults. **Conditions**: San Diego regular drivers who owned a mobile phone **Measures**: Distracted driving attitudes and behaviours (particularly phone use). **Participants**: 75 drivers (30-64 years) **Limitations**: Participants were mainly white, female. Social desirability bias.	Work obligations and overconfidence in driving ability were the main self-reported contributing factors for phone use while driving. Authors suggest there is potential to intervene at workplaces and implement policies that ban cell phone use while driving at work.	None specifically mentioned.
2015	Haque, M., & Washington, S. (2015). The impact of mobile phone distraction on the braking behaviour of young drivers: A hazard-based duration model. *Transportation Research Part C-Emerging Technologies, 50*, 13-27. doi:10.1016/j.trc.2014.07.011	Australia	Age	Simulator driving study, self-report questionnaire **Aim**: Compare the braking profile of young drivers distracted by mobile phone conversations to non-distracted braking. **Conditions**: Baseline, handsfree phone use, handheld phone use. **Measures**: Braking behaviours before pedestrian crossing. **Participants**: 32 young drivers. **Limitations**: None mentioned.	Distracted drivers appear to brake faster and more abruptly than non-distracted drivers. Younger drivers (provisional licence holders) appeared to break more aggressively than older (open licence) drivers. The authors suggest excessive braking may represent risk compensation and excessive/aggressive braking may increase the risk of rear-end collisions.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Hill, L., Rybar, J., Styer, T., Fram, E., Merchant, G., & Eastman, A. (2015). Prevalence of and Attitudes About Distracted Driving in College Students. *Traffic Injury Prevention, 16*(4), 362-367. doi:10.1080/15389588.2014.949340	USA	Age	Online anonymous survey **Aim**: Identify current distracted driving behaviours and canvass opinions of students on deterrents and interventions for reducing mobile phone use. **Conditions**: College and university students, owned a mobile phone, 18-29 years old, licensed drivers. **Measures**: Collision and citation history, attitudes, observation of other drivers. **Participants**: 4,964 young drivers **Limitations**: Sample not representative of all young drivers, social desirability bias.	91% of respondents used a phone while driving (talking and texting). 66% reported that they were better drivers than their peers and better able to drive distracted. These drivers reported more phone use while driving than less confident drivers. Almost 50% of the students thought they could drive distracted without incident but thought that only 9% of other drivers could do so. Perceived safety of multitasking while driving was a strong inverse predictor of distracted driving. Authors suggest this may indicate social desirability bias. Students who witnessed other drivers engaged in DD were more likely to drive whilst distracted. Students mentioned insurance penalties, the cost of citations, added points to their driving records, and license suspension as effective interventions. 39% agreed with a requirement that DD violators should attend an educational class.	Social norms
2015	Lee, J., Reimer, B., Mehler, B., Angell, L., Seppelt, B. D., & Coughlin, J. F. (2015). *Analyses of Glance Patterns of Older and Younger Drivers During Visual-Manual Human-Machine Interface Interaction.* Paper presented at the Transportation Research Board 94th Annual Meeting, Washington DC, Unites States.	USA	Age HMI	Naturalistic driving study, self-report questionnaire (both from secondary data source) **Aim**: Explore how driver characteristics (particularly age) impacts on visual attention when engaging in HMI tasks. **Conditions**: Vehicle equipped with traditional controls and a voice-activated controls. **Measures**: Data acquisition system (incl. voice recording and cameras) that captured driver behaviour. **Participants**: 52 experienced drivers (30 younger and 22 older drivers) who drove at least 3 times per week. **Limitations**: Study did not control for speed and environmental factors.	Two patterns of glance behaviour were observed: Type A: shorter, more frequent glance behaviour Type B: longer, less frequent glance behaviour. Both younger and older drivers had both types of glance patterns. Younger drivers generally completed the task with shorter and fewer glances (Type A), whereas older drivers required longer and more glances (Type B). Nonetheless, both Type A and B glance behaviours occurred in both age groups. Self-reported users of in-vehicle navigation systems completed manual radio tuning task with shorter and fewer glances.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Struckman-Johnson, C., Gaster, S., Struckman-Johnson, D., Johnson, M., & May-Shinagle, G. (2015). Gender differences in psychosocial predictors of texting while driving. *Accident Analysis and Prevention, 74,* 218-228. doi:10.1016/j.aap.2014.10.001	USA	Gender	Online self-report survey **Aim**: Study the psychosocial motives for texting while driving. **Conditions**: enrolled in Psychology course. **Measures**: Sociodemographic data, miles driven per week, distracted driving activities, confidence in driving ability. **Participants**: 515 psychology students (158 men, 357 women) **Limitations**: Self-report biases, non-representative sample, undifferentiated distracted driving behaviours.	Study showed that 94% of participants self-reported as texting while driving. Risk perception differed by gender. 52% of men and 64% of women believed texting while driving should be illegal. 21% of respondents had experienced a near crash and 4% an actual crash. The study showed that up to 94% of respondents self-reported they would stop texting for a range of reasons. Reasons varied by gender – men were generally only responsive to hard interventions (arrest, crash involvement, lower insurance premiums). Women were more responsive to social norms. Therefore, interventions efforts should be targeted at different genders.	None specifically mentioned.
2015	Tucker, S., Pek, S., Morrish, J., & Ruf, M. (2015). Prevalence of texting while driving and other risky driving behaviors among young people in Ontario, Canada: Evidence from 2012 and 2014. *Accident Analysis and Prevention, 84,* 144-152. doi:10.1016/j.aap.2015.07.011	Canada	Gender	Online safety survey – two time periods **Aim**: Investigate the prevalence of texting, talking on the phone, and speeding by age and gender. **Conditions**: Short survey during Passport to Safety (PS) test. Study 1 = 2012-2013 Study 2 = 2014-2015 **Measures**: Age, sex, frequency of texting and speeding. **Participants**: Study 1= 6133, Study 2 = 4450. **Limitations**: Sample sizes in each study were substantially different limiting the statistical significance of the findings. Limited number of survey questions.	<u>Study 1 findings</u> Males reported more frequent texting and speeding while driving. Younger participants reported more risky behaviour than older participants. <u>Study 2 findings</u> Males again reported more texting than females. However, both males and females reported similar rates of talking on the phone. There was a substantial decline in texting and talking on the phone in the second study. The authors do not say whether laws had changed over the two study time periods.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Carney, C., Harland, K. K., & McGehee, D. V. (2016). Using event-triggered naturalistic data to examine the prevalence of teen driver distractions in rear-end crashes. *Journal of safety research, 57,* 47-52. doi:10.1016/j.jsr.2016.03.010	USA	Age	Naturalistic driving study – secondary data analysis. **Aim**: Examine the effect of teen driver gender and the prevalence of driver behaviours on crash rate. **Conditions**: vehicles fitted with in-vehicle event records (IVERs) that captured video (inside and outside of vehicle) 8 seconds before and 4 seconds after trigger event (rear-end crash). **Measures**: Driver behaviours, eyes-off-road time, inadequate surveillance, and response times to lead-vehicle braking. **Participants**: 412 rear-end crashes. **Limitations**: Sample may not be representative of population (volunteer), IVERs could potentially moderate behaviour. Results only relate to rear-end crashes, not all distracting behaviours.	Overall, drivers were observed engaging in some type of potentially distracting behaviour in 76% of rear-end crashes. 95% of distracting behaviours were codes as operating/looking at phone. 17% were looking outside of vehicle, 16% were codes as attending to a passenger. Crashes were evenly distributed across genders. 36% of crashes has at least one passenger. For the 98 crashes with no distracting driver behaviour encoded, no passenger was on board, one third were codes as following a lead vehicle too closely, 72% were codes as inadequately surveying road ahead. 90% of crashes averaged 2.5s total eyes off the road (TEOTR) time in 6s prior to impact. Cell phone use was the most frequent behaviour in these crashes and had the longest average TEOTR time (4.1s).	None specifically mentioned.
2016	Simons-Morton, B., Li, K., Ehsani, J. P., & Vaca, F. E. (2016). Covariability in three dimensions of teenage driving risk behavior: impaired driving, risky and unsafe driving behavior, and secondary task engagement. *Traffic Injury Prevention, 17*(5), 441-446. doi:10.1080/15389588.2015.1107183	USA	Age	NEXT Generation study - secondary data analysis. **Aim**: Examine the extent to which teenagers who engaged in one form of risky driving also engaged in other forms and whether risky driving measures were reciprocally associated over time. **Conditions**: Longitudinal survey of 10th graders starting in 2009-2010 in 3 waves (W1, W2, W3) who had obtained an independent, unsupervised driving license. **Measures**: Driving while alcohol-impaired (DWI), risky driving scale, secondary task engagement **Participants**: W1=402, W2=880, W3=2408. **Limitations**: Relatively small sample size, lack of objective measures to compare self-report responses. Loose association between variability measures.	The findings indicate that each measure was stable over time. Some associations were found between risky driving behaviours and both DWI and secondary task engagement. However, the authors did not find prospective associations (likely to occur in the future) between secondary task engagement and DWI or other risky driving behaviours.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Clark, H., & Feng, J. (2017). Age differences in the takeover of vehicle control and engagement in non-driving-related activities in simulated driving with conditional automation. *Accident Analysis and Prevention, 106,* 468-479. doi:10.1016/j.aap.2016.08.027	USA	Age	Simulator driving study **Aim**: Examine the effect of age, level of activity-engagement and takeover notification interval on vehicle control **Conditions**: 3 driving scenarios with 4 transitions – twelve takeovers. Variations in notification interval (4.5s and 7.5s). Vehicle speed was consistent between conditions. **Measures**: Video recordings of driver behaviour, brake input, lane position, eye's off the road, steering wheel angle, and notification response time. **Participants**: 18 older drivers (age 62-81 years) and 17 younger drivers (18-35 years). **Limitations**: Study was correlational. Low ecological validity. Notifications were limited to audio. Participants not representative (only health adults).	Both younger and older drivers engaged in various non-driving-related activities during the automated driving portion, with distinct preferences on the type of activity for each age group (i.e., while younger drivers mostly used an electronic device, older drivers tended to converse). Authors suggest difference are related to personal habits (younger drivers engage more with technology than older drivers). Older drivers generally drove more slowly, had smaller deviations from road centreline, and braked and accelerated harder than younger drivers. Longer notification intervals were preferred by both age groups. Longer transitions resulted in smoother transitions of vehicle controls. Some minor but not significant differences between age groups.	None specifically mentioned.
2017	Gershon, P., Zhu, C., Klauer, S. G., Dingus, T. A., & Simons-Morton, B. (2017). Teens' distracted driving behavior: Prevalence and predictors. *Journal of safety research, 63,* 157-161. doi:10.1016/j.jsr.2017.10.002	USA	Age	Naturalistic driving study, self-report surveys **Aim**: Identify predictors of secondary task engagement in teen drivers **Conditions**: vehicles were equipped with data acquisition systems (DAS). **Measures**: Driving performance measures including secondary task engagement and environmental factors. **Participants**: 83 newly licensed drivers. **Limitations**: Participants sample is limited to one geographic area. Findings were significant but relatively weak (particularly for psychosocial factors).	The most prevalent types of secondary tasks were interaction with a passenger, talking/singing (no passenger), external distraction, and texting/dialling. Secondary task engagement was more prevalent among those with primary vehicle access and when driving alone. Social norms, friends' risky driving behaviours, and parental limitations were significantly associated with secondary task prevalence. Environmental conditions (e.g., complex roads, low lighting) did not moderate secondary task engagement for young drivers.	Social norms

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Gong, L., & Fan, W. (2017). Modeling single-vehicle run-off-road crash severity in rural areas: Accounting for unobserved heterogeneity and age difference. *Accident Analysis and Prevention, 101,* 124-134. doi:10.1016/j.aap.2017.02.014	USA	Age	Secondary crash data analysis (2009-2013) from North Carolina, USA **Aim**: Investigate factors that significantly contribute to the severity of driver injuries resulting from single-vehicle run-off-road (SV ROR) crashes on rural highways. **Conditions**: Age groups (16-24, 25-65, over 65). A series of driver, vehicle, roadway, and environmental characteristics were examined. **Measures**: Parameter estimates, and their elasticities. **Participants**: 55,355 SV ROR crashes were included and categorised **Limitations**: Secondary data analysis (without direct observation).	Contributing factors to SV ROR crash differ significantly across age groups. Reckless driving, speeding, distraction, inexperience, drug or alcohol involvement, presence of passengers, and driving an SUV or a van are found to have a more pronounced influence in young and middle-aged drivers than older drivers. Older drivers are less likely to experience possible injuries in an SUV or van than a car. Older drivers are more likely to be involved in a fatal road crash due to severe weather conditions (ice, snow).	None specifically mentioned.
2017	Guo, F., Klauer, S. G., Fang, Y., Hankey, J. M., Antin, J. F., Perez, M. A., Lee, S. E., & Dingus, T. A. (2017). The effects of age on crash risk associated with driver distraction. *International Journal of Epidemiology, 46*(1), 258-265. doi:10.1093/ije/dyw234	USA	Age	Naturalistic driving study (SHRP 2) **Aim**: Evaluate the prevalence and crash risk of distraction caused by secondary-task engagement across the full spectrum of age groups. **Conditions**: Severe crashes only (property damage and high severity). **Measures**: Secondary task engagement at onset of crash for four age groups (16-20, 21-29, 30-64, 65-98). **Participants**: 3542 drivers over 3 years. **Limitations**: None mentioned specifically.	Secondary task-induced distraction was a higher threat for drivers younger than 30 and above 65 when compared with middle-aged drivers. However, senior drivers engaged in secondary tasks much less frequently than their younger counterparts. High visual and cognitively demanding secondary tasks (e.g., mobile phones) affected drivers of all ages, however middle-aged drivers are less affected. Other distractions (like adjusting radio and climate controls) also increase crash risk (OR > 2). The results imply that driving experience and/or maturity plays a critical role in how drivers manage risk. Risk management tasks may take longer than 9-10 years (as previously thought).	

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Kidd, D. G., & Buonarosa, M. L. (2017). Distracting behaviors among teenagers and young, middle-aged, and older adult drivers when driving without and with warnings from an integrated vehicle safety system. *Journal of safety research, 61*, 177-185. doi:10.1016/j.jsr.2017.02.017	USA	Age	Naturalistic driving study – secondary data analysis **Aim**: Examine the impact of integrated vehicle-based safety system on secondary task behaviours among drivers aged 16–17, 20–30, 40–50, and 60–70. **Conditions**: Participants drove an instrumented sedan with various collision warning systems for an extended period. Two studies were analysed: the adult study (with equal numbers of young, adult, and older drivers) and the teenager study (with 40 16-17 year olds). Both studies contained a baseline condition with no warnings. **Measures**: Videos were encoded with 11 secondary behaviours **Participants**: Adult study = 108 participants. Teenager study = 40 participants. **Limitations**: Collision warning systems were not always reliable perhaps resulting in participants not responding to warnings.	At least one secondary behaviour was present in 46% of video clips; conversing with a passenger (17%), personal grooming (9%), and cell phone conversation (6%) were the most common. The main effects of driver age on the likelihood that at least one secondary behaviour, passenger conversation, cellphone conversation, visual-manual interaction with a portable device, or singing or whistling was present were statistically significant; the effect of driver age on the likelihood that personal grooming was present was not significant. Lower for middle-aged drivers, and older drivers relative to teenage drivers. Relative to teenage drivers, drivers were significantly less likely to be singing or whistling if they were young adult drivers, middle-aged drivers, and older drivers. Relative to teenage drivers, the likelihood of young adult drivers and middle-aged drivers being engaged in cellphone conversations were significantly increased. The likelihood of young adult drivers visually or manually interacting with a portable device was significantly increased relative to teenage drivers, whereas the likelihood for older drivers was significantly decreased relative to teenage drivers. The likelihood that at least one secondary behaviour was present was not significantly different when drivers received warnings relative to periods without warnings. Low (below 5mph) or high (above 25mph) speeds did not increase or decrease the likelihood that drivers engaged in secondary tasks.	

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Mirman, J. H., Durbin, D. R., Lee, Y. -C., & Seifert, S. J. (2017). Adolescent and adult drivers' mobile phone use while driving with different interlocutors. *Accident Analysis and Prevention, 104,* 18-23. doi:10.1016/j.aap.2017.04.014	USA	Age	Self-report survey **Aim**: Examine the frequency of adolescents' (16-18 years) and their parents' mobile phone use while driving (MPUWD). **Conditions**: Perceived risk of MPUWD depending on social communication (proximal processes) obligations with family, peers. **Measures**: Sociodemographic data, crash history, general mobile phone use, specific to driving mobile phone use (how often they initiative and received phone calls), technology addiction scale. **Participants**: 47 parent/child dyads (94 total). **Limitations**: Study used a convenience sample which was relatively homogenous.	Parents reported engaging in more frequent MPUWD with their children than their children reported engaging with their parents. Adolescents reported higher levels of symptoms associated with technology addiction. Parents engaged in MPUWD with their children at the same rate as adolescents engaged with their peers. Siblings did not frequently engage with each other by mobile phone use. The authors summarise that psychological correlates of mobile device use while driving varied depending on both the type of the driver and with whom the driver is communicating. Results imply that future interventions should be nuanced and targeted.	Bio-ecological model
2017	Monroe, K., Hardwick, W., Lawson, V., Nichols, E., Nichols, M., & King, W. D. (2017). Risky Teen Driving in a Rural Southern State. *Southern medical journal, 110*(5), 343-346. doi:10.14423/SMJ.0000000000000648	USA	Age	Self-report questionnaire **Aim**: Explore opinions of young drivers regarding high risk driving behaviours. **Conditions**: Teenagers from a large country school in Alabama. **Measures**: Safety behaviours including seatbelt use, phone use while driving, drink driving behaviours. **Participants**: 1023 young drivers. **Limitations**: Participants may not answer truthfully (social desirability bias). Participants were from one rural geographic area.	High risk behaviours were reported by many of the participants. A large proportion of participants did not wear seatbelts (52%), used mobile phones will driving (51%), and admitted to drinking and driving (10%), or were a passenger when another driver was drink driving (23%). Parents' seatbelt use increased the likelihood of participant seatbelt use, and parental discussion of the risks of driving and drinking appeared to be preventive. Parental behaviour had a positive impact in cellular telephone use because teens were more likely to use a phone while driving if the parent also did. Driver's education did seem to have a positive effect on seatbelt usage. The legislation in Alabama (seatbelt laws, restrictions on cellular telephone usage, and legislation against drinking and driving) did not seem to influence teen driving behaviour for many participants.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Trivedi, N., Haynie, D., Bible, J., Liu, D. P., & Simons-Morton, B. (2017). Cell Phone Use While Driving: Prospective Association with Emerging Adult Use. *Accident Analysis and Prevention, 106,* 450-455. doi:10.1016/j.aap.2017.04.013	USA	Age	Self-report survey from 'NEXT Generation study' - secondary data analysis **Aim**: Investigates the prospective association between peer and emerging adult texting while driving the first year after high school. **Conditions**: Young drivers in year after finishing high school. **Measures**: frequency of texting while driving. **Participants**: 212 young drivers and 675 peers. **Limitations**: Self-report studies may be subject to recall bias. Nominated peers may not be fully representative. Parental influence (or other older adults) was not investigated. Study design may not capture all social media interactions.	The study found that texting among peers was significantly associated with texting among young driver participants (44.3%). Participants with peers who never texted while driving were also unlikely to text while driving (only 14%). The authors suggest peer influence (or social norms) could be driven by perceived social norms, modelling, or peer pressure.	Theory of planned behaviour Theory of normative social behaviour
2017	Zahabi, M., Machado, P., Lau, M. Y., Deng, Y., Pankok, C., Jr., Hummer, J., Rasdorf, W., & Kaber, D. B. (2017). Driver performance and attention allocation in use of logo signs on freeway exit ramps. *Applied Ergonomics, 65,* 70-80. doi:10.1016/j.apergo.2017.06.001	USA	Age Billboards/signs	Simulator driving study **Aim**: Quantify the effects of driver age, ramp signage configuration, logo format and sign familiarity, on driver performance and attention allocation when exiting freeways. **Conditions**: Four lane, rural interstate freeway. Realistic driving environment with exits and signage. **Measures**: 3x2x2x2 within and between subject design. Measures included river age, attention allocation, accuracy, driving performance. **Participants**: 60 drivers. **Limitations**: Only daylight conditions and moderate traffic density were presented. No vehicle distractions were presented.	Results revealed elderly drivers demonstrated worse performance and conservative control strategies when compared to middle-aged and young drivers. Elderly drivers also showed lower off-road glance frequency and shorter off-road glance durations compared to middle-aged and young drivers. In general, drivers adopted a more conservative strategy when exposed to nine-panel signs as compared to six-panel signs and were more accurate in target detection when searching six-panels versus nine and with familiar versus unfamiliar logos.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Atwood, J., Guo, F., Fitch, G. M., & Dingus, T. A. (2018). The driver-level crash risk associated with daily cellphone use and cellphone use while driving. *Accident Analysis and Prevention, 119,* 149-154. doi:10.1016/j.aap.2018.07.007	USA	Age	Secondary data analysis – SHRP 2 naturalistic driving study (NDS) **Aim**: Examine overall prevalence of phone use, including the rates of calls and texts both per day and hourly while driving, and assessed whether or not individual crash risk was correlated with phone use. **Conditions**: Naturalistic driving over 3 years with linked phone records. **Measures**: Age, phone use, crash data. **Participants**: 557 participants **Limitations**: Manner of phone call was not parsed (handheld v. handsfree). Types of phone use was not parsed (talk text email).	The texting rate for drivers aged 16–19 was 59.4 per day and 2.9 per hour of driving, four times higher than the 14.3 per day and 1.0 per hour for drivers 30–64 years old. The texting rate for drivers 20–29 years old was also high at 42.4 per day and 2.6 per hour of driving. It was found that those who texted more often per day or per hour of driving had higher crash rates after adjusting for age and gender effects. In summary, the texting rate for young drivers is substantially higher than for middle-aged and senior drivers.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Carney, C., Harland, K. K., & McGehee, D. V. (2018). Examining teen driver crashes and the prevalence of distraction: Recent trends, 2007-2015. *Journal of safety research, 64*, 21-27. doi:10.1016/j.jsr.2017.12.014	USA	Age	Secondary data analysis of 2,229 naturalistic driving videos (2007-2015) **Aim**: Identify types of vehicle crashes teens are most frequently involved in, as well as the distracting activities being engaged in leading up to these crashes, with a focus on identifying changes or trends over time. **Conditions**: Moderate to severe crashes. **Measures**: Crash type, distracting behaviours, phone use, eyes off forward road (EOFR), gland duration. **Participants**: 2229 crash videos from 15,000 drivers aged 16-19 years. **Limitations**: Concerns about representativeness of sample. Only crash events were recorded therefore overall crash risk cannot be inferred. Driver identification was not possible to determine where more than one crash involved a particular driver.	In general, results did not show an increase over time in the proportion of crashes in which the driver was distracted prior to a crash. Teens were seen engaging in some type of secondary activity in the seconds leading up to 59% of crashes, consistent with other research. There was a significant increase in the proportion of rear-end collisions over the time period. In contrast, there was a significant reduction in both road departure and loss of control (LOC) crashes and, therefore, a significant decrease in single vehicle crashes overall. Rear-end crashes are most often caused by following too closely and/or responding late due to inattention or distraction. The authors suggest visual/manual/cognitive distraction (operating/looking at phone) has led to an increase in EOFR, resulting in an increase in the proportion of rear-end crashes. For rear-end crashes, the mean EOFR time and mean duration of the longest glance both increased in this study. In summary, the authors suggest it is possible that more drivers are choosing to check messages or text (visual/manual distraction) at times they perceive to be safer, such as while slowing for, stopped at, or departing from an intersection and this could explain the increase in rear-end crashes.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Cook, S., Boak, A., Hamilton, H. A., Mann, R. E., Manson, H. E., & Wickens, C. M. (2018). The prevalence and correlates of texting while driving among a population-based sample of Ontario students. *Traffic Injury Prevention, 19*(7), 722-727. doi:10.1080/15389588.2018.1491038	Canada	Age	Self-report survey – secondary data analysis (2013) **Aim**: Examine the prevalence and risk factors of writing text messages or emails while driving. **Conditions**: adolescent drivers, 16-20 years. **Measures**: Age, text while driving (TWD), seat belt use, driving after alcohol or marijuana use, rode in vehicle with driver who had used alcohol or marijuana, collision involvement. **Participants**: 1113 adolescent drivers **Limitations**: Inaccurate recall or self-report, no measure driving exposure, no measure of phone ownership.	36% of participants (16-20 years old) reported writing an email or text message while driving in 12-month study period. 56% did so 4 or more times. Graduated 2 licence (unsupervised) had the strongest association with TWD (10 times higher than G1/supervised licence). Rural participants were less likely to TWD than urban participants. TWD was also associated with drink driving and drug driving behaviours and also riding with a driver who had used alcohol or marijuana or had been involved in an accident in the past year. The authors suggest these results point to clustering of risky driving behaviours or sensation seeking. In summary, this study found that TWD is common among Ontario's adolescent drivers, particularly among those who have a G2 or full license. Writing text messages while driving is also associated with other risky driving behaviours and outcomes such as collision involvement.	None specifically mentioned.
2018	Hill, L., Baird, S., Engelberg, J. K., Larocca, J., Alwahab, U., Chukwueke, J., Engler, A. M., Jahns, J., & Rybar, J. (2018). Distracted Driving Behaviors and Beliefs among Older Adults. *Transportation Research Record, 2672*(33), 78-88. doi:10.1177/0361198118786245	USA	Age	Self-report survey, development of distracted driving scale (DDS) **Aim**: Characterise phone-related distractions in older drivers (age > 65) and identify intervention strategies likely to reduce cell distraction. **Conditions**: Online and paper survey offered to older drivers. **Measures**: Sociodemographic measure, health and wellbeing, phone use, other tasks while driving, perceived driving capability during other tasks, work obligation measure. **Participants**: 363 older drivers. **Limitations**: Participants not necessarily representative. Self-report studies may be prone to social desirability bias.	60% of older adults reported using their cell phone while driving at least some of the time. Participants perceived their own ability as capable or very capable when driving and using: handheld phone (40%); handsfree phone (78%); other tasks (38%) while driving. 32% of older adults who drive minors reported driving while distracted. 30% of those who work felt obligated to take work-related calls. Variables associated with distracted driving include younger age, driving more miles, perceived handsfree skill, smartphone ownership, and being employed or self-employed. Laws and potential loss of insurance coverage with distracted driving were cited as effective penalties.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Lee, J., Mehler, B., Reimer, B., Ebe, K., & Coughlin, J. F. (2018). Relationships Between Older Drivers' Cognitive Abilities as Assessed on the MoCA and Glance Patterns During Visual-Manual Radio Tuning While Driving. *The journals of gerontology. Series B, Psychological sciences and social sciences, 73*(7), 1190-1197. doi:10.1093/geronb/gbw131	USA	Age	Secondary data analysis - Naturalistic Driving Study **Aim**: Investigate the relationship between older drivers' (M = 66.3, range 61–69 years) cognitive abilities and the duration of off-road glances while engaged in secondary visual-manual activities. **Conditions**: Driving on 3 lane highway with posted limit of 65 mph under supervision. Radio tuning tasks (by audio recording). **Measures**: Cognitive assessment, eye glance measures (off-road, task relevant glances). **Participants**: 22 older drivers **Limitations**: Initial assessment excluded some older drivers with low cognitive ability scores, therefore findings are somewhat limited.	Driver with higher cognitive ability spent less glance time (mean duration and total glance time) away from the forward roadway during radio tuning AND spent shorted glance time to the task relevant area. The authors suggest that lower cognitive ability, rather than a simplistic age measure, may represent the decrement in performance reported in studies relating to driver distraction.	None specifically mentioned.
2018	Young, K. L., Charlton, J. L., Koppel, S., Grzebieta, R., Williamson, A., Woolley, J., & Senserrick, T. (2018). Distraction and older drivers: an emerging problem? *Journal of the Australasian College of Road Safety, 29*(4), 18-29. Retrieved from http://acrs.org.au/publications/journals/current-and-back-issues/	Australia	Age	Literature review. Secondary data analysis – Australian Naturalistic Driving Study (ANDS) **Aim**: Discuss current knowledge regarding why older drivers are particularly vulnerable to the effects of distracted driving. **Limitations**: None mentioned.	The older driver cohort is growing rapidly, and the demographic characteristics of older drivers are changing, most notably in terms of licensing rates, travel patterns and technology use. Functional declines (cognitive) make older drivers susceptible to risks with distracted driving, particularly mobile phone use. Older drivers in Australia spent 36.5 percent of their driving time engaged in secondary tasks, a percentage comparable to the younger and middle-aged drivers sampled; however, the nature of the tasks that older drivers engaged intended to differ. Older drivers tend to reduce speed, shed less relevant driving tasks, engage in secondary tasks of relatively short duration and at times when the surrounding traffic was light or no traffic was present when compared to younger and middle-aged drivers. In summary, findings from ANDS suggest that Australian older drivers engage in a large number of secondary tasks when driving; however, there is evidence that they self-regulate the type and timing of these tasks.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Berenbaum, E., Harrington, D., Keller-Olaman, S., & Manson, H. (2019). Y TXT N DRIVE? Predictors of texting while driving among a sample of Ontario youth and young adults. *Accident Analysis and Prevention, 122*, 301-307. doi:10.1016/j.aap.2018.10.021	Canada	Age	Online self-report survey (Jan-Feb 2015) **Aim**: Examine predictors of TWD behaviour among youth and young adults. **Conditions**: Ontario youths and young adults (16-24 years). Cross-sectional survey. **Measures**: Demographical variables, texting while driving (TWD), attitudes, intentions, perceived behavioural control, subjective norms, moral norms, risk perception, descriptive norms, perceived TWD skills, collisions due to TWD. **Participants**: 2001 young drivers **Limitations**: Self-report data may be subject to social desirability bias. Survey was online perhaps leading to voluntary participation of more technology savvy young drivers.	Intentions were positively associated with TWD. However, moral norms were negatively associated with TWD behaviours. Attitudes and subjective norms were not predictors of TWD. Perceived behavioural control was negatively associated with TWD behaviours. Participants who perceived themselves to be skilled at TWD were more likely to TWD. Descriptive norms (beliefs about the perceptions of others) were positively associated with TWD (peer pressure). Risk perception did not affect TWD behaviours, even if participant's self-reported as 'almost getting into a collision due to TWD' in the last week. The authors suggest this may be due to optimism bias.	Theory of planned behaviour Descriptive norms Risk perceptions
2019	Gershon, P., Sita, K. R., Zhu, C., Ehsani, J. P., Klauer, S. G., Dingus, T. A., & Simons-Morton, B. G. (2019). Distracted Driving, Visual Inattention, and Crash Risk Among Teenage Drivers*. American Journal of Preventive Medicine, 56*(4), 494-500. doi:10.1016/j.amepre.2018.11.024	USA	Age	Naturalistic driving study (2010-2014) **Aim**: Determine the extent to which visual inattention while engaging in distracting secondary tasks contributes to teenage drivers' crash risk. **Conditions**: Data acquisition systems (DAS) installed in private vehicles **Measures**: Driving kinematics, miles driven, video recordings of driver and driving environment. 6 second video segment from both crash and random samples of normal driving. **Participants**: 82 newly licensed drivers. **Limitations**: Participants may not be nationally representative. Study did not consider all key factors.	The results of the study indicate that the overall prevalence of secondary task engagement was similar for baselines and crash events. However, manual phone use (e.g., texting, dialling, and browsing the web) and reaching for objects were found to be associated with increased crash risk. Moreover, the analyses found that 41% of the association between manual phone use and teenagers' crash risk was mediated by the driver taking their eyes off the road (looking away from the forward road). The remaining 59% was due to the physical demands of operating the phone and additional cognitive load. The authors conclude the elevated risk for these tasks can be explained by visual inattention, cognitive load, and physical demands.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Gliklich, J., Maurer, R., & Bergmark, R. W. (2019). Patterns of Texting and Driving in a US National Survey of Millennial Parents vs Older Parents. *JAMA Pediatrics, 173*(7), 689-690. doi:10.1001/jamapediatrics.2019.0830	USA	Age	Self-report survey – Distracted Driving Survey (DDS) **Aim**: Characterise the texting and driving patterns of millennial vs older parents. **Measures**: Texting while driving (TWD) behaviours, attitudes, crash rate, technology use to reduce TWD, perceived driving ability, perceived TWD ability. **Participants**: 435 parents (225 millennial parents and 210 older parents). **Limitations**: Self-report potential for recall bias and selection bias for more tech savvy parents.	Higher DDS scores reflect higher reckless driving behaviours. Millennial parents had higher DDS scores than older parents, demonstrating riskier driving behaviours. However, crash rate did not differ across the two age groups. TWD was common in both age groups. Some parents (24.6% of millennial parents and 17.3% of older parents) used technologies that blocked phone features. Regardless of age 58.4% of parents said they are safe drivers and 67% said they use their phone less when driving children.	
2019	Huisingh, C., Owsley, C., Levitan, E. B., Irvin, M. R., MacLennan, P., & McGwin, G., Jr. (2019). Distracted Driving and Risk of Crash or Near-Crash Involvement Among Older Drivers Using Naturalistic Driving Data With a Case-Crossover Study Design. *Journals of Gerontology Series a-Biological Sciences and Medical Sciences, 74*(4), 550-555. doi:10.1093/Gerona/gly119	USA	Age	Secondary data analysis – SHRP2 NDS **Aim**: Examine the association between secondary task involvement and risk of crash and near-crash involvement among older drivers using naturalistic driving data. **Conditions**: Regular drivers aged >70 years from 6 US sites. Personal vehicles were equipped with 4 video cameras. Case cross-over design (control included in design). Videos were cut to 6 seconds in duration. **Measures**: Crash events, near crash events, speed, secondary task involvement. **Participants**: Drivers over 70 years from an original sample of 3,541 drivers. **Limitations**: Does not capture internal cognitive distractions (like emotional stress, anger), road type, time of day, weather.	The authors claim the study is the first to use a case-crossover study design (baseline or control). Secondary task involvement occurred in 40% of the normal driving (control) trips, including unspecified, interacting with passengers, talking, singing, glances to interior of vehicle, and infrequent phone use (approx. 1% of video time). In the crash event or near crash event video samples, phone use was associated with almost a fourfold increase (OR 3.9) in the likelihood of having a major crash. Secondary tasks coded as other glances into the interior of the vehicle were associated with an increased risk of having a near-crash event (OR 2.5). Other external distractions were associated with a decreased risk of crash involvement among older drivers. Other potentially distracting behaviours (e.g., talking, singing) were not associated with any type of crash or near-crash event.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Calvo, J. A., Baldwin, C., & Philips, B. (2020). Effect of age and secondary task engagement on motor vehicle crashes in a naturalistic setting. *Journal of safety research, 73*, 297-302. doi:10.1016/j.jsr.2020.03.011	USA	Age	Secondary data analysis – SHRP2 NDS **Aim**: Explore the relationship between older drivers, distracted driving, and crash rate. **Conditions**: Naturalistic driving study comparison between age groups. **Measures**: Crash severity, crash rate, secondary task frequency and type analysis. **Participants**: Novice drivers (484), young (662), middle-aged (553), elderly (770). **Limitations**: None mentioned.	The authors find that while older drivers and novice/younger drivers have more crashes per km driven than middle-age drivers, older drivers are not as at risk as previously thought. Secondary task engagement did not appear to have an effect on manoeuvre judgment. However, this may have been because all secondary tasks recorded in the NDS were condensed into a single level (secondary task engagement). It is possible that different age groups may have more or less difficulty conducting specific secondary tasks compared to others. For example, an older driver may be able to easily engage with a passenger but have a difficult time texting on a cell phone. The authors also explain that exposure to risky driving scenarios may be another explanatory factor. For example, older drivers tend to avoid driving at night and traffic complexity. Moreover, the older age group varies considerably by age segment. For example, the younger cohort (65-74) have less recorded crash or near crash events than the older cohort (above 75).	None specifically mentioned.
2020	Karthaus, M., Wascher, E., Falkenstein, M., & Getzmann, S. (2020). The ability of young, middle-aged and older drivers to inhibit visual and auditory distraction in a driving simulator task. *Transportation Research Part F-Traffic Psychology and Behaviour, 68,* 272-284. doi:10.1016/j.trf.2019.11.007	Germany	Age	Simulator driving study, self-report questionnaire **Aim**: Investigate the effects of acoustic and visual distractors on responses to critical events in the driving context. **Conditions**: Acoustic and visual distractions with three conditions (1) perception only (2) detection response (3) complex decision/discrimination response. One simple (drive in straight line) driving task. **Measures**: Driving history, driving habits and attitudes. Lane keeping, brake speed, reaction time to distraction. **Participants**: 89 licensed drivers in 4 age groups: 24 young drivers (19–25 years); 17 middle-aged drivers (35–45 years), 24 older drivers (56- 65 years) and 24 older drivers (70- 80 years). **Limitations**: Simulator studies have low ecological validity.	This distraction effect was most pronounced in the discrimination condition, in which the participants had to respond to some of the distracting stimuli and to inhibit (ignore) responses to some other stimuli. Visual distractions had a stronger impact than acoustic distractions. Middle-aged drivers managed distractor inhibition (ignore distraction) even in difficult tasks. Response times of young and old drivers increased significantly (especially when the task was to ignore the distraction).	Malleable Attentional Resource Theory Multiple Resource Theory Attention restoration theory

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Stavrinos, D., McManus, B., & Beck, H. (2020). Demographic, driving experience, and psychosocial predictors of adolescent distracted driving beliefs. *Accident Analysis and Prevention, 144,* 8. doi:10.1016/j.aap.2020.105678	USA	Age	Self-report survey **Aim**: Investigate how different age groups, genders, thrill seeking/risk-taking tendencies, and social obligation tendencies affect distracted driving beliefs and behaviours. **Conditions**: All participants had either a GDL stage 1, 2, or 3 licence and resided in the southeast region of the United States. **Measures**: Demographic data, distracted driving attitudes. **Participants**: 379 high school students (15-19 years) who had enrolled in a driver education course. **Limitations**: Sample may not be representative of all young drivers.	Most adolescents said handsfree cell phone conversations to be at least somewhat acceptable (82 %) whereas less than half (40 %) perceived hands-held cell phone conversations to be at least somewhat acceptable. Interestingly, most individuals in the current study would have been in a restricted licensure phase, making this behaviour illegal for them under the state's Graduated Driver's Licensing Laws. In general, men, those with more driving experience, higher in sensation seeking, and those placing more importance on checking notifications on a phone had riskier beliefs about distracted driving. Findings suggest adolescent distracted driving beliefs are influenced by individual difference factors.	Theory of planned behaviour

Table B.10: Legislation and enforcement

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Carpenter, C. S., & Nguyen, H. V. (2015). Effects of a Driver Cellphone Ban on Overall, Handheld, and Hands-Free Cellphone Use While Driving: New Evidence from Canada. *Health Economics, 24*(11), 1452-1467. doi:10.1002/hec.3098	Canada	Law Mobile phones	Self-report surveys **Aim:** To compare two Canadian jurisdictions on mobile phone use while driving. **Conditions:** Ontario – where there is a mobile phone ban and Alberta where there is no ban. **Measures:** Questions from the Canadian Community Health Surveys regarding handheld and hands-free mobile phone use while driving. **Participants:** 32,056 from Ontario and 9,555 from Alberta. **Limitations:** Self-report data, possible social desirability bias, unable to identify the effects of an Ontario-specific educational campaign.	The ban reduced overall and handheld mobile phone use but increased hands-free mobile use while driving. There was no effect for adults 51 years and older. There was a reduction for individuals with higher levels of education but an increase in handheld mobile phone use for those with lower levels of education.	None specifically mentioned.
2016	Brubacher, J. R., Desapriya, E., Chan, H., Ranatunga, Y., Harjee, R., Erdelyi, S., Asbridge, M., Purssell, R., & Pike, I. (2016). Media reporting of traffic legislation changes in British Columbia (2010) (Reprinted from vol 82, pg 227-233, 2015). *Accident Analysis and Prevention, 97*, 335-341. doi:10.1016/j.aap.2016.11.005	Canada	Law Mobile phones	Media analysis **Aim:** Understand extent and type of media coverage of new traffic laws introduced into British Columbia and to identify how laws were framed by the media. **Conditions:** Reviewed a database of injury related news coverage (May 2010 – December 2012) and classified articles according to (a) type (b) issue discussed (c) reference to new laws and (d) pro/anti traffic law. **Participants:** 1,848 articles mentioned distraction, impairment or speeding, 597 mentioned new laws. **Limitations:** None mentioned.	There were 227 articles regarding mobile phone distraction. Most articles regarding mobile phone distraction were in favour of the new laws or did not mention the new laws.	Deterrence theory (briefly)

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Ehsani, J. P., Ionides, E., Klauer, S. G., Perlus, J. G., & Gee, B. T. (2016). Effectiveness of Cell Phone Restrictions for Young Drivers Review of the Evidence. *Transportation Research Record*(2602), 35-42. doi:10.3141/2602-05	USA	Law Young drivers Mobile phones	Systematic review of the literature **Aim:** Summarise the prevalence of cell phone use and motor vehicle crashes involving young drivers. Conditions: Literature search for mobile phone restrictions for drivers aged below 25 years. **Participants**: 9 peer reviewed publications and 2 reports were included. **Limitations:** No crash study included, used mobile phone related crashes as an outcome measure, difficult to interpret and codify legislation	Most prevalence studies did <u>not</u> show a sustained reduction in mobile phone use following the introduction of a restriction.	None specifically mentioned.
2016	Qiao, N., & Bell, T. M. (2016). State all-driver distracted driving laws and high school students' texting while driving behavior. *Traffic Injury Prevention, 17*(1), 5-8. doi:10.1080/15389588.2015.1041112	USA	Law Young drivers Mobile phones	Cross-sectional survey **Aim:** Examine the effect of different all-driver distracted driving laws on texting while driving among high school students. **Conditions:** High school student data from the 2013 National Youth Risk Behaviour Survey. **Participants:** 6,168 high school students above the restricted driving age and with access to a vehicle. **Limitations:** Cross-sectional design, cannot generalise results to other mobile phone behaviours, did not identify if deaths and injuries were reduced.	Findings suggests that laws that specifically aim to prohibit texting while driving can significantly reduce texting while driving.	None specifically mentioned.
2016	Rudisill, T. M., & Zhu, M. (2016). Who actually receives cell phone use while driving citations and how much are these laws enforced among states? A descriptive, cross-sectional study. *BMJ open, 6*(6). doi:http://dx.doi.org/10.1136/bmjopen-2016-011381	USA	Law Mobile phones	Cross-sectional descriptive study **Aim:** Identify who receives tickets for mobile phone use while driving laws infractions and how much these laws are enforced at the state level. **Conditions:** 14 states and the District of Columbia within the USA **Participants:** Individuals who received a cell phone use while driving citations between 2007 and 2013. **Limitations:** Based on written citations and not convictions (which may differ), only considered state-level enforcement and not local enforcement.	Handheld cell phone use while driving citations were issued most frequently. Young driver all phone ban violations were issued the least frequently. Males received more citations than females. Mobile phone use citations are 1% of all citations suggesting mobile phone use enforcement is limited.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Zhu, M., Rudisill, T. M., Heeringa, S., Swedler, D. I., & Redelmeier, D. A. (2016). The association between handheld phone bans and the prevalence of handheld phone conversations among young drivers in the United States. *Annals of Epidemiology, 26*(12), 833. doi:10.1016/j.annepidem.2016.10.002	USA	Law Mobile phones Young drivers	Observational survey **Aim:** Identify if legislation that bans handheld phone use for all drivers is associated with reduced handheld phone conversations for drivers under the age of 25 years. **Conditions:** 14 states and the District of Columbia. **Participants:** 32,784 young drivers observed at stop signs or lights **Limitations:** Classification of age was based on observation, drivers may be more likely to make a short call while at traffic lights or a stop sign, unable to determine the level of enforcement by police.	Handheld phone bans may be effective at reducing handheld phone use among young drivers. The longer the legislation has been in place, the more effective it was a reducing calls while driving.	None specifically mentioned.
2017	Rudisill, T. M., & Zhu, M. (2017). Handheld cell phone use while driving legislation and observed driver behavior among population sub-groups in the United States. *BMC public health, 17*(1), 437. doi:10.1186/s12889-017-4373-x	USA	Law Mobile phones	Observational survey **Aim:** Identify if handheld mobile phone use while driving bans were associated with lower observed use when considering age, sex, race, rural and regional areas. **Participants:** 263,673 drivers **Limitations:** Possible misclassification as relied on observation data; not all states from USA sampled; drivers may be more likely to make a short call while at traffic lights or a stop sign; observations only occurred during day time; there was no control for level of enforcement or public education campaigns.	Drivers having handheld mobile phone conversations tended to be younger, female, African American and from the Southern states of the USA. Handheld mobile phone use while driving bans were associated with lower handheld phone conversations across all age groups but there were particular benefits for female drivers and those from Western states.	None specifically mentioned.
2017	Parnell, K. J., Stanton, N. A., & Plant, K. L. (2017). What's the law got to do with it? Legislation regarding in-vehicle technology use and its impact on driver distraction. *Accident Analysis and Prevention, 100*, 1-14. doi:10.1016/j.aap.2016.12.015	United Kingdom	Law HMI Mobile phones	Accimap analysis **Aim:** Evaluate legislation regarding the use of mobile phones and other in-vehicle technologies. **Conditions:** Use Accimap accident analysis methodology. **Participants:** 40 possible actors spanning 8 hierarchical levels **Limitations:** Focus on UK legislation, does not include public opinion.	Findings were 13 recommendations across the 8 hierarchical levels examined including providing clearly worded legislation on avoiding driver distraction that relates to the whole system, not just the driver and requiring enforcement to support the legislation.	Risk Management Framework Socio-technical system perspective

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Nevin, P. E., Blanar, L., Kirk, A. P., Freedheim, A., Kaufman, R., Hitchcock, L., Maeser, J. D., & Ebel, B. E. (2017). "I wasn't texting; I was just reading an email.": a qualitative study of distracted driving enforcement in Washington State. *Injury Prevention, 23*(3), 165-170. doi:10.1136/injuryprev-2016-042021	USA	Law Enforcement	Focus groups **Aim:** Identify the factors that influence distracted driving enforcement from the perspective of police officers. **Conditions:** 3 large Washington state counties. **Participants:** 26 active law enforcement officers. **Limitations:** Exploratory nature may limit generalisability of findings, participation was low in one county, officers who volunteered to participate may have different views to those who didn't participate.	Results indicated that it was important that young officers were engaged and motivated to enforce distracted driving. Dedicated traffic patrols were also important. There appears to be a culture of under-reporting the influence of distracted driving on crashes. Officers self-reported their own distracted driving habits. There needs to be improvements in distracted driving legislation to facilitate enforcement.	Social-ecological framework
2018	Rudisill, T. M., Smith, G., Chu, H., & Zhu, M. (2018). Cellphone Legislation and Self-Reported Behaviors Among Subgroups of Adolescent U.S. Drivers. *Journal of Adolescent Health, 62*(5), 618-625. doi:10.1016/j.jadohealth.2017.12.00	USA	Law Mobile phones Young drivers	Self-report survey **Aim:** Investigate the relationship between state-wide mobile phone legislation and mobile phone use across adolescent driver subgroups including age, sex, ethnicity and rurality. **Conditions:** Self-reported texting and handheld mobile phone conversations and the presence of a texting or handheld mobile phone ban that applied to all drivers. **Participants:** 2,569 current drivers aged 16 to 18 years at the time of the survey. **Limitations:** Self-report data, social desirability bias, cross-sectional design does not allow identification of whether legislation changed drivers behaviour, subgroups not representative of their respective populations, no control for enforcement levels, some legislation applies to certain age or license groups only and the license type was not known.	Universal handheld mobile phone calling bans were associated with lower occurrences of mobile phone conversations across all groups apart from rural drivers. Universal texting bans were not associated with fewer texting behaviours in any group.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Rudisill, T. M., Baus, A., & Jarrett, T. (2018). The challenges of enforcing cell phone use while driving laws among police: A qualitative study. *Traffic Injury Prevention, 19*, S192-S193. doi:10.1080/15389588.2018.1532241	USA	Law Mobile phones	Focus groups **Aim:** Understand law enforcement officers' perspective and learn the potential barriers to mobile phone law enforcement. **Conditions:** 5 West Virginia law enforcement agencies. **Participants:** 19 officers who were over 18 years of age and employed for more than one year. **Limitations:** Exploratory nature may limit generalisability of findings, all participants were male, individuals who participated may have different views from those who chose not to participate.	Barriers to enforcement include cultural norms, lack of perceived support from courts/judges, different laws between states, the need for a general distracted driving law, unclear legislation, wanting to maintain a positive relationship with the public, being unable to see the driver, phones having multiple functions and not knowing what the driver is doing, risk of crashing during traffic stops and lack of resources.	None specifically mentioned.
2019	Lyu, C., Jewell, M. P., Cloud, J., Smith, L. V., & Kuo, T. (2019). Driving Distractions Among Public Health Center Clients: A Look at Local Patterns During the Infancy of Distracted Driving Laws in California. *Frontiers in Public Health, 7*, 8. doi:10.3389/fpubh.2019.00207.	USA	Law Mobile phones	Self-report survey **Aim:** To provide a baseline of driving behaviours and identify opportunities for prevention of distracted driving during the infancy of Californian laws that ban mobile phone use while driving. **Participants:** 1,051 lower-income clients of three multi-purpose public health centres in Los Angeles. **Limitations:** The sample is not representative of the wider population, self-report data.	Distracted driving beyond mobile phone use and texting were common suggesting the need for more inclusive distracted driving laws and public education. The most common distractions were talking to other passengers, adjusting the radio, MP3 or cassette player and adjusting other car controls. Males, having a lower education and more years of driving experience predicted the number of distractions. A variety of distractions including mobile phone use and texting were predictive of increased crashes in the 12 months prior to the survey.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Rudisill, T. M., Zhu, M., & Chu, H. (2019). Association between cellphone use while driving legislation and self-reported behaviour among adult drivers in USA: a cross-sectional study. *BMJ Open, 9*(2), e023456. doi:10.1136/bmjopen-2018-023456	USA	Law Mobile phones	Cross-sectional self-report survey **Aim:** Identify if legislation restricting mobile phone use while driving is associated with lower self-reported mobile phone conversations and texting among adult drivers of different ages, sex, ethnicity or rurality. **Conditions:** 50 states within the USA. **Participants:** 9,706 individuals that were 19 or older who were a current driver and participated in the 2011 – 2014 Traffic Safety Culture Index Surveys. **Limitations:** Self-report data, causality cannot be determined due to the cross-sectional nature of the data.	Universal texting bans were not associated with reductions in texting behaviours. Universal mobile phone calling bans were associated with lower self-reported mobile phone calls while driving.	None specifically mentioned.
2019	Pope, C. N., Mirman, J. H., & Stavrinos, D. (2019). Adolescents' perspectives on distracted driving legislation. *Journal of Safety Research, 68*, 173-179. doi:10.1016/j.jsr.2018.12.013	USA	Law Mobile phones Non driving related in-vehicle technology Young drivers	Self-report survey **Aim:** The relationships between demographic factors, perceived threat to safety, peer influences and adolescent support for three types of distracted driving legislation (a) reading or sending text messages/emails while driving (b) handheld mobile phone use while driving and (c) using non-driving-related-in-vehicle (NDIV) technology while driving. **Participants:** 379 people aged 15 to 19 years from public high schools in a large metropolitan region in the southeast region of the USA. **Limitations:** Unable to generalise to other jurisdictions due to differences in laws, not all schools within the district were represented in the sample.	Strongest support for law against reading and sending a text/email while driving than using a handheld mobile phone use while driving. Peer acceptance was not associated with supporting legislation. Females had two times greater odds of supporting a distracted driving law against reading and sending a text/email while driving when compared with male adolescents. A greater perceived threat to safety was associated with more support for the three types of distracted driving legislation.	Health Belief Model

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Flaherty, M. R., Kim, A. M., Salt, M. D., & Lee, L. K. (2020). Distracted Driving Laws and Motor Vehicle Crash Fatalities. *Pediatrics, 145*(6), 9. doi:10.1542/peds.2019-3621	USA	Law Mobile phones Young drivers	Secondary data analysis **Aim:** Identify the association between fatal crashes involving 16 to 19 year old drivers and state-based distracted driving laws. **Conditions:** Retrospective time series analysis based on data from the Fatality Analysis Reporting System. Three primary types of distracted driving laws (1) Laws explicitly banning text messaging while driving (2) Handheld mobile phone bans (3) All mobile phone use bans (including Bluetooth for novice drivers. **Participants:** 38,215 drivers aged 16 to 19 years old involved in fatal crashes between 2007 and 2017. **Limitations:** Data only included fatalities and not nonfatal crashes or injuries, unable to account for driver experience, unable to identify enforcement levels.	When police officers are able to pull a driver over and issue a ticket for text messaging directly, rates for fatal motor crashes involving 16 to 19 year old drivers were associated with a 29% lower rate of fatalities. When police officers are able able to pull a driver over for another offence and then issue a ticket for either handheld mobile phone use or a texting ban, there was a 20% lower rate of fatalities. For all age groups, all distracted driving laws were associated with a lower incidence of fatal crashes except for novice driver all mobile phone bans.	None specifically mentioned.
2020	Wickens, C. M., Ialomiteanu, A. R., Cook, S., Hamilton, H., Haya, M., Ma, T., Mann, R. E., Manson, H., & McDonald, A. (2020). Assessing the impact of the 2015 introduction of increased penalties and enhanced public awareness and enforcement activities on texting while driving among adults in Ontario, Canada. *Traffic Injury Prevention, 21*(4), 241-246. doi:10.1080/15389588.2020.1731922	Canada	Law Mobile phones	Cross-sectional telephone interviews **Aim:** Examine self-reported texting while driving in a sample of Ontario adults before and after the introduction of new legislation and the enhanced public education and enforcement efforts. **Participants:** 1,846 individuals, 18 years or older, who had driving in the past year. **Limitations:** Self-report data, methodology meant that those who were homeless, hospitalised, incarcerated or living on military establishments were excluded.	Texting while driving decreased following the introduction of enhanced penalties with corresponding public education and enforcement efforts.	None specifically mentioned.

Table B.11: Perceptions of driver distraction

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2017	Prat, F., Gras, M. E., Planes, M., Font-Mayolas, S., & Sullman, M. J. M. (2017). Driving distractions: An insight gained from roadside interviews on their prevalence and factors associated with driver distraction. *Transportation Research Part F-Traffic Psychology and Behaviour, 45*, 194-207. doi:10.1016/j.trf.2016.12.001	Spain	Opinion Type of distraction	Semi structured Interviews and statistical analysis (SPSS) **Aim:** Investigate the proportion and type of distractions drivers engage in. **Conditions:** Spanish resident holding driver's license. **Measures:** Free response format, descriptive norms. **Participants:** 426 drivers. **Limitations:** Non-random sample, results could be affected by social desirability bias.	The most reported distraction (without prompting by researcher) was looking at things/events outside and mind-wandering, followed by manipulating audio systems (>90%), talking with passengers (85%), or placing/reaching for objects (60%), sending or receiving text messages (>40%). A smaller percentage (28%) said interacting with children or pets was common. The least common distraction reported was smoking. Participants believed that handheld mobile phone use riskier than handsfree use. Participants said important others frequently engaged in a range of distracted driving behaviours. The authors therefore contend descriptive norms were a consistent predictor of engagement in all types of driving distractions. That is, drivers understood the risk but continued to engage in distracting behaviours.	Descriptive norms Social desirability bias
2018	Oviedo-Trespalacios, O. (2018). Getting away with texting: Behavioural adaptation of drivers engaging in visual-manual tasks while driving. *Transportation Research Part a-Policy and Practice, 116*, 112-121. doi:10.1016/j.tra.2018.05.006	Australia	Opinion Predictors	Online questionnaire **Aim:** Identify predictors of engaging in distracting mobile phone use behaviours. **Conditions:** Drivers who self-identified as texting or browsing while driving. **Measures:** Demographic variables, frequency of mobile phone use, workload management strategies, enforcement avoidance strategies. **Participants:** 484 drivers. **Limitations:** Potential bias due to self-report method, study did not include environmental factors, analytical approach did not account for all psychosocial factors.	The study reports contradictory findings. (1) Higher perceived crash risk was sometimes associated with a higher self-report incidence of texting/browsing. (2) However, higher perceived crash likelihood was usually associated with lower rates of texting/browsing. The authors content that contradictory findings may be explained by (1) some participant's high self-assessment of their capabilities to multitask and (2) some drivers engage in workload management strategies in complex driving conditions. Some drivers use police avoidance strategies to hide phone use. The authors argue more qualitative research is needed to understand driver's decision-making processes.	Cyber-psychology Task capability interface (TCI)

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2018	Parnell, K. J., Stanton, N. A., & Plant, K. L. (2018). Good intentions: drivers' decisions to engage with technology on the road and in a driving simulator. *Cognition Technology & Work, 20*(4), 597-619. doi:10.1007/s10111-018-0504-0	UK	Opinion Predictors Contextual factors Self-regulation	Naturalistic driving study, simulator study, questionnaire **Aim:** Understand drivers' decision to engage with technological devices using an experimental verbal protocols methodology. **Conditions:** Experimental design combing observational study with qualitative analysis. **Measures:** Response to verbal protocols during naturalistic and simulator driving scenarios, driver workload metric and recorded speed. Coding and quantitative analysis using NVivo software and thematic analysis. **Participants:** 12 experienced frequent drivers with no more than 3 demerit/penalty points. **Limitations:** Small sample size, controlled vehicle design (no ADAS).	The authors contend the results show a strong positive correlation between the simulator and naturalistic study. This provides validation for future simulators studies designed to observe and measure drivers' intention to engage in distracting behaviours. The study found that drivers strategically adapt their multitasking behaviours. Participants engaged with vehicle entertainment system more often than phone or sat nav tasks in complex driving scenarios. Self-regulation was highest when driving in complex road infrastructure. Self-regulation was also positively influenced by other road users (for example when changing lanes or when encountering heavy vehicles).	Sociotechnical systems theory
2018	Rolison, J. J., Regev, S., Moutari, S., & Feeney, A. (2018). What are the factors that contribute to road accidents? An assessment of law enforcement views, ordinary drivers' opinions, and road accident records. *Accident Analysis and Prevention, 115*, 11-24. doi:10.1016/j.aap.2018.02.025	UK	Opinion Law	Factor analysis **Aim:** Compare the reported crash causation involving young, middle age, and older drivers in official accident records with the opinions of crash causation of experts (police officers) and the members of the general public. **Conditions:** Hypothetical crash scenes. **Measures:** (1) contributing factor analysis according to age and gender of depicted drivers, (2) rating which factors were more likely to have contributed to the collisions for each age and gender group, (3) a memory recall exercise. **Participants:** 77 police officers, 102 citizens. All participants were residents of the UK. **Limitations:** None mentioned.	The findings suggest that police officers and the general public have similar views (generally) on crash causation. Drugs, alcohol and (to a lesser extent) distraction, were noted as contribution to young driver scenarios. While defective eyesight and other medical conditions (contributing to slower driver reactions) were often generated as causes for older driver crashes. Young males were seen as engaging in more dangerous (risky) driving behaviours by both police and the general public. Police officers occasionally also generated drugs and alcohol as causes for older driver crashes. These opinions were broadly consistent with existing crash causation records. Participants also generated distraction as a causal factor,however this was rarely reported in the accident records. The authors suggest UK accident reports provide a fixed set of contribution factors (tick boxes) that may not reflect actual behaviours.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2018	Zhu, M., Rudisill, T. M., Rauscher, K. J., Davidov, D. M., & Feng, J. (2018). Risk Perceptions of Cellphone Use While Driving: Results from a Delphi Survey. *International journal of environmental research and public health, 15*(6). doi:10.3390/ijerph15061074	USA	Opinion Methodology Age	Self-report surveys **Aim:** Identify important behavioural and consequential indicators for assessing cell phone use while driving among young drivers. **Conditions:** Views of experts compared with young drivers Measure: Delphi method to measure convergence of views. Three rounds (email surveys) were completed. **Participants:** 22 road safety experts and 7 young drivers. **Limitations:** Limited number of young driver participants.	The expert panel top five behaviours important indicators for cell phone use in young drivers were: (1) sending text/email, (2) handheld phone use, (3) reading handheld text/email, (4) handheld dialling, (5) looking down while driving. This was broadly consistent with young driver views. However, young drivers selected playing music as the second most important behavioural indicator of cell phone use. Playing music on handheld devices was overlooked by the expert panel.	None specifically mentioned.
2019	Kim, K., Ghimire, J., Pant, P., & Yamashita, E. (2019). Self-reported handheld device use while driving. *Accident Analysis and Prevention, 125*, 106-115. doi:10.1016/j.aap.2019.01.032	USA	Opinion Age Laws	Secondary data analysis (naturalistic driving and self-report survey) and online cross-sectional self-report survey **Aim:** Identify experiences, practices, and attitudes of participants handheld device use while driving. **Conditions:** Nationwide survey. **Measures:** Descriptive and inferential statistical analysis, qualitative analysis of opinions relating to phone use while driving. **Participants:** 321 drivers (19-80 years) of diverse ethnic groups + secondary data source. **Limitations:** Self-report data may be biased or not truthful.	Self-report survey report showed that 58.9% of participants used a handheld phone while a lower percentage use handsfree modes. Only 9% said they never use a phone while driving. There was very little difference between young (57%) and older driver (60%) phone use while driving although elderly drivers had lower rates. Males (59%) and females (59%) had similar phone use rates will driving. Pacific Islanders (70.83%) had slightly higher cell phone use than other ethnic groups. College education was an indicator for higher cell phone use (60%) when compared with high school graduates only (50%). Most participants (77%) said phone ban enforcement measures should increase.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Behavioural theories/ Models/ frameworks
2019	Mikoski, P., Zlupko, G., & Owens, D. A. (2019). Drivers' assessments of the risks of distraction, poor visibility at night, and safety-related behaviors of themselves and other drivers. *Transportation Research Part F-Traffic Psychology and Behaviour, 62*, 416-434. doi:10.1016/j.trf.2019.01.011	USA	Opinion Age	Cross-sectional self-report survey, sociodemographic analysis **Aim:** Assess drivers' perception of risk and appropriate behaviours associated with common distractions and visibility at night. **Conditions:** Nationwide geographic sample. **Measures:** Analysis of variance (ANOVAs) among and between groups. **Participants:** 492 participants who learned to drive in the USA and had 2 or more years driving experience. **Limitations:** None mentioned.	Listening to music and talking to passengers (auditory distractions) received the lowest rating of distraction (20-30%). Consistent across age groups. Visual distraction (e.g., texting, dialling, reading) received the highest rating for distractions (60-80%). These findings were consistent across age groups. All respondents greatly overestimated night-time visibility. Most motorists considered themselves to be 'better than average' drivers, however the magnitude of the effect depended on sequencing of questions. Younger drivers (age = 18-34) reported that despite the risks they frequently texted or talked on the phone.	Lake Wobegon Effect (Coleman 2008)
2019	Wells, H., & Savigar, L. (2019). Keeping up, and keeping on: Risk, acceleration and the law-abiding driving offender. *Criminology & Criminal Justice: An International Journal, 19*(2), 254-270. doi:10.1177/1748895817738555	UK	Opinion Context Laws	Focus groups, naturalistic observations, interviews **Aim:** Exploration of the concepts of 'risk' and 'acceleration' and how these relate to distracted driving and speeding behaviours. **Conditions:** Observation of driving behaviour after a Speed Awareness Course and investigation of drivers' and police officers' perceptions of distracted driving and speed limits. **Measures:** Thematic analysis (inductive). **Participants:** Drivers and police officers. **Limitations:** None mentioned.	The authors explore 'law abidingness' in the context of speeding and distracted driving laws. The main conclusion of the study is that people's social obligations (to be available to others) are sometimes in tension with following road rules. The social obligation to quickly respond to a significant other/work may take precedence and result in speeding behaviours (to be somewhere on time) or distracting behaviours (to answer a text/phone call or to use sat nav). Modern society (social media and new technology) has intensified (accelerated) these social obligations creating a tension between following the law and responding to social pressures. Moreover, breaking the law is sometimes justified through rationalising the concept of 'risk' as 'unlikely'. This belief is reinforced each time the risky behaviour is performed with no harmful effect.	Postmodernism Ontological belief in flux Authors suggest identity and belief is often fluid in the postmodern world, requiring constant reaffirmation and reconstruction of the self (Giddens 1991). Postmodern individuals are more prone to angst and therefore attempt to constantly prove their worth (by responding to social pressures).

Table B.12: Interventions

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Creaser, J. I., Edwards, C. J., Morris, N. L., & Donath, M. (2015). Are cellular phone blocking applications effective for novice teen drivers? *Journal of Safety Research, 54*, 75-82. doi:10.1016/j.jsr.2015.06.014	USA	Interventions Young drivers Mobile phones	Field experiment with no baseline period **Aim:** Identify a technological solution to distracted driving risks for young novice drivers due to mobile phones. **Conditions:** Control group, partial system group that received the smartphone application without parental feedback, full system group that received the smartphone application with parent feedback. **Participants:** 274 (144 female) novice teenage drivers and 272 (203 female) consenting parents (2 sibling pairs participated in the study with one parent). **Limitations:** study equipment was only installed in the vehicle registered for the study so participants may have used their phones in other vehicles.	The partial system and full system groups made fewer phone calls per mile driven than the control group Young male drivers made fewer calls than young female drivers Drivers that shared a vehicle made fewer phone calls than those who did not need a share a vehicle with other drivers The partial system and full system groups sent fewer texts than the control group Males sent fewer text messages than females.	None specifically mentioned.
2015	He, J., Choi, W., McCarley, J. S., Chaparro, B. S., & Wang, C. (2015). Texting while driving using Google Glass™: Promising but not distraction-free. *Accident Analysis and Prevention, 81*, 218-229. doi:10.1016/j.aap.2015.03.033	USA	Interventions Mobile phones Head-Mounted Displays	Driving simulator **Aim:** Identify if speech recognition technology for outgoing messages reduces dual-task interference when compared with manual text entry and identify if a head mounted display reduces dual task interference when compared with a heads-down display. **Conditions:** 6 experimental conditions: drive only (no texting), two text-only (compose text messages either manually using the smartphone or vocally using Google Glass without driving), three drive-text conditions (read and compose a message using a smartphone, vocally using Google Class and vocally using a smartphone). **Participants:** 25 university students aged 18 to 25 years (13 females) **Limitations:** None mentioned.	Texting while driving impaired driving regardless of the interface. Speech-based interface was less impairing than manual entry of text. A head mounted display was less distracting than a heads-down display for a texting task.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Lawrence, N. K. (2015). Highlighting the injunctive norm to reduce phone-related distracted driving. *Social Influence, 10*(2), 109-118. doi:10.1080/15534510.2015.1007082	USA	Interventions Mobile phone	Field experiment **Aim:** Measure the effectiveness of a social norm intervention to reduce phone-related distracted driving on a university campus. **Conditions:** Sign one highlighted the injunctive norm (people's disapproval of the behaviour) while sign 2 implied that phone-related distracted driving was disapproved. **Participants:** 8869 observations of drivers exiting the parking decks on a university campus. **Limitations:** Unable to randomly assign participants to conditions, drivers could have been exposed to more than one experimental treatment.	Injunctive norm messages can be effective in reading phone-related distracted driving when they focus people's attention on the social disapproval of that behaviour. Distracted driving decreased when drivers were exposed to a sign that clearly expressed social disapproval of their behaviour but not when it implied social disapproval.	Social norms
2015	Stewart, T. C., Harrington, J., Batey, B., Merritt, N. H., & Parry, N. G. (2015). From focus groups to production of a distracted driving video: Using teen input to drive injury prevention programming. *Journal of Trauma and Acute Care Surgery, 79*(3), S42-S47. doi:10.1097/ta.0000000000000776	Canada	Interventions Mobile phones	Mixed methods questionnaire and focus groups **Aim:** Obtain student input on the development of Impact to ensure program content and format were optimal and relevant. **Measures:** Demographic questions, injury and risk questions, questions specifically on the Impact program **Participants:** 167 participants (48% female). **Limitations:** Social desirability bias, may be intimidating to talk in front of others, quality of findings may depend on the skills of the facilitator.	Text while driving was perceived as a significantly more common issue for adolescents compared with other driving risk factors Teenagers desire to hear personal stories with a visual element	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Adeola, R., Omorogbe, A., & Johnson, A. (2016). Get the Message: A Teen Distracted Driving Program. *Journal of Trauma Nursing, 23*(6), 312-320. doi:10.1097/jtn.0000000000000240	USA	Interventions Young drivers	Pre and Post survey design **Aim:** Examine the protective factors and program measures that may influence teenagers' perspectives about safe driving habits. **Measures:** Baseline behaviours, attitudes and knowledge and changes in driving behaviour after completion **Participants:** Convenience sample of 1,238 people aged 14 to 18 years. Participants came from USA, Puerto Rico, Canada and 21 other countries (70% female). **Limitations:** Lack of representative sample, wide age range of participants, lack of a control group, no random assignment.	The intervention is a three hour program that runs over a 6 week period to multiple groups of students. The program includes a presentation, hospital tour, video and survivor's testimony. Females reported the intention to engage in safe driving behaviours at a higher frequency than male participants. Increase in a number of participants who stated that they were unlikely or not likely to send or reply to a text while driving. There were also increases in participants who stated that they were unlikely or not likely to make or receive a phone call while driving.	Health Belief Model Social Cognitive Theory
2016	Fournier, A. K., Berry, T. D., & Frisch, S. (2016). It can W8: A community intervention to decrease distracted driving. *Journal of Prevention & Intervention in the Community, 44*(3), 186-198. doi:10.1080/10852352.2016.1166814	USA	Interventions Young drivers	Pre and Post observational design **Aim:** Identify if an intervention reduces mobile phone use while driving. **Conditions:** Interventions included thumb bands and a pledge sheet (where students were encouraged to sign a pledge that they would tuck their phone away before starting their vehicle and remind others that talking on a phone could wait) and the use of a fear appeal on a flyer that was distributed around the campus. **Participants:** Drivers in passenger vehicles and trucks on a two-lane road bordering the campus of a Midwest university. The total sample was 3,827 observations (46.3% female) **Limitations:** Some observations would not have been exposed to the intervention, observations of mobile phone use may underestimate the prevalence.	Drivers talking on their mobile phone decreased from 8.5% of 945 drivers to 5.5% of 1,428 drivers. Drivers texting on their phones increased from 4% of 945 drivers to 6.2% of 1,428 drivers. Differences were observed for females but not for males. Intervention was cost effective (less than $300 to distribute thumb bands and flyers to approximately 20% of the campus).	Perceived threat or risk perception

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Hurwitz, D. S., Miller, E., Jannat, M., Boyle, L. N., Brown, S., Abdel-Rahim, A., & Wang, H. (2016). Improving teenage driver perceptions regarding the impact of distracted driving in the Pacific Northwest. *Journal of Transportation Safety & Security, 8*(2), 148-163. doi:10.1080/19439962.2014.997329	USA	Interventions Young drivers	Pre and post survey **Aim:** To measure the degree to which the interactive presentation improved teenage driver perspectives regarding the hazards of distracted driving. **Conditions:** An interactive presentation was developed and administered to 1,400 teenage drivers. The presentation included research results, videos of naturalistic driving, static images, hands-on demonstrations and the use of inductive and deductive reasoning through extensive questioning. Two interactive activities were included. **Participants:** 1,006 teenage drivers (50% female) **Limitations:** Self-report data, post-survey completed two weeks after intervention.	After the interactive presentation, teenage drivers were more likely to correctly identify different types of distracted driving. It appears that the impact of the program decreases over time. Females responded more favourable to the intervention. Engaged in a range of distracted driving behaviours including working on homework, text messaging, changing clothes or shoes.	Felder-Silverman learning styles model
2016	Joseph, B., Zangbar, B., Bains, S., Kulvatunyou, N., Khalil, M., Mahmoud, D., Friese, R. S., O'Keeffe, T., Pandit, V., & Rhee, P. (2016). Injury prevention programs against distracted driving: Are they effective? *Traffic Injury Prevention, 17*(5), 460-464. doi:10.1080/15389588.2015.1116042	USA	Interventions	Pre and post observations **Aim:** Identify incidences of distracted driving amongst health care providers and create awareness of distracted driving. **Conditions:** E-mail survey, pamphlets and banners in hospital cafeteria, post-intervention. **Participants:** 15,416 observations of employees existing hospital car park and 520 survey responses (88.7% female). **Limitations:** Sample was health care providers only, only considered calling and texting and not the broader range of possible distractions, some participants may have noticed the observer and changed behaviour accordingly, could not assess behaviour change in people using public transportation.	Reduction by 32% in distracted driving between pre and post intervention. Reduction in talking and texting post intervention. Reduction in drink driving sustained at the 6-month follow up. 77% of participants felt more informed after the survey and 91% supported state legislation against drink driving.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Kujala, T., Karvonen, H., & Makela, J. (2016). Context-sensitive distraction warnings - Effects on drivers' visual behavior and acceptance. *International Journal of Human-Computer Studies, 90*, 39-52. doi:10.1016/j.ijhcs.2016.03.003	Finland	Interventions Mobile phones	Test track experiment **Aim:** Identify the effects of context-sensitive distraction warnings on drivers' in-car glance behaviours and acceptance. **Conditions:** Novice and experienced drivers conducted in-car tasks with a smartphone with and without warnings. The application gave a warning if the driver's gaze was recognised to remain on the smartphone over a situation-specific threshold time or if the driver was approaching a high-demand part of the track. **Participants:** 31 drivers with experience on smartphones (35.5% female). **Limitations:** Warning application could increase the use of smartphones while driving due to a false sense of security, participant experience with application was short.	Driving experience did not affect the efficiency of the warnings. Gaze tracking with current smartphones outside the laboratory is highly unreliable due to varying lighting conditions. Context-sensitive distraction warnings can help drivers to place more attention on the road.	Technology Acceptance Model
2016	Ponte, G., & Baldock, M. (2016). *An examination of the effectiveness and acceptability of mobile phone blocking technology among drivers of corporate fleet vehicles.* Paper presented at the Australasian Road Safety Conference (2016), Canberra, ACT, Australia.	Australia	Interventions Mobile phones	Pre and Post survey **Aim:** To determine if mobile phone blocking technology is an effective and acceptable method for reducing driver distraction among drivers of corporate fleet vehicles. **Conditions:** Firstly, one requiring software to be installed on mobile phones and secondly, one that used software in addition to external Bluetooth hardware that paired with the phones. **Participants:** 104 people who regularly drove a corporate fleet vehicle (6.7% female). **Limitations:** All participants from one organisation with a strong safety culture, difficulty in obtaining sufficient units of one type of technology.	Participants reported that phone blocking was not reliable, but they considered the technology to be an effective way of preventing mobile phone use while driving. Mobile phone blocking technologies may provide a useful method of changing mobile phone use behaviour while driving. However, product improvements are needed to reach higher ratings of user acceptance and approval. During the trial, several participants with one of the technologies were de-activating the software. There was no change in attitudes regarding the dangers of phone use while driving.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2016	Thompson, J., Baldock, M., Raftery, S., Mackenzie, J., Wall, J., & Iwanski, K. (2016). *The Transport for New South Wales FleetCAT (Fleet Collision Avoidance Technology) Trial: drivers attitudes to the technology.* Paper presented at the Australasian Road Safety Conference (2016), Canberra, ACT, Australia.	Australia	Interventions	Post intervention survey **Aim:** To examine the acceptance, benefits and concerns about the technology. **Conditions:** 34 vehicles were fitted with Mobileye 560 CAT Warning Systems that provide Forward Collision Warnings, Headway Monitoring Warnings, Pedestrian Collision Warnings and Lane Departure Warnings. **Participants:** 122 people who drove a fleet vehicle from three New South Wales government departments: Transport for NSW, NSW State Emergency Services and NSW Public Works. **Limitations:** No demographic information available as participants were government employees, non-representative sample, self-report measures.	Drivers recognised that it could improve safety but did not wish to use the system in the future because they found it distracting.	None specifically mentioned.
2017	Hassani, S., Kelly, E. H., Smith, J., Thorpe, S., Sozzer, F. H., Atchley, P., Sullivan, E., Larson, D., & Vogel, L. C. (2017). Preventing distracted driving among college students: Addressing smartphone use. *Accident Analysis and Prevention, 99*, 297-305. doi:10.1016/j.aap.2016.12.004	USA	Interventions Mobile phones	Pre, post and follow up surveys **Aim:** Develop, implement and evaluate a distracted driving presentation for university students to change knowledge, attitude and behaviour on distracted driving. **Conditions:** A 60-minute, multi-media presentation on distracted driving. **Participants:** 466 university students (61% female). **Limitations:** Difficulty recruiting, only 28.3% of participants completed the 3 months follow up survey.	The 60-minute workshop improved distracted driving related attitudes, knowledge and behaviours. There is a need for constant reinforcement of messages regarding the dangers of distracted driving.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Layba, C., Griffin, L. W., Jupiter, D., Mathers, C., & Mileski, W. (2017). Adolescent motor vehicle crash prevention through a trauma center-based intervention program. *The journal of trauma and acute care surgery, 83*(5), 850-853. doi:10.1097/TA.0000000000001605	USA	Interventions Mobile phones Young drivers	Natural experiment **Aim:** Identify if the implementation of a longitudinal education program affects the rates of motor vehicle crash related injuries. **Conditions:** Save A Life Tour (SALT) is a commercially available, high-impact, safe driving awareness program that was initially targeted at drink driving but has been expanded to include distracted driving. **Participants:** Crashes from two counties within Texas, USA. One where the SALT program had been delivered to school students and one where it had not. **Limitations:** A hurricane shut down the hospital that was collecting data on crashes which resulted in some data being excluding from the study	Ongoing educational intervention programs aimed at adolescent drink and distracted driving can have an impact on the incidence of crashes. Reduction in crashes of 37% in the county that had the SALT program delivered.	None specifically mentioned.
2017	Merrikhpour, M., & Donmez, B. (2017). Designing feedback to mitigate teen distracted driving: A social norms approach. *Accident Analysis and Prevention, 104*, 185-194. doi:10.1016/j.aap.2017.04.016	Canada	Interventions Young drivers	Driving simulator experiment **Aim:** Investigate teens perceived social norms and whether providing normative information can reduce distracted driving behaviours. **Conditions:** (a) social norms feedback that provided a report at the end of each drive on adolescent's distracted driving behaviour comparing their distraction engagement to their parent's (b) post-drive feedback that provided just the report on adolescent's distracted driving behaviour without information on their parent's (c) real-time feedback in the form of auditory warnings based on eyes of road-time (d) no feedback as control. **Participants:** 40 parent-adolescent (17-19 years) dyads. **Limitations:** Potential selection bias with one group, relatively small sample size.	The social norms and real-time feedback conditions resulted in significantly smaller average off-road glance duration, rate of long (greater than 2 seconds) off-road glances and standard deviation of lane position when compared to no feedback. Social norms feedback decreased brake response time and percentage of time not looking at the road compared to no feedback.	Social norms

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Allee, L., Dechert, T., Rao, S. R., Crandall, M., Christmas, A., Eastman, A., Duncan, T., & Foster, S. (2018). The Eastern Association for the Surgery of Trauma's Injury Control and Violence Prevention Committee's annual distracted driving outreach event: Evaluating attitude and behavior change in high school students. *Journal of Trauma and Acute Care Surgery, 84*(1), 31-36. doi:10.1097/ta.0000000000001589	USA	Interventions Young drivers	Pre, post and follow up surveys **Aim:** Identify the short- and long-term impact of a multimodal educational program including student-developed interventions, simulated driving experiences and presentations by law enforcement and medical personnel. **Conditions:** A single day program was delivered at a high school. **Participants:** 356 high school students in grades 9 to 12. **Limitations:** Student bias, single-school population, sample size, absence of a control group.	Distracted driving education may facilitate short term knowledge and attitude changes, however the effect does not appear to last. The effects appear to have disappeared by 6 months.	None specifically mentioned.
2018	Alvarez, L., Classen, S., Medhizadah, S., Knott, M., Asantey, K., He, W., Feher, A., & Moulin, M. S. (2018). Feasibility of DriveFocus™ and Driving Simulation Interventions in Young Drivers. *OTJR: Occupation, Participation & Health, 38*(4), 245-253. doi:10.1177/1539449218787495	Canada	Interventions Young drivers	Driving simulator experiment **Aim:** Investigated the feasibility of a DriveFocus app intervention on driving performance. **Conditions:** The DriveFocus app training section was completed by participants. This involved users determining which critical items take priority over others. **Participants:** Young drivers aged between 16 and 19 years, had a valid driver's licence that was either equivalent to a learner's permit or a provisional licence, could read and understand English. **Limitations:** Over-representation of white females, lack of control group.	30.8% preferred to participate during weekend sessions. 43% of participants preferred evening sessions. Decrease in number of errors.	None specifically mentioned.
2018	Dehzangi, O., Rajendra, V., & Taherisadr, M. (2018). Wearable Driver Distraction Identification On-The-Road via Continuous Decomposition of Galvanic Skin Responses. *Sensors (Basel, Switzerland), 18*(2). doi:10.3390/s18020503	USA	Interventions	Real driving experiment **Aim:** Investigate a continuous measure of phasic Galvanic Skin Responses (GSR) using a wristband wearable to identify distraction of drivers. **Conditions:** (a) normal driving focusing attention on the primary task of driving (b) phone distracted driving while having an engaging phone conversation (c) text distracted while writing and sending texts when driving. **Participants:** 10 male drivers aged between 20 and 40 years and legally able to drive. **Limitations:** None mentioned.	Using Galvanic Skin Responses may be a reliable indicator of driver distraction.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Delgado, M. K., McDonald, C. C., Winston, F. K., Halpern, S. D., Buttenheim, A. M., Setubal, C., Huang, Y., Saulsgiver, K. A., & Lee, Y.-C. (2018). Attitudes on technological, social, and behavioral economic strategies to reduce cellphone use among teens while driving. *Traffic injury prevention, 19*(6), 569-576. doi:10.1080/15389588.2018.1458100	USA	Interventions Mobile phones Young drivers	Online survey Aim: Examined adolescents' willingness to reduce mobile phone use while driving and perceptions of potential strategies to limit this behaviour. **Participants:** 153 adolescents who admitted to texting while driving and were aged 16 or 17 years (61% female). **Limitations:** Self-report data, convenience sample, unable to calculate response rates, all participants had previous contact with the paediatric health care system because of recruitment method.	Most adolescents were willing or somewhat willing to give up reading texts, sending texts and social media while driving. They were not willing to give up navigation or music applications. The following strategies were rated as likely to be very effective for reducing texting while driving: financial incentives, insurance discounts, automatic phone locking while driving, email notifications to parents, automated responses to incoming texts, peer concern and parental concern. The predominant reason for not wanting to use mobile phone blocking technology was not wanting parents to monitor their behaviour.	None specifically mentioned.
2018	McDonald, C. C., Brawner, B. M., Fargo, J., Swope, J., & Sommers, M. S. (2018). Development of a Theoretically Grounded, Web-Based Intervention to Reduce Adolescent Driver Inattention. *Journal of School Nursing, 34*(4), 270-280. doi:10.1177/1059840517711157	USA	Interventions Young drivers	Focus groups, beta-testing, pilot testing, randomised control trial **Aim:** Develop a web-based intervention based on the Theory of Planned Behaviour in order to reduce adolescent driver inattention and evaluate the program. **Conditions:** Focus groups and surveys, beta and pilot testing, randomised control trial. **Participants:** Focus groups – 30 adolescents, beta-testing – five adolescents and young adults (20% female), pilot testing – three adolescents (33.3% female), randomised control trial – 60 adolescents (66.7% female). **Limitations:** Small sample sizes, non-representative sample with lack of diversity, self-report data.	Outlined a process for a multiphase development approach to develop and refine a theoretically grounded intervention to reduce novice driver inattention. Beta and pilot testing allowed the researchers to see theoretical and content issues with the intervention. The randomised control trial results regarding effectiveness of the intervention were not presented.	Theory of Planned Behaviour

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Munira, S., Henk, R. H., & Tisdale, S. (2018). *An Incentive-Based Teen Driver Smartphone App: Results of 2017 Pilot Project*. Paper presented at the Transportation Research Board 97th Annual Meeting, Washington DC, United States.	USA	Interventions Mobile phones Young drivers	Four phases pilot of an incentive app **Aim:** Explore the effects of a mobile phone app that includes a reward system to provide incentives for safe driving. **Phases:** (a) pre-incentive conditions (b) with incentives in place (c) post incentives phase with school still operating (d) post incentives phase with school no longer operating. **Participants:** 299 individuals that used the app to track their trips (62%-73% female depending on phase). **Limitations:** None mentioned.	App users receive 5 points for every distraction-free mile that was driven over the course of a trip. No partial credit was given, so if a distraction occurred at any point over the course of a trip, zero points were earned. Points could be redeemed for gift cards. Reductions in distracted driving occurred when incentives were awarded for distraction-free driving.	None specifically mentioned.
2018	Rana, N., Ross, M., LaRock, L., Mele, J., Cumbo, N., Colom, L., Trecartin, A., Granet, J., & Behm, R. (2018). An awareness campaign decreases distracted driving among hospital employees at a rural trauma center. *Traffic Injury Prevention*, 19, S165-S167. doi:10.1080/15389588.2018.1532216	USA	Interventions Mobile phones	Pre and post observations **Aim:** Identify if an educational campaign on distracted driving has an impact in a given community. **Conditions:** 4-week hospital-wide distracted driving awareness campaign including signs/posters in the hospital, booth outside the cafeteria with flyers, large banner in the employee car park and an opportunity for people to sign a pledge form to drive distraction-free. **Participants:** 485 vehicles observed pre-campaign, 495 vehicles post campaign and 530 drivers in the one year follow up observations. **Limitations:** None mentioned.	A significant decrease in the number of distracted drivers following the hospital campaign. There were no effects at the one year follow up observations of the campaign.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Albert, G., & Lotan, T. (2019). Exploring the impact of "soft blocking" on smartphone usage of young drivers. *Accident Analysis and Prevention, 125*, 56-62. doi:10.1016/j.aap.2019.01.031	Israel	Interventions Mobile phones Young drivers	Naturalistic study using a research-orientated smartphone app **Aim:** Evaluating 'soft blockers' which silence and hide phone notifications as well as sending an automatic reply to the person trying to contact the driver. **Conditions:** (a) control group (b) intervention that silences and hides notifications (c) intervention that silences and hides notifications plus sends an auto-response to the texter. **Participants:** 167 young Israeli drivers (females 36%). **Limitations:** Concerns regarding accuracy of data captured through smartphone app, sample not representative of the target population.	Soft blockers mean that drivers are not aware of receiving any communication attempts. When they check, they exhibit self-regulated behaviour and do it when the vehicle is not in motion.	None specifically mentioned.
2019	Basch, C. H., Mouser, C., & Clark, A. (2019). Distracted driving on YouTube: implications for adolescents. *International Journal of Adolescent Medicine and Health, 31*(2). doi:http://dx.doi.org/10.1515/ijamh-2016-0158	USA	Interventions	Youtube video analysis **Aim:** Describe the content on YouTube to ascertain the type of distracted driving conveyed in widely viewed videos. **Measures:** A range including number of views, date of upload, length of video, gender of people, whether it was daytime or nighttime driving, if it was intended for an adolescent or adult population, consumer or professional, television or internet-based videos. **Participants:** 100 most widely viewed English language videos with collective views of over 35 million **Limitations:** Only examined videos in English, cross-sectional design.	Videos on YouTube related to distracted driving are popular and this medium could be successful as a method of communicating information about this issue.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Jung, T., Kafl, C., Zapf, D., & Hecht, H. (2019). Effectiveness and user acceptance of infotainment-lockouts: A driving simulator study. *Transportation Research Part F: Traffic Psychology and Behaviour, 60*(0), 643-656. Retrieved from https://doi.org/10.1016/j.trf.2018.12.001	Germany	Interventions	Driving simulator **Aim:** Examine the influence of in-vehicle information systems lockouts on driving performance and user acceptance. **Conditions:** (a) unlocked in-vehicle information systems (b) partially locked in-vehicle information system (c) completely locked in-vehicle information system. **Participants:** 26 participants **Limitations:** Only considered some measures of driving performance, large amounts of data loss (originally 52 participants), all participants were the employees of an automobile manufacturer.	Lateral control was better when the system employed partial or complete lockets compared with an unlocked system. Longitudinal control did not benefit from a lockout. User acceptance decreased with an increasing number of disabled system functions while driving.	None specifically mentioned.
2019	Linden, P. L., Endee, L. M., Flynn, E., Johnson, L. M., Miller, C.-A., Rozensky, R., Smith, S. G., & Verderosa, C. (2019). High School Student Driving Perceptions Following Participation in a Distracted Driving Curriculum. *Health Promotion Practice, 20*(5), 703-710. doi:10.1177/1524839918824322	USA	Interventions	Pre and post survey **Aim:** To identify if the Prevention of Distracted Driving program increases knowledge of distracted driving behaviours, address the barriers to safe driving and teaches skills to protect students from high-risk driving situations. **Measures:** Demographics, hours per week they drive, engagement in 8 listed distraction behaviours, knowledge of distracted driving laws, sleep habit items and items regarding the likelihood of them falling asleep under eight conditions. **Participants:** 248 pre-surveys and 225 post surveys from students aged 14 to 20 years (51% female) **Limitations:** All participants were from public schools, participants were not randomised, lack of controls.	Majority reported that they learned new information and would recommend the program to others. Students were likely to speak up as the passenger with a distracted or drowsy driver.	Health Belief Model Transtheoretical Model Theory of Planned Behaviour Social Cognitive Theory

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Oviedo-Trespalacios, O., King, M. J., Truelove, V., & Kelly, R. (2019). *Can voluntary apps reduce mobile phone use while driving ?* (9780994566669). Retrieved from https://apo.org.au/node/306135	Australia	Interventions Mobile phones	A driver acceptance assessment study, an expert-based assessment study, an online based case-scenario analysis and an in-vehicle study **Aim:** Investigate the potential use of voluntary apps to reduce distracted driving due to mobile phone use through four empirical studies. **Measures:** Online survey – mobile phone history, cognitive interactions with apps, self-reported mobile phone use while driving, driver demographics. **Participants:** Driver acceptance assessment – 35 participants aged between 19 and 44 years (43% female), expert-based assessment study – 7 participants, online based case-scenario analysis – 511 participants aged between 18 and 90 years (47.7% female), in-vehicle study – 33 participants aged between 18 and 56 years (57.6% female). **Limitations:** Self-report, selection biases, a longer period of monitoring experience would have been positive.	Self-reported reductions in phone use and decreased mental demand while participants were using the voluntary app Intentions to use the voluntary app were influenced by the features and performance of the app. Only voluntary apps that function reliably and provide a satisfactory level of integration with the vehicle and the functions the drivers use should be promoted. There were concerns about being able to be contacted during an emergency.	Technology Acceptance Model Theory of Planned Behaviour
2019	Oviedo-Trespalacios, O., Williamson, A., & King, M. J. (2019). User preferences and design recommendations for voluntary smartphone applications to prevent distracted driving. *Transportation Research Part F: Traffic Psychology and Behaviour, 64*(0), 47-57. Retrieved from https://doi.org/10.1016/j.trf.2019.04.018	Australia	Interventions Mobile phones	Online questionnaire **Aim:** Investigate the factors that influence the use of voluntary smartphone applications to reduce the distraction associated with mobile phone use while driving. **Measures:** Driver demographics, self-reported mobile phone use while driving, familiarity with voluntary smartphone apps, scenario-based experiment and voluntary smartphone functions. **Participants:** 712 drivers aged 18 to 90 years (48% female). **Limitations:** Majority of participants were in or completing tertiary education, sub-groups of the population with limited internet access would have been unable to participate, possible social desirability bias.	Willingness of participants to install and activate a mobile phone app was determined by the facility to disable visual-manual tasks and notifications and allow hands-free conversations. Facility to set up automatic responses to inform contacts that they are driving was also important. Females were more likely to install and activate the app. Participants wanted to retain the ability to use music-playing functions. Ability to give commands to the phone exclusively through audio using a hands-free device or Bluetooth was also favoured.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Young, K. L., Koppel, S., Stephens, A. N., Osborne, R., Chambers, R., & Hassed, C. (2019). Mindfulness Predicts Driver Engagement in Distracting Activities. *Mindfulness, 10*(5), 913-922. doi:10.1007/s12671-018-1060-7	Australia	Interventions Mindfulness	Online survey **Aim:** Identify if mindfulness predicts driver engagement in a wide range of distracting activities including in-vehicle technology and non-technology based distraction sources, daydreaming/mind wandering and distractions external to the vehicle. **Measures:** Demographics, driving distraction, mindful attention and awareness. **Participants:** 312 drivers aged from 18 to 86 years (81.4% female) **Limitations:** Non-representative, convenience sample of drivers, largely female, many had completed a undergraduate or postgraduate degree.	Mindfulness was negatively associated with the frequency of driver engagement in all distractions (talking on mobile phone, text messaging, other technology, non-technology sources, advanced driver assistance systems) with the exception of passenger interaction	None specifically mentioned.
2020	Arslanyilmaz, A. (2020). Hazard warning systems to improve young distracted drivers' hazard perception skills. *Safety, 6*(1), Article ID 12.	USA	Intervention	Simulator experiment **Aim:** Identify if a Hazard Warning System that is integrated with a game-based, multi-player, online simulated training application improves young and inexperienced drivers hazard perception skills. **Conditions:** (a) Hazard Warning System integrated with a game-based, multi-player, online simulated training application (b) the game-based, multi-player, online simulated training application by itself. **Participants:** 22 high school students aged 15 to 18 years old without a driver licence.. **Limitations:** None mentioned.	A Hazard Warning System that is integrated with a game-based, multi-player, online simulated training application improves novice distracted drivers' hazard perception skills.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Diegelmann, S., Ninaus, K., & Terlutter, R. (2020). Distracted driving prevention: an analysis of recent UK campaigns. *Journal of Social Marketing, 10*(2), 243-264. doi:10.1108/jsocm-07-2019-0105	UK	Interventions Media campaigns	Qualitative content analysis **Aim:** Analyse message features of fear appeals in British road safety campaigns directed against mobile phone use while driving. **Participants:** 9 web-based road safety campaigns. **Limitations:** Qualitative nature of the study limits generalisability, there may be issues related to the coding process, geographic focus was only in the United Kingdom.	Threat based content appears 87.3% times compared with efficacy based content which appears 12.7% of the time. Fear content always preceded efficacy messages (when present). To enhance self-efficacy campaigns should illustrate success stories of drivers who have found useful ways for themselves to change their behaviour and stop using their phones while driving. To enhance response efficacy, the success stories should highlight the selected strategies have been successful in avoiding negative consequences of mobile phone use while driving.	Theory should be used when design campaigns
2020	Ehrlich, P. F., Costello, B., & Randall, A. (2020). Preventing distracted driving: A program from initiation through to evaluation. *American Journal of Surgery, 219*(6), 1045-1049. doi:10.1016/j.amjsurg.2019.07.043	USA	Interventions Young drivers	Focus groups, analytics of website **Aim:** Identify the effectiveness of a media strategy to encourage parents to download a parent toolbox from a website. **Conditions:** Traditional media – billboards, radio, television and mobile phone banner advertisements, Social media – blogs, facebook posts and advertisements on social media. **Participants:** Focus groups – 15 parents and 15 adolescents, analytics of website – 73,972 sessions of greater than 2 minutes. **Limitations:** Do not know if visitors to the website read the material, do not know if the toolkit was used once it was downloaded, only one focus group (though it did have 30 participants).	Social media was more effective than traditional media and resulted in more visits to the website, longer visits to the website and more downloads of the distracted driving toolkit. Few parents and adolescents have had discussions regarding distracted driving. Few adolescents would use the bag to store their mobile phone limiting its usefulness as a strategy to reduce distracted driving.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Foglia, V., Roy-Charland, A., Leroux, D., Lemieux, S., Yantzi, N., Skjonsby-McKinnon, T., Fiset, S., & Guitard, D. (2020). When Pictures Take Away From the Message: An Examination of Young Adults' Attention to Texting and Driving Advertisements. *Canadian Journal of Experimental Psychology-Revue Canadienne De Psychologie Experimentale, 74*(2), 131-143. doi:10.1037/cep0000190	Canada	Interventions Media campaigns Young drivers	**Aim:** Examine the eye movements of young adults while they were viewing texting and driving prevention advertisements to determine which formats attract the most attention. **Conditions:** Non-driving, general distracted driving, texting and driving advertisements. Each was edited to contain text-only, image only, text and image content. **Participants:** 32 individuals aged between 16 and 24 years old (71% female). **Limitations:** Advertisements were not controlled in terms of their content, greater number of female participants.	For the non-driving and the general distracted driving advertisements, participants spent more time viewing the images than the text. The texting and driving specific advertisements in the text only format had the most attention toward the advertisements. Attracting young adults attention to texting and driving public health advertisements, the most successful format would be text-based.	None specifically mentioned.
2020	Gaspar, J. G., & Brown, T. L. (2020). Matters of State: Examining the effectiveness of lane departure warnings as a function of driver distraction. *Transportation Research Part F-Traffic Psychology and Behaviour, 71*, 1-7. doi:10.1016/j.trf.2020.03.009	USA	Interventions	Driving simulator experiment **Aim:** Investigate whether land departure warnings were more effective for drivers when they were distracted compared to when they were undistracted. **Conditions:** Distraction (distracted, undistracted), lane departure Warning type (no warning, auditory, visual, steering wheel vibration, seat vibration) and timing (early, late). **Participants:** 80 licensed drivers aged between 35 and 55 years (50% female). **Limitations:** No subjective feedback regarding the lane departure warnings.	During distracted lane departures, drivers with lane departure warnings responded faster and had less severe lane departures than drivers without the land departure warning. There was no difference during undistracted lane departures. Lane departure warnings are most effective when drivers are distracted.	None specifically mentioned.
2020	Hill, L., Rybar, J., Jahns, J., Lozano, T., & Baird, S. (2020). 'Just Drive': An Employee-Based Intervention to Reduce Distracted Driving. *Journal of Community Health, 45*(2), 370-376. doi:10.1007/s10900-019-00752-4	USA	Interventions Mobile phones Professional drivers	Pre and Post surveys **Aim:** Evaluate the effectiveness of a 1 hour in-person work-based class to reduce distracted driving in participating employees. **Measures:** Knowledge and behavioural intentions regarding mobile phone use while driving, self-reported driving behaviours **Participants:** 4,928 participants (for the surveys that asked about demographics – 25% female). **Limitations:** Lack of control group, self-report.	Increase in knowledge about distracted driving risks. Intentions to change behaviour. Self-reported changes in behaviour 3 months after the course. Commercial drivers were less likely than non-commercial drivers to change their behaviour following the class.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Imberger, K., Poulter, C., Regan, M. A., Cunningham, M. L., & Paine, M. (2020). Considerations for the development of a driver distraction safety rating system for new vehicles. *Journal of Road Safety, 31*(2), 23-34	Australia	Interventions Human Machine Interface	Consultation with expert international researchers and industry representatives, workshops. **Aim:** Determine the feasibility of developing a test protocol for rating the distraction potential of new vehicles entering the Australian market. **Participants:** 27 experts. **Limitations:** None mentioned.	Three assessment methods that are most suitable for assessing the distraction potential of in-vehicle technologies: Human Machine Interface design checklist, Detection Response Task and Visual Occlusion Test that measure cognitive and visual load respectively.	None specifically mentioned.
2020	Oviedo-Trespalacios, O., Briant, O., Kaye, S. A., & King, M. J. (2020). Assessing driver acceptance of technology that reduces mobile phone use while driving: The case of mobile phone applications. *Accident Analysis and Prevention, 135*, 9. doi:10.1016/j.aap.2019.105348	Australia	Interventions Mobile phones	Online survey **Aim:** Explore and compare the explanatory value of the Technology Acceptance Model, Theory of Planned Behaviour and the Unified Theory of Acceptance and Use of Technology and determine the intent of participants to use the proposed applications to prevent distracted driving. **Measures:** Theory measures, intention to use the application to prevent distracted driving, familiarity with the application. **Participants:** 731 drivers (47.7% female). **Limitations:** The mobile phone applications used in this study may not be the best to reduce distracted driving, possible social desirability bias, convenience sample.	Psychological theories are useful in assessing the acceptance of mobile phone technologies. The Technology Acceptance Model was slightly better than the Theory of Planned Behaviour in explaining behavioural intent for using mobile phone applications designed to reduce distraction.	Technology Acceptance Model Theory of Planned Behaviour Unified Theory of Acceptance and Use of Technology
2020	Pettinico, G., & Debevec, K. (2020). The positive effects of explaining the underlying mechanisms (how it works) when promoting healthy behaviors. *Health Marketing Quarterly, 37*(1), 58-72. doi:10.1080/07359683.2020.1713579	USA	Interventions Media campaigns	Online survey **Aim:** How to improve the effectiveness of campaigns designed to increase healthy behaviours. **Conditions:** (a) benefits (b) benefits and how behind them (c) control statement. **Participants:** 188 undergraduate students. **Limitations:** None mentioned.	Telling people about the benefits and the how behind them is significantly higher in terms of information and persuasion when compared to the other two conditions. Including details about the processes by which healthy/safer behaviours actually work to bring personal benefits has a significant and positive impact on both how informative the message is perceived to be as well as its degree of persuasiveness.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Reagan, I. J., & Cicchino, J. B. (2020). Do Not Disturb While Driving - Use of cellphone blockers among adult drivers. *Safety Science, 128*, 26. doi:10.1016/j.ssci.2020.104753	USA	Interventions	Telephone survey **Aim:** Measure the adoption and use of mobile phone blocking technology. **Participants:** 800 adult drivers who own smartphones, were aged 18 or older and had driven at least once a week in the previous month. **Limitations:** Low response rate, self-report data.	20.5% of participants with Do Not Disturb While Driving compatible iPhones had Do Not Disturb set to activate automatically when driving or when connected to the vehicle's Bluetooth. Among those without a Do Not Disturb While Driving compatible phone, 18.7% reported having an alternative blocker and only half of these reported turning it on while driving at least 75% of the time.	None specifically mentioned.

Table B.13: Methodology

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2015	Merat, N., Kountouriotis, G., Tomlinson, A., Carsten, O., & Engstrom, J. (2015). *Performance on the Detection Response Task during driving: Separating the manual and cognitive element of the secondary task.* Paper presented at the International Conference on Driver Distraction and Inattention, 4th, 2015, Sydney, New South Wales, Australia	UK	Detection response task Manual response	Driving simulator study **Aim**: Compare drivers' performance on the head-mounted version of the Detection Response Task (HDRT) during dual task conditions (DRT + driving) with performance in a tertiary task setting (DRT + driving + secondary task). **Conditions**: Two tasks: visual task and "visuomanual" task. Both had an easy and hard version. **Participants**: 17 experienced drivers holding a valid UK driving license (11 males) Mean age of 30.8 years (SD = 8.9). **Limitations**: None mentioned.	Detection Response Task (DRT) was sensitive to the different difficulty levels of the nonvisual task, complex interactions exist between DRT performance and visual/visuomanual tasks. For example: DRT was not able to distinguish between different perceptual demands of the visual task; but was sensitive to the manual load of the visuomanual task. Results suggesting that DRT performance may generally be sensitive to more difficult driving conditions.	Wickens' Multiple Resources Theory mentioned at introduction.
2015	Rydström, A., Aust, M.L., Broström, R., & Victor, T. (2015). *Repeatability of the NHTSA Visual-Manual Guidelines Assessment Procedure.* Paper presented at the 24th International Technical Conference on the Enhanced Safety of Vehicles (ESV), Gothenburg, Sweden.	Germany	EGDS Guidelines	Driving simulator study **Aim**: Assess whether the inconsistent outcomes following the EGDS (Eye Glance Measurement Using Driving Simulator Testing) previously found was primarily methodological or structural in character. **Conditions**: Nine tasks were included for the in-vehicle interface, and an additional radio manual tuning reference task. **Participants**: 48 participants (24 female), six participants in each of the age groups (18-24, 25-39, 40-54, and 55+). **Limitations**: Some of the inconsistencies may be due to methodological issues (incorrect assumption of identical test). Did not test/consider the impact of different simulator setups.	For 6 of the 10 tested tasks, pass/fail outcomes differed between the two groups on one or more of the proposed criteria. The high level of inconsistency in outcome between two identical tests using ten identical tasks raises questions regarding the repeatability of the proposed NHTSA EGDS procedure.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2017	Hoekstra-Atwood, L., Chen, H. -Y. W., & Donmez, B. (2017). Simulator study of involuntary driver distraction under different perceptual loads. *Transportation Research Record, 2663*(1), 12-19. doi:10.3141/2663-02	Canada	Involuntary distraction Cognitive failures questionnaire	Driving simulator study **Aim**: Explore how involuntary distraction affects individual drivers and whether varying perceptual load in the driving environment modulates involuntary distraction engagement. **Conditions**: 2 × 2 within-subject design. Distraction type (involuntary distraction or baseline) and perceptual load (rural road with lower perceptual load or urban road with higher perceptual load). **Participants**: 24 participants (12 female). Mean age 26 (21 – 34, SD = 3.4). **Limitations**: Small sample size. Sample was not representative of the entire driving population (young and healthy). Stimuli were designed to elicit involuntary engagement, but it is possible that some participants' responses might have been driven by an interest.	Higher self-reported everyday distractibility scores (from Cognitive Failures Questionnaire scale) were found to be associated with longer glances, but not the number of glances, toward the irrelevant stimuli. Study suggests that the Cognitive Failures Questionnaire scale may correlate better with the ability to disengage from a distraction than with the ability to suppress automatic attentional capture. Delayed accelerator release times to lead vehicle braking events in the presence of irrelevant stimuli. The perceptual responses associated with the accelerator release times show that the delay occurred after participants glanced at the brake light, possibly indicating slower processing of information under distraction. Perceptual load, manipulated by the simulated road's visual complexity, did not affect involuntary distraction engagement but directly affected driving performance.	Load theory.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2018	Prat, F., Gras, M. E., Planes, M., Font-Mayolas, S., & Sullman, M. J. M. (2018). Self-reported distraction-related collisions: Mundane distractions are reported more often than technology-related secondary tasks. *Transportation Research. Part F, Traffic Psychology and Behaviour, 59,* 124-134. doi:10.1016/j.trf.2018.08.008	Spain	Interview Collisions Near misses	Semi-structured interviews **Aim**: Investigate self-reported distraction-related collisions and near-misses, both as a driver and a passenger. **Measures**: A set of questions were asked about - what they consider to be distractions - driving experiences. - frequency of engagement in constructs regarding a pool of driving distractions. **Participants**: 426 drivers (220 females, 1 unregistered). Ages from 18 to 78. **Limitations**: The use of a non-probabilistic sampling means that the estimates produced in this study may not be representative of the general population. The estimates of the proportion of drivers having had accidents and near-misses while distracted are based upon self-reports.	7% of drivers reported having had an accident while distracted. The reported distraction: - drivers' own thoughts (2.5%), - looking at something outside the vehicle (2%) - talking to a passenger (1.1%); - talking on a handheld phone (0.2%); - reading or sending text messages (0.2%) 35.7% reported having had a near-miss while distracted. The most common distraction types: - manipulating the audio entertainment system (8.6%) - talking to passengers (8.2%). - talking on a handheld mobile phone (2.4%) - hands-free phone (0.7%) - text messaging (reading or sending) (4.6%) Drivers who knew another who had crashed - handheld phone use was the most commonly identified task Those who reported engaging in each distraction type were also more likely to report having experienced a crash or near-miss related to that distraction type.	Social Learning Theory. Social Cognitive Theory.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2019	Wijayaratna, K. P., Cunningham, M. L., Regan, M. A., Jian, S., Chand, S., & Dixit, V. V. (2019). Mobile phone conversation distraction: Understanding differences in impact between simulator and naturalistic driving studies. *Accident Analysis and Prevention, 129,* 108-118. doi:10.1016/j.aap.2019.04.017 Later version of: Cunningham, M., Regan, M., Wijayaratna, K., Dixit, V., Jian, S., Hassan, A., & Chand, S. (2018). *Mobile Phone Distraction: Understanding the Inconsistencies between Simulator and Naturalistic Driving Study Findings*. Paper presented at the Australasian Road Safety Conference, Sydney, Australia.	Australia	Simulation studies Naturalistic driving studies.	Expert critical appraisal of literature **Aim**: Investigates the impact of the differences between simulator and naturalistic driving studies. **Participants**: Consulted with “international distraction and human factors experts”. **Limitations**: Was not able to access raw data. Did not discuss in detail about experts or their possible differences of opinion.	The study produced some possible psychological and methodological reasons that can cause the identified discrepancies: - **Self-regulation:** The possibility for a driver to self-regulate mobile phone use in the real-world to a greater extent. -**Arousal:** Phone conversations being of higher significance and arousal in NDSs relative to a simulated environment leading to greater real-world compensatory driver behaviour. -**Gaze Concentration:** Real-world phone conversations enhance enough cognitive loading to improve gaze concentration and as such longitudinal hazard detection in NDSs. -**Task displacement:** Phone conversations may prevent drivers from engaging in other, more risky, activities in real world scenarios which cannot be captured in a simulation environment. -**Controlled versus Automatised performance**: Cognitive loading tasks may impact driving performance in controlled environments (driving simulator), but may not have an impact on automatised driving performance (naturalistic driving).	Heinrich Triangle.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Ahlström, C., Wachtmeister, J., Nyman, M., Nordenstrom, A., & Kircher, K. (2020). Using smartphone logging to gain insight about phone use in traffic. *Cognition, Technology & Work, 22*(1), 181-191, doi:http://dx.doi.org/10.1007/s10111-019-00547-6.	Sweden	Mobile phone Smartphone logging	Smartphone logging application **Aim**: Develop a custom-made smartphone logging system. **Measures**: Phone interactions (mobile phone applications, incoming/outgoing phone calls and text messages, audio output, and screen activations. Movement (transport, cycling, walking, running, or stationary). **Participants**: 143 participants with a valid driver's license and an Android smartphone. (53 female). Mean age 38.4 ± 13.1 years. **Limitations**: Cannot be used on iPhones. Not possible to log usage of floating widgets, like Facebook Messenger. Daily requests to identify whether one has been driver or passenger will increase awareness of being monitored, and possible inaccuracy. Finally, the fast pace with which applications are being developed can make research appear to lag.	Examples of results that can be gained from smartphone logging include: - prevalence in different transportation modes - which apps are being used; and - on which road types. Smartphone logging was found to be an insightful complement to the other methods for assessing phone use in traffic, especially since it allows the analyses of which apps are used and where they are used, split into transportation mode and road type, all at a relatively low cost. Compared to other methods phone logging is: - considerably cheaper - richer in data as they are collected in more than one or a few locations, and are obtained continuously for the same driver - phone and application usage is logged objectively.	None specifically mentioned

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	McDonald, A. D., Ferris, T. K., & Wiener, T. A. (2020). Classification of driver distraction: A comprehensive analysis of feature generation, machine learning, and input measures. *Human Factors, 62*(6), 001872081985645-1035. doi:10.1177/0018720819856454	USA	Algorithm Machine learning	Algorithm development, Driving simulator study **Aim**: Analyse a set of driver performance and physiological data using advanced machine learning approaches to determine the best-performing algorithms for detecting driver distraction. **Measures**: Secondary cognitive and texting tasks to driving Algorithm input: 1. Physiological Data Set: including only driver physiological measures 2. Driver Behaviour Data Set: including only driving behaviour measures 3. Combined Data Set: including both driving behaviour and driver physiological measures. To measure: **Participants**: 48 licensed, regular drivers from two age groups: 18–27 years (14 female); > 60 years (13 female). **Limitations**: Several studies have observed differences in physiological and driver behaviour measures between simulators and on road environments. Most of the data exclusions in the analysis were due to failures in the physiological sensor hardware or software. Risk of model overfitting due to size of data.	Results showed that a Random Forest algorithm, trained using only driving behaviour measures and excluding driver physiological data, was the highest performing algorithm for accurately classifying driver distraction. The most important input measures identified were lane offset, speed, and steering, whereas the most important feature types were standard deviation, quantiles, and nonlinear transforms. The study presents several new indicators of distraction derived from speed and steering measures.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/ Methodology	Main findings / comments	Theories/models/ frameworks
2020	Morgenstern, T., Wögerbauer, E. M., Naujoks, F., Krems, J. F., & Keinath, A. (2020). Measuring driver distraction – evaluation of the box task method as a tool for assessing in-vehicle system demand. *Applied Ergonomics, 88,* 103181-103181. doi:10.1016/j.apergo.2020.103181	Germany	Secondary tasks Box task method	Driving simulator study **Aim:** Evaluate the box task combined with a detection response task by comparing its sensitivity to the sensitivity of already established methods. **Conditions**: Two independent variables: methods and secondary tasks. The variable "method" included three conditions (box task + detection response task, Lane Change Test and driving simulation task), Secondary task: (1) baseline condition (no secondary task) and six secondary task conditions). **Participants**: 29 participants (12 female). Mean age 32 (20 – 46, SD = 7.29). **Limitations**: A relatively small sample. The secondary task implementation was rather artificial in the experiment (e.g., due to the limited completion time).	The results showed that the box task parameters (especially the standard deviation of box position and size) were sensitive to differences in demand across the visual-manual secondary tasks. The box task sensitivity results were comparable to what was found with the Lane Change Test. The box task performance measures were more sensitive than those of the driving simulation task. The box task captured cognitive distraction effects with the integration of the detection response task. The box task + detection response task could be a cost-effective method to assess in-vehicle system demand.	Dimensional Model of Driver Demand (Young, R., Seaman, S., Hsieh, L., 2016. The dimensional model of driver demand: visual-manual tasks. SAE Int. J. Transport. Safety 4 (1), 33–71.) mentioned at the introduction.
2020	Osman, O. A., & Rakha, H. (2020). Application of deep learning for characterisation of drivers' engagement in secondary tasks in in-vehicle systems. Transportation Research Record, 2674(8), 429-440. doi:10.1177/0361198120926507	USA	Deep neural network Secondary tasks	Deep neural network development **Aim**: Investigate the possibility of detecting engagement in secondary tasks using deep learning tools. **Measures**: Vehicle speed, the longitudinal acceleration, the lateral acceleration, the yaw rate, pedal position features, and headway feature. **Limitations**: Did not discuss participants who created the events in any detail. Did not account for a few factors that may have an impact on driving patterns while engaging in secondary tasks, such as roadway geometric features, vehicle characteristics, and driver characteristics.	The models are able to identify the different types of secondary tasks with high accuracies of: - 100% for calling, - 96%–97% for texting, - 90%–91% for conversation, and - 95%–96% for the normal driving. The developed models improve on the results of a previous model developed by the author to classify the same three secondary tasks, which had an accuracy of 82%.	None specifically mentioned.

Table B.14: New direction – mind wandering research

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Theories/models/ frameworks
2015	Qu, W., Ge, Y., Xiong, Y., Carciofo, R., Zhao, W., & Zhang, K. (2015). The relationship between mind wandering and dangerous driving behavior among Chinese drivers. *Safety Science, 78*, 41-48. doi:10.1016/j.ssci.2015.04.016	China	Mind wandering Gender	Self-report questionnaire with scales **Aim:** Investigate the relationship between mind wandering and dangerous driving. **Conditions:** Baseline and demographic variables. **Measures:** The mind wandering scale (MW), Dula Dangerous Driving Index (DDDI), demographic questionnaire. **Participants:** 295 drivers. **Limitations:** Unrepresentative sample, self-report study (social desirability and memory issues).	Mind wandering is positively correlated with dangerous driving behaviours. Drivers checked their mirrors less and were less responsive to speed limits when daydreaming (mind wandering). The authors association mind wandering with dangerous driving, aggressive driving, risky driving, drunk driving and negative emotional behaviour. The main association with distracted driving is the connection between negative emotion and inattentiveness to the primary driving task. Drivers who tended to mind wander more self-reported more road crashes, violations, and fines. Executive control may shift from the primary task to the secondary task (mind wandering)	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Theories/models/ frameworks
2017	Steinberger, F., Schroeter, R., & Watling, C. N. (2017). From road distraction to safe driving: Evaluating the effects of boredom and gamification on driving behaviour, physiological arousal, and subjective experience. *Computers in Human Behavior, 75*, 714-726. doi:10.1016/j.chb.2017.06.019	Australia	Mind wandering Intervention	Simulator based study, semi-structured interviews **Aim:** Explore the impact of a gamification intervention on boredom (and mind wandering) related distracted driving behaviours. **Conditions:** Control and gamification intervention that provides driving speed feedback and fuel efficiency driving challenges on a smartphone visual display. Within-subject, repeated measures design. **Measures:** Psychophysiological measures: driving behaviour (lateral shift, eye glance variations, reaction times), physiological arousal (EDA and ECG), subjective experience. **Participants:** 21 young male drivers. **Limitations:** Only young male participants, results were not statistically significant, simulators have low ecological validity, control condition was not reflective of normal driving.	Participant speed was lower in the intervention condition (gamification) than the control condition. Participants also had better lateral control of the vehicle and showed elevated arousal measures (EDA). However, intervention participants had lower reaction times to sudden hazard events. The authors contend this may be due to the nature of the game (to game encouraged fuel efficiency and relayed information about fuel consumption). The authors assert gamification (interacting with an app) can help to sustain attention and arousal on monotonous driving trips. The authors claim findings uphold the predictions of Kurzvan et al. (2013) opportunity control model – attentional resources are allocated to compelling tasks.	Opportunity cost model
2018	Albert, D. A., Ouimet, M. C., Jarret, J., Cloutier, M. S., Paquette, M., Badeau, N., & Brown, T. G. (2018). Linking mind wandering tendency to risky driving in young male drivers. *Accident Analysis and Prevention, 111,* 125-132. doi:10.1016/j.aap.2017.11.019	Canada	Mind wandering	Driving simulator study. Self-report surveys. **Aim:** Examine relationships between mind wandering tendency, executive control capacity, driver vigilance, and risky driving behaviour in young drivers. **Conditions:** 2 drives, each drive took approx. 30 minutes to complete. Both drivers were calm and uneventful to (no traffic events that required hard braking). **Measures:** Speed test, horizontal eye movement, Sustained Attention to Response Task (SART) and Daydreaming Frequency Scale (DDFS), colour word interference test (CWIT). **Participants:** 30 young drivers with previous experience with alcohol **Limitations:** Only males were included, starting times were either morning or afternoon, potentially implicating performance as chronotype influenced measures.	Results showed that greater mind wandering predicted higher median speed measures. Neither greater vigilance (measured by eye glance movements) nor greater executive control capacity (measured by CWIT) moderated this relationship. Interestingly, the authors found individuals with greater working memory capacity (executive control) experienced more mind wandering. Greater apparent vigilance did not affect distraction measures.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Theories/models/ frameworks
2018	Geden, M., Staicu, A. M., & Feng, J. (2018). The impacts of perceptual load and driving duration on mind wandering in driving. *Transportation Research Part F-Traffic Psychology and Behaviour, 57*, 75-83. doi:10.1016/j.trf.2017.07.004	USA	Mind wandering	Driving simulator study, demographic questionnaire **Aim:** Examine how perceptual load and driving duration impact mind wandering rates and costs in simulated driving. **Conditions:** Driving scenario: two lane rural highway, follow lead vehicle task with speed limit of 45mph. Two conditions: (1) lower perceptual load with no other traffic, (2) incoming traffic, houses, trees, intersections. Mind wandering probes about thoughts (either task related or task unrelated). **Measures:** Generalised additive mixed models (GAMMs) measuring lane position, lateral and longitudinal velocity and acceleration. **Participants:** 43 young drivers. **Limitations:** Non-representative sample, a limited amount of measures were used.	Higher perceptual loading resulting in less mind wandering. Driver speed was lower in the higher load scenario. This slowing down effect is consistent general distracted driving (however this is thought to be a compensatory effect). Mind wandering increased with time (thought to be associated with gaining experience on particular road). In other words, when the road environment stayed the same, less cognitive resources were required to drive, and mind wandering increased.	None specifically mentioned.
2019	Burdett, B. R. D., Charlton, S. G., & Starkey, N. J. (2019). Mind wandering during everyday driving: An on-road study. *Accident Analysis and Prevention, 122*, 76-84. doi:10.1016/j.aap.2018.10.001	New Zealand	Mind wandering	Naturalistic driving study with self-report questionnaires. Secondary data analysis (NZ crash database). **Aim:** Investigate mind wandering during everyday driving and its association with crash patterns. **Conditions:** An urban 25km driving route (accompanied by researcher). Researcher asked questions about thought patterns at 3 predetermined points. **Measures:** Categorising thought patterns as either mind wandering or driving focus. Comparison with crash statistics. **Participants:** 25 drivers (none involved in road crash in last 5 years). **Limitations:** Small sample size, conditions were restricted. Longer, more mundane (boring) driving routes were not explored.	Results showed that although all road sections (206 in total) reported some mind wandering, slower, quieter, less complex road sections had a higher frequency of mind wandering. In general, mind wandering was triggered by an environmental factor in complex sections and more random thoughts (untriggered) occurred at quieter, uneventful roads (often dual carriageways). Crash data showed a higher crash rate at intersections, midblocks (pedestrian crossings), and roundabouts where mind wandering was reported less. The authors argue findings suggest, although mind wandering happens constantly, it occurs less at intersections or complex road scenarios. Nonetheless, according to the crash data statistics, crashes tend to occur at more complex road infrastructure	Context relational hypothesis (CRH)

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Theories/models/ frameworks
2019	Young, K. L., Koppel, S., Stephens, A. N., Osborne, R., Chambers, R., & Hassed, C. (2019). Mindfulness Predicts Driver Engagement in Distracting Activities. *Mindfulness, 10*(5), 913-922. doi:10.1007/s12671-018-1060-7 23	Australia	Mindfulness Mind wandering Goal conflicts	Online self-report survey **Aim:** Examine if 'mindfulness' predicts driver engagement in distracting activities. **Conditions:** Interaction with mobile phones, passengers, eating/drinking, outside of vehicle objects and events. **Measures:** Mindfulness Attention Awareness Scale (MAAS). Demographic and socio-economic characteristics, driver experience and exposure, crash and infringement history. **Participants:** 312 mostly frequent drivers (90%). **Limitations:** Non-representative convenience sample, MAAS is a unidimensional construct.	Results showed that mindfulness was negatively associated with distracted driving (including mind wandering). Engagement in distracting activities is common. The most common distracting activities were talking with passengers, changing climate controls, looking at something outside of the vehicle, daydreaming/mind wandering. Phone use was also a common activity. Mindfulness was most highly negatively correlated with driver's daydreaming or being lost in thought.	None specifically mentioned. Referred to 'goal conflict' and social influences in a discussion about interacting with other passengers (particularly children)
2020	Wotring, B., Dingus, T. A., Atwood, J., Guo, F., McClafferty, J. A., & Buchanan-King, M. (2020). The prevalence of cognitive disengagement in automobile crashes. *Applied Cognitive Psychology, 34*(2), 543-550. doi:http://dx.doi.org/10.1002/acp.3630	USA	Mind wandering 'Cognitive disengagement'	Secondary data analysis of naturalistic driving data (SHRP 2 NDS). **Aim:** Determine via a large-scale naturalistic driving study the prevalence of cognitive disengagement (i.e., purely cognitive distraction and mind wandering/microsleep) in automobile crashes. **Conditions:** Mined data for higher severity crashes only. **Measures:** Glance and event analysis and reduction to identify prevalence of cognitive disengagement (cognitive distraction, mind wandering, micro-sleep). **Participants:** Approx. 3,500 drivers **Limitations:** Hard to determine cognitive disengagement. Mind wandering could have led to making phone call. These multiple causes were not detected in the NDS videos. SHRP 2 NDS oversampled younger drivers. Sampling techniques may not reflect cognitive disengagement across all crash scenarios or regular driving.	The study found the prevalence of cognitive disengagement was very low (less than 1%) in high-level crash data. Instead, the study found that 72% of high-level crashes were due to driver's eyes off the forward roadway (within 3s of crash) or engagement in visual/manual tasks. Authors claim cognitive disengagement was very low in high-level crashes contrary to many studies.	None specifically mentioned.

Table B.15: New direction – ‘systems’ and the Australian ‘ecosystem approach’

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Theories/models/ frameworks
2015	Bingham, C. R., Zakrajsek, J. S., Almani, F., Shope, J. T., & Sayer, T. B. (2015). Do as I say, not as I do: Distracted driving behavior of teens and their parents. *Journal of safety research, 55*, 21-29. doi:10.1016/j.jsr.2015.07.007	USA	Social context Gender difference	Self-report survey **Aim:** Examine teen drivers and parents of teen drivers distracted driving habits. **Conditions:** Parents and teen drivers living in the same household. **Measures:** Demographic data, marital status, annual income, school level (for teen driver), frequency of distracting behaviours (DBs). **Participants:** 403 parent-teen dyads. **Limitations:** Self-report measures may be exaggerated or exhibit a range of biases.	Results did not show significant differences in DBs between genders for teens or their parents. The most common DBs for both parents and teens was eating, drinking, and dealing with passengers. Teens whose parents read or send text messages are 2.5 times more likely to text while driving. Similar odds ratios were seen for other DBs like eating, drinking, looking for objects while driving, reading directions etc.	Social model of behaviour (social learning theory)
2015	Young, K. L., & Salmon, P. M. (2015). Sharing the responsibility for driver distraction across road transport systems: A systems approach to the management of distracted driving. *Accident Analysis and Prevention, 74*, 350-359. doi:10.1016/j.aap.2014.03.017	Australia	Socio-technical systems Commentary	Critique of reductionist, driver-centric approach to distracted driver (DD) studies and theoretical discussion **Aim:** Review currently approach to DD and compare this approach with systems thinking approaches.	The authors argue that understanding how all the transport system components that lead to DD fit together, provides the essential basis for planning effective policy interventions. Transport system components include government, regulatory bodies, local government, technical and operational producers, drivers/passengers/other road users, equipment manufacturers. The authors claim a driver-centric approach is piecemeal and ineffective.	The systems approach Vision Zero Systems-Theoretic Accident Model and Process (STAMP) Risk Management Framework (RMF)
2016	Chen, H. -Y. W., & Donmez, B. (2016). What drives technology-based distractions? A structural equation model on social-psychological factors of technology-based driver distraction engagement. *Accident Analysis and Prevention, 91*, 166-174. doi:10.1016/j.aap.2015.08.015	Canada	Social-psychological factors	Self-report survey **Aim:** Predict the influence of sociodemographic and psychosocial factors on a range of technology based distracting driving behaviours. **Conditions:** Demographic groups. **Measures:** Structural equation model (SEM) measured the influence of attitude, descriptive norm, injunctive norm, personality, and technology inclination. **Participants:** 525 drivers. **Limitations:** Self-report data is susceptible to biases and inconsistencies.	In general, participants self-reported engagement with in-vehicle technologies more than phone conversations or manual phone interactions. The effect of social norms, particularly perceived approvals was higher in younger drivers (18-30) than older drivers (30+). Personality characteristics as a predictor of distracted driving in the older age group (30+).	Theory of planned behaviour

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Theories/models/ frameworks
2016	LaVoie, N., Lee, Y. -C., & Parker, J. (2016). Preliminary research developing a theory of cell phone distraction and social relationships. *Accident Analysis and Prevention, 86*, 155-160. doi:10.1016/j.aap.2015.10.023	USA	Social context Age	Questionnaire development, self-report survey, development of theory **Aim:** Describe calling patterns differences between novice teen drivers and experienced drivers. **Conditions:** Interviews with small sample (18) of drivers to help design a broad ranging self-report survey on phone use whilst driving. **Measures:** Questionnaires were coded to establish the relationship between the driver and the person(s) they called. **Participants:** 13 (teen) + 5 (adult) questionnaire participants. 471 participants completed the survey. **Limitations:** Self-report results may be inaccurate due to biases. It is not known if the driver initiated each call.	The authors found that cell phone interactions were focused on communicating with close friends or family members. Teens spoke mostly with their parents. Adults spoke mainly with their spouses. Survey results suggest engaging in phone conversation with close social contacts may indicate a risk compensating strategy. For example, only socially important calls were answered or made. Other survey results suggest calls were made primarily for coordinating purposes or checking in with loved ones. Authors contend as parents both make and receive calls while driving any young driver based countermeasures must include parents.	None specifically mentioned.
2016	Massey, K., Kant, S., Violano, P., Roney, L., King, W. D., Justice, W., McFalls, K., & Monroe, K. (2016). Evaluating distracted driving behaviors in parents of children in suburban and rural areas of Alabama. *The journal of trauma and acute care surgery, 81*(4 Suppl 1), S44-S47. doi:10.1097/TA.0000000000001181	USA	Social context Intervention	Self-report survey **Aim:** Investigate the driving behaviours of parents while transporting their children. **Conditions:** Parents who drive with children younger than 18 years. **Measures:** Short questionnaire, statistical analysis using Z test **Participants:** 150 rural (64) and suburban (86) parents. **Limitations:** Small sample from one area. Self-report studies are subject to bias.	Risky driving behaviours (phone use while driving) occurred in both rural and suburban parent groups, however suburban parents used their phones more often.	None specifically mentioned.

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Theories/models/ frameworks
2016	Parnell, K. J., Stanton, N. A., & Plant, K. L. (2016). Exploring the mechanisms of distraction from in-vehicle technology: The development of the PARRC model. *Safety Science, 87*, 25-37. doi:10.1016/j.ssci.2016.03.014	UK	Socio-technical systems In-vehicle tech	Literature review and development of driver distraction model. Applied case study (crash event). **Aim:** Explore the underlying factors/mechanisms (particularly system-based factors) of in-vehicle technology (IVT) distractions in order to develop a model of driver distraction. **Conditions:** Applied case study – crash event. **Measures:** Document analysis applying open coding methods using grounded theory techniques. **Limitations:** Critiques of grounded theory suggest it oversimplifies complex issues and interrelations.	The authors found 33 articles that discussed underlying factors/mechanisms of driver distraction in relation to IVT. In the literature, 25 factors were found to contribute to distraction. The 5 most prevalent factors were: adapt to demands, goal conflict, behavioural regulation, goal prioritisation, and resource constraints. The authors analysed interconnections between factors within the literature and found a strong connection between 2 factors – 'goal conflict' and 'goal prioritisation' - which led to the mechanism - 'adapt to demands'. In the crash event case study, the goal conflict related to the dual task of safe driving and using a sat nav IVT. The driver prioritised (gave attention to) the navigation task and was inattentive to the driving task resulting in the fatal crash event.	Grounded theory Risk management framework Multiple resource theory Development of PARRC model
2016	Salmon, P. M., Read, G. J. M., & Stevens, N. J. (2016). Who is in control of road safety? A STAMP control structure analysis of the road transport system in Queensland, Australia. *Accident Analysis and Prevention, 96*, 140-151. doi:10.1016/j.aap.2016.05.025	Australia	Socio-technical systems	Development of road safety control structure model, Literature review **Aim:** Clarify who shares responsibility for road safety in Queensland and determine what control measures are enacted to prevent fatal five behaviours. **Conditions:** Queensland road safety system. **Measures:** Modified two-round Delphi study. **Participants:** 44 subject matter experts (SME). **Limitations:** None mentioned.	The model depicts the range of actors and organisations operating within the Qld road system (including Federal and International actors) and outlines key control and feedback mechanisms. The authors suggest the controls are often at the level of ‘influence’ rather than direct control and question their effectiveness when compared to comparable transport systems (e.g., aviation, rail).	STAMP (Systems Theoretic Accident Model and Process) Systems and control theory

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Theories/models/ frameworks
2016	Terry, C. P., & Terry, D. L. (2016). Distracted Driving Among College Students: Perceived Risk Versus Reality. *Current Psychology, 35*(1), 115-120. doi:10.1007/s12144-015-9373-3	USA	Social context	Self-report survey **Aim:** Compare perceptions of accident risk and social norms related to cell phone use while driving (CPWD) and alcohol-impaired driving with self-reported behaviour. **Measures:** Behavioural scales. **Participants:** 726 college students. **Limitations:** Sample not representative, self-report data may be biased or inaccurate.	Participants viewed sending text messages as posing a similar accident risk as driving with a BAC just over the legal limit. However, participants reported using their cell phone (talking and texting) more often than driving under the influence. Participants thought their peers viewed CPWD as more socially acceptable than they did. Participants thought their peers perceived laws regulating phone use while driving were too restrictive when compared with their own views. Participants thought CPWD was more socially acceptable than drink driving. The authors contend that social norms and injunctive norms (attitudes of peers) influence CPWD behaviours. Therefore, interventions should be multifaceted, including social media campaigns targeting social norms.	Social norms Perceived injunctive social norms
2016	Watters, S. E., & Beck, K. H. (2016). A qualitative study of college students' perceptions of risky driving and social influences. *Traffic Injury Prevention, 17*(2), 122-127. doi:10.1080/15389588.2015.1045063	USA	Social context	Focus group study **Aim:** Determine driving risk perceptions of young adults in relation to their social context. **Measures:** Phenomenological process (inductive thematic analysis) to explore how participants perceive their experiences. **Participants:** 25 college students **Limitations:** Self-report response bias and small sample size with little sociodemographic variety.	Participants believed that 'distracted' was a personal characteristic rather than a behaviour. Moreover, because most participants believed they were not distracted they overestimated their ability to drive while performing a secondary task like texting or conducting a phone conversation. Participants were more inclined to listen if a peer criticised (fear of judgement) their risky driving than if a parent did so. Most participants said they drove more safely when carrying passengers (social accountability and social norms). Most participants felt the law (and enforcement practices) were ineffective. Fines were too low, and police did not enforce consistently.	Health Belief Model

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Theories/models/ frameworks
2017	Islam, T., Thue, L., & Grekul, J. (2017). Understanding Traffic Safety Culture: Implications for Increasing Traffic Safety. *Transportation Research Record,* (2635), 79-89. Retrieved from https://doi.org/10.3141/2635-10	Canada	Social context Traffic safety culture	Self-report telephone survey **Aim:** Compare sociodemographic factors and safety culture in relation to driving behaviour and support for laws and enforcement. **Conditions:** Perceived traffic safety culture (TSC). **Measures:** descriptive and multivariate confirmative factor analysis (CFA), structural equation modelling (SEM). **Participants:** Approx. 1000 participants. **Limitations:** Self-report response bias.	The main finding of the study was that perceived threat to personal safety has the largest effect on driving behaviours and, to a lesser extent, support for traffic laws and enforcement. The study found that females, older road users, and parents are more likely to perceive a threat to personal safety than other groups. Most respondents believe phone use while driving was acceptable and was a lesser threat to personal safety than other risky behaviours. Self-report phone use while driving was also high.	Traffic safety culture (TFC)
2018	Briskin, J. L., Bogg, T., & Haddad, J. (2018). Lower Trait Stability, Stronger Normative Beliefs, Habitual Phone Use, and Unimpeded Phone Access Predict Distracted College Student Messaging in Social, Academic, and Driving Contexts. *Frontiers in Psychology, 9*, 16. doi:10.3389/fpsyg.2018.02633	USA	Social context Mental conditions	Questionnaire with response scales **Aim:** Investigate phone messaging behaviours across the contexts of eating with others, being in class, and driving. **Conditions:** Societal expectations to remain connected, frequency of message checking. **Measures:** Group/peer/moral norms **Participants:** 634 university students **Limitations:** Only college students were included.	The study found greater stability personality traits (calm, controlled, selfless) indirectly predicted less frequent messaging while higher plasticity personality traits (energetic, assertive) predicted increased messaging and phone related habits. Beliefs, values, habits strongly predicted messaging habits. Physical proximity of phone also strongly predicted degree of messaging behaviours. However, this was mediated by habits.	Social psychological theory Theory of planned behaviour Sociocognitive connection model Cybernetic personality system model
2018	Parnell, K. J., Stanton, N. A., & Plant, K. L. (2018). Creating the environment for driver distraction: A thematic framework of socio-technical factors. *Applied Ergonomics, 68*, 213-228. doi:10.1016/j.apergo.2017.11.014	UK	Socio-technical systems	Qualitative semi-structured interviews **Aim:** Understand the drivers self-reported reasons for engaging with technological devices while driving and the involvement of socio-technical factors in their decision-making process. **Conditions:** Drivers in the UK. **Measures:** Transcripts were thematically analysed using Nvivo and subjective interpretation of codes. **Participants:** 30 frequent drivers. **Limitations:** None mentioned.	Thematic analysis was compared to a hierarchical model/framework – the PARRC model The PARRC model represents the bidirectional influence of organisational and stakeholders/operators with the individual driver, infrastructure development, driving tasks, and other contexts (e.g., research organisations, social media use). The authors argue that research should move away from individual focussed countermeasures and towards the role of systemic factors.	PARRC model of socio-technical systems

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Theories/models/ frameworks
2018	Parnell, K. J., Stanton, N. A., & Plant, K. L. (2018). Where are we on driver distraction? Methods, approaches and recommendations. *Theoretical Issues in Ergonomics Science, 19*(5), 578-605. doi:10.1080/1463922X.2017.1414333	UK	Socio-technical systems	Review of the literature on research methods used to assess driver distraction **Aim:** Explore the relationship between research and practice in driver distraction to determine how current research methods affect the mitigation of distraction. **Conditions:** Methods of studying driver distraction. **Limitations:** None mentioned.	The authors discuss the pros and cons of traditional epistemological approaches to road safety research. They suggest methods that focus on cause/effect of individual driver distraction ignore (or control for) systemic factors. Systemic factors include a pool of actors, for example, legislation, organisations, infrastructure, technology, and cultural context. Understanding how systemic factors interact will provide valuable insights to develop more effective distracted driving countermeasures. They suggest that ecological validity is key to understanding systemic factors that influence behaviours related to distracted driving.	Systems theory Accimaps HFACS STAMP
2019	Salmon, P. M., Read, G. J. M., Beanland, V., Thompson, J., Filtness, A. J., Hulme, A., McClure, R., & Johnston, I. (2019). Bad behaviour or societal failure? Perceptions of the factors contributing to drivers' engagement in the fatal five driving behaviours. *Applied Ergonomics, 74*, 162-171. doi:10.1016/j.apergo.2018.08.008	Australia	Socio-technical systems	Self-report surveys, systems ergonomic mapping, expert workshop. **Aim:** Investigate driver and road safety expert perceptions on the system-wide factors underpinning engagement in eight behaviours known to lead to fatal road crashes. **Conditions:** Driver perceptions and experiences of driving. **Measures:** Drivers' knowledge, experience, personality, road safety policy, transport system design, road rules, societal contexts. **Participants:** 316 drivers (Queensland). **Limitations:** None mentioned.	The majority of factors reported by drivers were related to operating process (driver-centric capacities) and environmental factors. Some drivers reported cost of fitting child restraints and unreasonable speed limits. Many factors reported by the experts were located at the higher levels of the road transport system. For example, societal issues, rules and regulations, local government and industry stakeholders, operational delivery and management (particularly responsibility of commercial orgs to their fleet drivers). However, experts also identified factors at the lower level of the transport system (e.g., human factors).	Systems theory

Year	Reference	Country	Research theme(s)	Ref type/methodology	Main findings / comments	Theories/models/ frameworks
2019	Shinar, D. (2019). Crash causes, countermeasures, and safety policy implications. *Accident; analysis and prevention, 125*, 224-231. doi:10.1016/j.aap.2019.02.015	Israel	Socio-technical systems Countermeasures	Discussion (treatise) about crash cause assessment methodologies and their underlying assumptions. **Aim:** Describe the threshold biases of each approach and to promote the systems thinking approach as a working alternative. **Conditions:** Crash causation literature. **Measures:** Norms and threshold bias of different fields of enquiry. **Limitations:** None mentioned.	Critiques Ralph Nader's seminal book about crash causation that attributed over 90% of all crashes to human error. Benchmark for road safety studies. Shinar argues the starting point of analyses depends on each field of enquiry. Engineers will look at road design, police will look at human error, cognitive psychology will investigate socioeconomic or psychosocial human behavioural factors. Systems theorists take a broader view and examine contextual factors. Moreover, how causation is understood is dependent on threshold bias. That is the starting point for what we consider normal behaviour or normal function. The lower the threshold, the more causes can be listed.	Threshold bias Systems theory

Appendix C: Key organisations and researchers

Table C.1: Key organisations

Organisation	Function	Key name (if applicable)	Country	Source
AAA Foundation for Traffic Safety			USA	https://aaafoundation.org
Accidents of the Directorate-General for Traffic			Spain	https://www.abertis.com/en/the-group
Australasian College of Road Safety	Awareness and research		Australia	https://acrs.org.au
Australian Government - Department of Infrastructure, Transport, Regional Development and Communication	Government		Australia	www.infrastructure.gov.au/ roads/safety/
Australian Road Safety Foundation	Research, education and awareness		Australia	www.arsf.com.au
Canadian Council of Motor Transport Administrators	NGO	Brian Jonah	Canada	https://ccmta.ca/en/
Car Advice	Education		Australia	www.caradvice.com.au
Centres for Disease Control and Prevention	Government	Dr Ann M Dellinger, Chief Division of Injury Prevention	USA	https://www.cdc.gov/injury/pressroom/ fullbios_ subjectmatterexperts/bio_ AnnDellinger.html
Department for Transport			UK	www.dft.gov.uk
Department of Mining Industry and Road Safety (DMIRS)	Government - WHS	Iain Dainty	Australia	https://www.dmirs.wa.gov.au
Department of Transportation - Federal Motor Carrier Safety Administration	Government		USA	https://www.fmcsa.dot.gov
Driving for Better Business	Program from Highways England		UK	www.drivingforbetterbusiness. com
European Transport Safety Council	Research, reform and education		Europe	https://etsc.eu/about-us/
Federal Motor Carrier Safety Administration			USA	www.fmcsa.dot.gov
Global Alliance of NGO's for Road Safety	Mobilising and empowering NGOs		Worldwide	https://www.roadsafetyngos. org/
Government of Alberta Transportation	Government		Canada	www.transportation.alberta.ca
Governors Highway Safety Association			USA	www.ghsa.org
Illinois Centre for Transportation	Research		USA	https://ict.illinois.edu
Insurance Institute for Highway Safety	Education		USA	www.iihs.org
Insurance Institute for Highway Safety (IIHS)	Insurance		USA	www.iihs.org
Keele University	Research	Dr Helen Wells	UK	http://www.keele.ac.uk/criminology/ people/helenwells/
Monash University Accident Research Centre (MUARC)	Research Institute	Dr Kristie Young, Prof Judith Charlton,	Australia	https://research.monash.edu/en/ organisations/monash-university-accident-research-centre

Organisation	Function	Key name (if applicable)	Country	Source
Motor Accident Insurance Commission	Insurance		Australia	motor accident insurance commission
National Highway Traffic Safety Administration (NHTSA)	Research Institute		USA	www.nhtsa.gov
National Road Safety Committee, Ministry of Transport	Government		New Zealand	https://www.transport.govt. nz/area-of-interest/safety
National Road Safety Partnership Program	Safer roads		Australia	www.nrspp.org.au
National Road Safety Strategy	Research and education		Australia	www.roadsafety.gov.au
National Transport Commission	Research and reform		Australia	www.ntc.gov.au
National Transport Research Organisation	Research		Australia	www.arrb.com.au
Northern Territory Government Department of Transport - Road Safety	Government		Australia	www.transport.nt.gov.au
NSW Government Centre for Road Safety	Government		Australia	https://roadsafety.transport.nsw.gov.au
Office of Road Safety (Australian Government)	Government		Australia	www.officeofroadsafety.gov.au
Office of Road Safety (Western Australia)	Government		Australia	https://www.rsc.wa.gov.au
Parliamentary Advisory Council for Transport Safety	Advisory Council - Government		UK	www.pacts.org.uk
PIARC - world road association	Reform and discussion		USA	www.piarc.org
Queensland Government of Transport and Main Roads	Government		Australia	www.tmr.qld.gov.au
Queensland Government Transport and Main Roads	Government		Australia	www.transport.qld.gov.au
Queensland Police Service	Government - law enforcement		Australia	www.police.qld.gov.au
Queensland University of Technology's Centre for Accident Research and Road Safety – Queensland (CARRS-Q)	Research Institute	Dr Oscar Oviedo-Trespalacios	Australia	https://research.qut.edu.au/carrsq/
Royal Automobile Association Queensland (RACQ)	Roadside assistance, insurance, education		Australia	RACQ
Recording Artists, Actors and Athletes against Drink Driving (RADD)	Raising awareness		Australia	http://www.radd.org.au
Research Centre for Integrated Transport Innovation (University of NSW)	Research	Prof Michael Regan	Australia	https://www.rciti.unsw.edu.au
Road Policing Academic Network	Research	Contact Dr Helen Wells	UK	Contact: h.m.wells@keele.ac.uk
Road Safety Advisory Council	NGO		Australia	www.rsac.tas.gov.au
Road Safety Commission (WA Police)	Government		Australia	www.rsc.wa.gov.au
Road Safety Observatory			UK	www.roadsafetyobservatory. com
Safercar (NHTSA)	NGO		USA	www.safercar.gov
South Australia Department of Transport- Road Safety	Government		Australia	www.dpti.sa.gov.au/

Organisation	Function	Key name (if applicable)	Country	Source
South Australian Police	Law enforcement		Australia	https://www.police.sa.gov.au/your-safety/road-safety
Swedish National Road and Transport Research Institute	Research Institute		Sweden	https://www.vti.se/en
Swedish Transport Administration	Government	Dr Matts-Ake Belin	Sweden	https://www.kth.se/profile/mabeli
SWOV Institute for Road Safety Research	Research Institute		Netherlands	www.swov.nl
Tasmanian Department of State Growth	Government		Australia	www.transport.tas.gov.au
The National Safety Council	Government		USA	www.nsc.org
The RACC Foundation	Research Institute		UK	www.racfoundation.org
The Royal Society for the Prevention of Accidents	NGO - education	Rebecca Needham	UK	www.rospa.com
Transport Canada	Government	Paul Boase, Chief Road Users	Canada	http://www.goc411.ca/en/146234/Paul-Boase
Transport Canada	Government	Dr Peter Burns, Chief Ergonomics and Crash Avoidance	Canada	https://www.itu.int/en/fnc/2014/Pages/Burns.aspx
Transport for NSW - Centre for Road Safety	Government and education		Australia	www.roadsafety.transport.nsw.gov.au
Transport Research Centre	Research Institute		France	Transport Research Centre
Transport Research Laboratory Ltd	Research Institute		UK	https://trl.co.uk
University College of London	Research	Dr Gemma Briggs	UK	em: gemma.briggs@open.ac.uk
University of Leicester	Research	Professor Sally Kyd, Dr Steven Cammiss	UK	https://www2.le.ac.uk/departments/law/people/sally-kyd-cunningham
University of Utah	Research	Professor David Strayer, Dr Joel Cooper	USA	https://www.utah.edu
VicRoads - Safety and rules	Government		Australia	www.vicroads.vic.gov.au
World Health Organisation (WHO)	Research Institute	United Nations Global Safety Collaboration	USA	www.who.int
University of British Colombia (Bureau of Integrated Transportation and Advanced Mobility)	Research	Dr Tarek Sayed	Canada	www.civil.ubc.ca
Delft University of Technology - Transport Institute	Research		Netherlands	www.transport.tudelft.nl
Tongji University - College of Transport Engineering	Research		China	https://tjjt.tongji.edu.cn
National Technical University of Athens (Road Safety Observatory)	Research		Greece	https://www.nrso.ntua.gr
Institute of Transport Economics	Research		Norway	https://www.toi.no
Tsinghua University (dept of Automative Engineering)	Research		China	http://www.dae.tsinghua.edu.cn
University of Central Florida	Research		USA	https://www.transportation.institute.ufl.edu
University of NSW - Transport and Road Safety	Research		Australia	http://www.tars.unsw.edu.au
Volvo Cars	Manufacturer		Worldwide	https://www.volvogroup.com/en-en
Virginia Tech Transportation Institute	Research		Canada	https://www.vtti.vt.edu/

Organisation	Function	Key name (if applicable)	Country	Source
KTH Royal Institute of Technology - CTS Centre for Transport Studies	Research	Dr Karin Edvardsson Björnberg	Sweden	https://www.cts.kth.se
University of Tasmania - Transport Research Centre	Research		Australia	https://www.uts.edu.au/research-and-teaching/our-research/transport-research-centre

Table C.2: Key researchers

Name	Country	Organisation	Contact Details	Source
Dr Matts-Åke Belin	Sweden	Swedish Transport Administration	em: matts-ake.belin@trafikverket.se	https://etsc.eu/wp-content/uploads/Matts-Ake_Belin_23072017.pdf **and** https://www.kth.se/profile/mabeli
Paul Boase	Canada	Transport Canada, Canadian Associate of Road Safety Professionals, Canadian Council of Motor Transport Administrators, Chief of United Nations Road Safety Collaboration in Canada	em: paul.boase@tc.gc.ca	https://www.who.int/roadsafety/decade_of_action/focal/ca/en/ **and** http://www.carsp.ca/our-association/board-of-directors/
Dr Gemma Briggs	UK	The Open University, British Psychological Society, Society of Applied Research in Memory and Cognition	em: gemma.briggs@open.ac.uk	http://www.open.ac.uk/people/gfb57
Dr Peter Burns	Canada	Transport Canada	em: peter.burns@tc.gc.ca	http://www.goc411.ca/en/147085/Peter-Burns **and** https://www.itu.int/en/fnc/2014/Pages/Burns.aspx
Dr Steven Cammiss	UK	University of Leicester	em: steven.cammiss@le.ac.uk	https://www2.le.ac.uk/departments/law/people/steven-cammiss
Dr Judith Charlton	Australia	Monash University – Accident Research Centre	em: judith.charlton@monash.edu	https://research.monash.edu/en/persons/judith-charlton
James Coleman	USA	University of Utah	ph: 801-581-4743	https://psych.utah.edu/people/graduate-students/coleman-james.php
Dr Joel Cooper	USA	University of Utah	em: joel.cooper@psych.utah.edu	https://faculty.utah.edu/u0008337-JOEL_M_COOPER/teaching/index.hml and https://psych.utah.edu/people/faculty/cooper-joel.php
Mitchell Cunningham	Australia	University of Sydney	em: mcun9919@uni.sydney.edu.au	https://psychologicalsciences.unimelb.edu.au/research/msps-research-groups/physical-appearance-research-team/lab/team-members
Dr Ann Dellinger	USA	Centers for Disease Control and Prevention – Division of Injury Prevention	em: adellinger@cdc.gov	https://www.cdc.gov/injury/pressroom/fullbios_subjectmatterexperts/bio_AnnDellinger.html
Dr Thomas Dingus	USA	Virginia polytechnic Institute and State University	em: tdingus@vtti.vt.edu	https://beam.vt.edu/people/faculty/dingus.html
Dr Karin Edvardsson Björnberg	Sweden	KTH Royal Institute of Technology	em: karine@kth.se	https://karinbjornberg.wordpress.com
Professor Buddhima Indraratna	Australia	UTS - Transport Rsearch Centre	em: Buddhima.Indraratna@uts.edu.au	https://www.uts.edu.au/research-and-teaching/our-research/transport-research-centre/overview/meet-transport-research-centre-team
Dr Brian Jonah	Canada	Canadian Council of Motor Transport Administrators, independent road safety consultant	em: n.bjonah@gmail.com	https://rsxinternational.org/roadsafetycanada/brian_jonah_cv.pdf and https://rsxinternational.org/roadsafetycanada/profile.htm
A/Prof Hadi Khabbaz	Australia	UTS - Transport Rsearch Centre	em: Hadi.Khabbaz@uts.edu.au	https://www.uts.edu.au/research-and-teaching/our-research/transport-research-centre/overview/meet-transport-research-centre-team
Susan Kirinich	USA	National Highway Traffic Safety Administration	HQ ph: (202) 366-9950	https://www.zoominfo.com/p/Susan-Kirnich/-2035425793
Dr Sally Kyd	UK	University of Leicester	em: sally.kyd@le.ac.uk	https://www2.le.ac.uk/departments/law/people/sally-kyd-cunningham

Name	Country	Organisation	Contact Details	Source
Brian Lawton	UK	Road Safety Foundation		https://roadsafetyfoundation.org/about-road-safety-foundation/meet-the-team/
Kate MacMahon	UK	Road Safety Trust	em: info@roadsafetytrust.org.uk	https://www.roadsafetytrust.org.uk/trustees/kate-mcmahon
Dr Dinesh Mohan	India	Jawaharlal Nehru University	ph: 09717196214	https://marroninstitute.nyu.edu/people/dinesh-mohan **and** https://www.jnu.ac.in/Faculty/dmohan/opportunities.htm
Rebecca Needham	UK	The Royal Society for the Prevention of Accidents	em: rneedham@rospa.com	http://www.rospa.com
Dr Oscar Oviedo-Trespalacios	Australia	Queensland University of Technology – Centre for Accident Research and Road Safety	em: oscar.oviedotrespalacios@qut.edu.au	https://staff.qut.edu.au/staff/oscar.oviedotrespalacios
Dr Katie Parnell	UK	University of Southampton	em: k.parnell@soton.ac.uk	https://www.southampton.ac.uk/engineering/about/staff/kp1m12.page#contact
Dr Katherine Plant	UK	University of Southampton	em: k.plant@soton.ac.uk	https://www.southampton.ac.uk/engineering/about/staff/kp1v09.page#contact
Dr Stephanie Pratt	USA	National institute for Occupational Safety and Health – Centre for Motor Vehicle Safety		https://www.cdc.gov/niosh/motorvehicle/ncmvs/newsletter/ncmvsnewsletterv4n4.html?deliveryName=USCDC_1091_DM14868
Dr Michael Regan	Australia	University of New South Wales – Research Centre for Integrated Transport Innovation	em: m.regan@unsq.edu.au	https://www.engineering.unsw.edu.au/civil-engineering/staff/michael-regan
Dr Toni Rudisill	USA	West Virginia University	ph: 304-293-0687	https://directory.hsc.wvu.edu/Profile/43319
Dr Paul Salmon	Australia	University of the sunshine Coast – Centre for Human Factors and Sociotechnical Systems	em: psalmon@usc.edu.au	https://www.usc.edu.au/staff/professor-paul-salmon
Dr Tarek Sayed	Canada	University of British Columbia – Bureau of Intelligent Transport Systems and Freight Security	em: tsayed@civil.ubc.ca	https://www.civil.ubc.ca/faculty/tarek-sayed
Dr Teresa Senserrick	Australia	Queensland University of Technology – Centre for Accident Research and Road Safety	em: teresa.senserrick@qut.edu.au	https://staff.qut.edu.au/staff/teresa.senserrick
Dr David Shinar	Israel	Ben-Gurion University – Driving Behaviour Laboratory		https:///www.ise.il
Dr David Sleet	USA	Centers for Disease Control and Prevention – Division of Injury Prevention, Curtin University, Emory University	em: davidasleet@gmail.com, dds6@cdc.com	https://ens.sdsu.edu/people/emeritus-faculty/david-sleet/
Dr Hamid Soori	Iran	Road Traffic Injuries Research Network, Shahid Behesti University	em: hsoori@sbmu.ac.ir	http://rtirn.net/profile/hamid-soori/
Dr Neville Stanton	UK	University of Southampton	em: n.stanton@soton.ac.uk	https://www.southampton.ac.uk/engineering/about/staff/ns4c08.page
Dr David Strayer	USA	University of Utah	em: strayer@psych.utah.edu	https://psych.utah.edu/people/faculty/strayer-david.php
Virginia Tanase	France and Worldwide	Fédération Internationale de l'Automobile, United Nations	em: virginia.tanase@unece.org	https://2018.itf-oecd.org/tanase.html **and** https://unece.org/contacts-4

Name	Country	Organisation	Contact Details	Source
Dr Claes Tingvall	UK and Sweden	Towards Zero Foundation, Chalmers University of Technology. Previously at Swedish Transport Administration and Monash University – Accident Research Centre	em: tingvall@chalmers.se	http://www.towardszerofoundation.org/about/claes-tingvall/ **and** https://www.chalmers.se/en/staff/Pages/tingvall.aspx
Jonna Turrill	USA	University of Utah	em: jonna.turrill@psych.utah.edu	https://psych.utah.edu/people/graduate-students/turrill-jonna.php
Maria Vegega	USA	National Highway Traffic Safety Administration	ph: (202) 366-2719	http://www2.edc.org/buildingsafecommunities/buildbridges/bb1.1/fedfld1.html
Dr Pieter Venter	South Africa and Europe	European Global Road Safety Parnership	em: pventer@itse.co.za	http://www.GRSProadsafety.org
Dr Fred Wegman	Netherlands	Delft University of Technology	em: f.c.m.wegnab@tudelft.nl	https://www.tudelft.nl/en/ceg/about-faculty/departments/transport-planning/staff/personal-pages/wegman-fcm/
Dr Helen Wells	UK	Road Policing Academic Network, Keele University	em: h.m.wells@keele.ac.uk	https://www.keele.ac.uk/spgs/staff/helenwells/
Dr Kristie Young	Australia	Monash University – Accident Research Centre	em: kristie.young@monash.edu	https://research.monash.edu/en/persons/kristie-young

Appendix D: Information sheet and consent form

Griffith UNIVERSITY Queensland, Australia

Review of Distracted Driving Research and Assessment of the Policy Landscape

Information Sheet

Who is conducting the research:

Dr Lyndel Bates (project lead) Griffith Criminology Institute l.bates@griffith.edu.au	Ms Marina Alexander Griffith Criminology Institute marina.alexander@griffith.edu.au
Ms Margo van Felius (projectmanager) Griffith Criminology Institute m.vanfelius@griffith.edu.au	

Griffith University Ethics Reference Number: 2020/759

Why is the research being conducted?

Context

Every month around 100 Australians die on our roads, and every day around the same number are hospitalised for road crash-related injuries. Every year road trauma costs the national economy almost $30 billion and brings tragedy into the lives of thousands of Australians. Road safety is a national crisis that demands real leadership, collaboration and solutions.

In September 2019, Australia's motoring clubs, as represented by the Australian Automobile Association (AAA), launched the AAA Road Safety Research Program (the Program) in response to this national crisis. The Program is making significant investments in research to identify solutions that focus on addressing key road safety issues. The Program supports research and translation activities that deliver tangible benefits for road users and the wider community and have a strong potential to prevent road fatalities and injuries on Australian roads. One of the research area's the Program is investing into is **distracted driving**.

Griffith University has been contracted by the AAA to conduct a literature review of distracted driving research and conduct an assessment of the policy landscape.

Aims of this project

For the assessment of the policy landscape, the AAA seeks to understand what is known about the extent of distracted driving, what legal and policy frameworks are effective, what factors contribute to distracted driving, what countermeasures are effective in preventing distracted driving (and why), and how can distracted driving best be prevented?

The basis by which participants will be selected or screened

The intended informants for the interviews are researchers, professionals and practitioners of organisations involved with road safety, traffic regulations and/or enforcement.

Griffith UNIVERSITY
Queensland, Australia

What you will be asked to do

If you choose to be part of this project, you will be asked to participate in a semi-structured interview. The interview will be up to one hour in duration (location to be advised and mutually agreed upon)

The interview will focus on the following topics on the following topics: 1) the term distracted driving; 2) current road rules to deter people from distracted driving; 3) evaluations of these road rules; and 4) views on reducing distracted driving.

There are no direct benefits to you. However, it will give you the opportunity to comment on the policy landscape around distracted driving.

Risks to you

We do not foresee any risks to you as a result of participating in the interview.

Your confidentiality

The conduct of this research involves the collection, access and/ or use of your identified personal information. The information collected is confidential. Your information will not be disclosed to third parties without your consent. A de-identified copy of this data may be used for other research purposes. Your anonymity will be safeguarded at all times. For further information consult the University's Privacy Plan at http://www.griffith.edu.au/about-griffith/plans-publications/griffith-university-privacy-plan or telephone (07) 3735 4375.

It is important that you understand that your answers to the questions will be confidential. Your comments will be recorded using an audio recording device to ensure we capture as much information as possible. We will then transcribe your comments and assign a pseudonym (fake name) to the transcript, so your identity remains confidential. Once transcribed, you will receive a copy of the transcript. As required by Griffith University, all audio recordings will be erased after transcription. However, other research data (transcripts and analysis) will be retained in a password protected electronic file at Griffith University for a period of five years before being destroyed.

Your participation is voluntary

Please note that participation in the study is voluntary. This means that you will not be penalised by Griffith University or your organisation for not taking part. Further to this, you can choose not to answer questions and may withdraw from the study at any time without giving a reason. There will be no ramifications for withdrawal.

Consent to participate

If you are willing to participate, we would like to ask you to sign the attached consent form to confirm your agreement to participate and to indicate your willingness to audio-record your interview. (If you do not wish to be recorded, but would like to participate, we will happily arrange a phone interview.)

Questions / further information

You are free to discuss your participation in this study Dr Lyndel Bates or Margo van Felius from the research team by either phone 0422367541 or m.vanfelius@griffith.edu.au

The ethical conduct of this research

Griffith University conducts research in accordance with the National Statement on Ethical Conduct in Human Research. This research project has been reviewed by the Human Research Ethics Committee at Griffith University in accordance with these guidelines.

If you have any concerns or complaints about the ethical conduct of the research project, you can contact the Manager, Research Ethics on 3735 4375 or research-ethics@griffith.edu.au.

Feedback to you

In accordance with the contract between Griffith University and the Department of Justice and Attorney-General, the results of the evaluation will be disseminated via a final evaluation report, including a project briefing/presentation outlining the key findings. The primary audience is the Department of Justice and Attorney-General, Women's Legal Service and Legal Aid Queensland. The research team might also utilise the findings from the evaluation to compose peer-reviewed journal articles and conference papers.

Participants can seek information about the findings from the Department of Justice and Attorney-General.

Review of Distracted Driving Research and Assessment of the Policy Landscape

Information Sheet

Who is conducting the research:

Dr Lyndel Bates (project lead) Griffith Criminology Institute l.bates@griffith.edu.au	Ms Marina Alexander Griffith Criminology Institute marina.alexander@griffith.edu.au
Ms Margo van Felius (projectmanager) Griffith Criminology Institute m.vanfelius@griffith.edu.au	

Griffith University Ethics Reference Number: 2020/759

Why is the research being conducted?

Context

Every month around 100 Australians die on our roads, and every day around the same number are hospitalised for road crash-related injuries. Every year road trauma costs the national economy almost $30 billion and brings tragedy into the lives of thousands of Australians. Road safety is a national crisis that demands real leadership, collaboration and solutions.

In September 2019, Australia's motoring clubs, as represented by the Australian Automobile Association (AAA), launched the AAA Road Safety Research Program (the Program) in response to this national crisis. The Program is making significant investments in research to identify solutions that focus on addressing key road safety issues. The Program supports research and translation activities that deliver tangible benefits for road users and the wider community and have a strong potential to prevent road fatalities and injuries on Australian roads. One of the research area's the Program is investing into is **distracted driving**.

Griffith University has been contracted by the AAA to conduct a literature review of distracted driving research and conduct an assessment of the policy landscape.

Aims of this project

For the assessment of the policy landscape, the AAA seeks to understand what is known about the extent of distracted driving, what legal and policy frameworks are effective, what factors contribute to distracted driving, what countermeasures are effective in preventing distracted driving (and why), and how can distracted driving best be prevented?

The basis by which participants will be selected or screened

The intended informants for the interviews are researchers, professionals and practitioners of organisations involved with road safety, traffic regulations and/or enforcement.

Appendix E: Interview Questions

List with Questions

Topic 1 interpretation of legislation

1. What is your definition of careless driving/driving without due care and attention?
2. What is your interpretation of careless driving/driving without due care and attention?
3. What is your definition of distracted driving?
4. What is your interpretation of distracted driving?
5. What is the difference between distraction and inattention?
6. What do you see as the main differences between distracted driving and driving without due care and attention?
7. Please provide any comments regarding current road laws and enforcement options and its effectiveness

Topic 2 Views on distracted driving

8. What do you see as the main causes for distraction? (withing the vehicle and outside the vehicle)
9. What is needed, in your opinion, to reduce distracted driving?

Topic 3 Current legislative framework

10. Currently, it appears on mobile phone use is covered specifically in the Road Rules, which other distractions would you like to see covered?
11. To what extent does the current legislation sufficiently cover distracted driving?
12. To what extent is the current enforcement effective in reducing distracted driving?
13. To what extent does current enforcement work as a deterrence?
14. What about mobile phone detection cameras? To what extent to they work as a deterrence?

Topic 4 Work, health and safety (under the act a vehicle is a workplace)

15. To what extent are there sufficient policies in place around distracted driving in work vehicles in your State/Territory and/or Australia?
16. To what extent are there sufficient policies in place around distracted driving in work vehicles in your organisation?
17. To what extent is digital equipment (VDU's, navigation, etc) in commercial vehicles (trucks, taxis etc) allowed to be used?

Topic 5 Evaluations

18. Are you aware of any evaluations of distracted driving legislation and other countermeasures?
19. What measures were used
20. What were the main findings?

Topic 6 Future direction:

21. What research would you like to see in order to develop effective distracted driving countermeasures?
22. What amendments to the current legislation would you see as beneficial to reduce distracted driving?

Appendix F: Australian legislation on distracted driving

Table F.1: Table of Australian legislation

Department	Act	Details
Queensland		
Department of Transport and Main Roads (administrator) **Queensland Police Service (enforcement)**	Transport Operations (Road Use Management) Act 1995	S83: Careless driving. Driving without due care and attention, or without reasonable consideration for other road uses or place. Maximum penalty is dependent on the effect: ○ If the driver is unlicensed and causes the death or grievous bodily harm to another person: 160 penalty units or 2 years imprisonment. ○ If the driver is licensed and causes death or grievous bodily harm to another person: 80 penalty units or 1 year's imprisonment. ○ Otherwise: 40 penalty units or 6 months imprisonment.
	Transport Operations (Road Use Management–Road Rules) Regulation 2009	S272: Interfering with the driver's control of a vehicle etc. A passenger in or on a vehicle must not interfere with the driver's control of the vehicle or obstruct the driver's view of the road or traffic. Maximum penalty: 20 penalty units. S297: Driver to have proper control of a vehicle etc. A driver must not drive a vehicle unless they have proper control of the vehicle, and a clear view of the road and traffic ahead, behind, and to each side. This includes not driving a vehicle with an animal in the driver's lap and not riding a motorbike with an animal between rider and handlebars, or in any position that interferes with the rider's ability to control the motorbike or have a clear view of the road. Maximum penalty: 20 penalty units. Exception: a motorbike rider can ride with an animal between the rider and handlebars for up to 500m for the purpose of a farming activity. S299: Television receivers and visual display units in motor vehicles. One must not drive (inc. stationary but not parked) a vehicle with a television receiver or VDU if it is visible to the driver from the normal driving position or likely to distract another driver. Maximum penalty: 20 penalty units. Exceptions: if the driver is a bus driver and the VDU is a bus sign, the VDU is a driver's aid (e.g. GPS, rear view screen) and is not held by the driver, or the VDU is fitted to a police or emergency vehicle. S300: Use of mobile phones. One must not drive (inc. stationary but not parked) and operate any function on a mobile phone that they are holding. Exemptions of mobile phone use for police and emergency vehicles driving Maximum penalty: 20 penalty units. *From S78A in Transport Operations Regulation 2010 (below), if this offence is committed twice within the period of a year, double demerit points apply.* S15: What is a vehicle A vehicle includes, a motor vehicle, trailer, tram, bicycle, animal-drawn vehicle, and an animal that is being ridden or drawing a vehicle, a motorised wheelchair that can travel at over 10km/h (on level ground); but does not include another kind of wheelchair, a train, a wheeled recreational device, a wheeled toy or a personal mobility device.

Department	Act	Details
	Transport Operations (Road Use Management–Driver Licensing) Regulation 2010	S68: Use of mobile phones by particular driver license holders. Total ban on mobile phone usage for L or P1 platers under 25 years old, or a P1 probationary or restricted license because of a young driver disqualification offence, unless the car is parked. Maximum penalty: 20 penalty units. S69: Use of mobile phones by passengers. A passenger of a L or P1 platers under 25 years old, or a P1 probationary or restricted license because of a young driver disqualification offence cannot use a mobile phone in loudspeaker mode unless the car is parked. Maximum penalty: 20 penalty units. S74: Peer passengers. For a driver who is under 25 years and holds a C P1 provisional license or holds a C P1 probationary or restricted license because of a young driver disqualification offence, between 11pm and 5am they cannot drive with more than 1 passenger who is under 21 years and not immediate family. Maximum penalty: 20 penalty units. *Implied reasoning is to prevent young, inexperienced drivers from carrying many drunk passengers.* S78A: Additional demerit points for mobile phone offences. If a mobile phone offence is committed with one year of a previous mobile phone offence, 4 additional demerit points are allocated. *Affects S300 in Transport Operations Regulation 2009 (above).*
South Australia		
	Victims of Crime (Fund and Levy) Regulations 2003 (found in traffic offences and penalties law handbook)	Victims of Crime Levy (as at May 2014): Added onto any offence is the victims of crime levy, varying for the type of offence. ○ Expiate offence: $60 ○ Summary offence: $160 ○ Indictable offence: $260 ○ Payable by youth: $100 or $180
Department for Infrastructure and Transport (administrator) **South Australia Police (enforcement)** ***Note: additional $60 Victims of Crime Levy is attached to all fines, this has been included in the maximum penalty.***	Motor Vehicles Act 1959	S81A: Provisional licenses The holder of a P1 license who is under the age of 25 years must not drive with more than 1 passenger in the vehicle, unless accompanied by a qualified supervising driver. Maximum penalty: $1250 fine and $327 expiation fee.
	Road Traffic Act 1961	S45: Careless driving A person must not drive a vehicle without due care or attention or without reasonable consideration for other road users. Maximum penalty, if this is found to be an aggravated offence: 12 months imprisonment and disqualification from holding or obtaining a driver's licenses for at least 6 months. An aggravated offence here counts as: an offence that causes death or serious harm to a person, the offender was attempting to escape pursuit by a police officer, the offender was knowingly disqualified their BAC was 0.08 or higher, or they were driving a vehicle in contravention of sections 45A or 47. It is a defence if the offender was acting as an emergency worker, in accordance with directions of their employing authority, and in a manner they believed to be reasonable in their circumstances.

Department	Act	Details
	Australian Road Rules (applicable under the Road Traffic Act 1961)	S272: Interfering with the driver's control of the vehicle etc. A passenger in or on a vehicle must not interfere with the driver's control of the vehicle or obstruct the driver's view of the road or traffic. Maximum penalty: $2500 fine and $300 expiation fee. S297: Driver to have proper control of a vehicle etc. A driver must not drive a vehicle unless they have proper control of the vehicle, and a clear view of the road and traffic ahead, behind, and to each side. This includes not driving a vehicle with an animal in the driver's lap and not riding a motorbike with an animal between rider and handlebars, or in any position that interferes with the rider's ability to control the motorbike or have a clear view of the road. Maximum penalty: $2500 fine and $165 expiation fee. Exception: a motorbike rider can ride with an animal between the rider and handlebars for up to 500m for the purpose of a farming activity. S299: Television receivers and visual display units in vehicles One must not drive (inc. stationary but not parked) a vehicle with a television receiver or VDU if it is visible to the driver from the normal driving position or likely to distract another driver. Maximum penalty: $2500 fine and $93 expiation fee. Exceptions: if the driver is a bus driver and the VDU is a bus sign, the VDU is a driver's aid (e.g. GPS, rear view screen) and is not held by the driver, or the VDU is fitted to a police or emergency vehicle S300: Use of mobile phones A driver must not use a phone while the vehicle is moving or in stationary but not parked. Maximum penalty: $2500 fine, $300 expiation fee, and 3 points. Exceptions: the phone used to make or receive a call or is a driver's aid and is secured in a mounting affixed to the vehicle or does not require the driver to touch the phone, or the vehicle is an emergency or police vehicle. S15: What is a vehicle A vehicle includes, a motor vehicle, trailer, tram, bicycle, animal-drawn vehicle, and an animal that is being ridden or drawing a vehicle, a motorised wheelchair that can travel at over 10km/h (on level ground); but does not include another kind of wheelchair, a train, a wheeled recreational device, a wheeled toy
	Road Traffic (Road Rules – Ancillary and Miscellaneous Provisions) Regulation 2014	S44: Prohibition of use of mobile phone by holder of learner's permit, P1 license etc. A driver of a vehicle who is a learner or P1 driver must not use a mobile phone at all while the vehicle is moving or in stationary but not parked. Maximum penalty: $2500 fine, $300 expiation fee, and 3 points.
New South Wales		
Transport for NSW (administration) **New South Wales Police Force (enforcement)**	Road Transport Act 2013	S117: Negligent furious or reckless driving A person must not drive a motor vehicle on a road negligently. Maximum penalty is dependent on effect: ○ If driver causes death, a second or subsequent office: 50 penalty units or imprisonment for 2 years or both. ○ If driver causes death, a first offence: 30 penalty units or 18 months imprisonment or both. ○ If driver causes grievous bodily harm, a second or subsequent office: 30 penalty units or 12 months imprisonment or both. ○ If driver causes grievous bodily harm, a first offence: 20 penalty units or 9 months imprisonment or both. ○ If driver does not cause death or grievous bodily harm: 10 penalty units.

Department	Act	Details
	NSW Road Rules 2014	S272: Interfering with the driver's control of the vehicle etc. A passenger in or on a vehicle must not interfere with the driver's control of the vehicle or obstruct the driver's view of the road or traffic. Maximum penalty: 20 penalty units. S297: Driver to have proper control of a vehicle etc. A driver must not drive a vehicle unless they have proper control of the vehicle, and a clear view of the road and traffic ahead, behind, and to each side. This includes not driving a vehicle with an animal in the driver's lap and not riding a motorbike with an animal between rider and handlebars, or in any position that interferes with the rider's ability to control the motorbike or have a clear view of the road. Maximum penalty: 20 penalty units. Exception: a motorbike rider can ride with an animal between the rider and handlebars for up to 500m for the purpose of a farming activity. S299: Television receivers and visual display units in vehicles One must not drive (inc. stationary but not parked) a vehicle with a television receiver or VDU if it is visible to the driver from the normal driving position or likely to distract another driver. Maximum penalty: 20 penalty units. Exceptions: if the driver is a bus driver and the VDU is a bus sign, the VDU is a driver's aid (e.g. GPS, rear view screen) and is not held by the driver, or the VDU is fitted to a police or emergency vehicle S300: Use of mobile phones A driver must not use a phone while the vehicle is moving or in stationary but not parked. Maximum penalty: 20 penalty units. Exceptions: the phone used to make or receive a call or is a driver's aid and is secured in a mounting affixed to the vehicle or does not require the driver to touch the phone, or the vehicle is an emergency or police vehicle. S15: What is a vehicle A vehicle includes, a motor vehicle, trailer, tram, bicycle, animal-drawn vehicle, and an animal that is being ridden or drawing a vehicle, a motorised wheelchair that can travel at over 10km/h (on level ground); but does not include another kind of wheelchair, a train, a wheeled recreational device, a wheeled toy
	Road Transport (Driver Licensing) Regulation 2017	S38: Restrictions on passengers under 21 For a P1 class C license holder less than 25 years old, they must not drive between 11pm and 5am with more than 1 passenger who is less than 21 years old. Maximum penalty: 30 penalty units. Exemption: if they are the driver of an emergency or police vehicle and performing their duty. S40: Additional conditions on learner and provisional licenses. A driver holding a L, P1 or P2 license, there is a total ban on mobile phone use unless the vehicle is parked. Maximum penalty: 20 penalty units
Victoria		
Department of Transport / VicRoads (administrator) Victoria Police (enforcement)	Road Safety Act 1986	S65: Careless driving A driver must not drive a vehicle carelessly on a highway. Maximum penalty varies: o Driving a motor vehicle, subsequent offence: 25 penalty units o Driving a motor vehicle, first offence: 12 penalty units o Driving a non-motor vehicle, subsequent offence: 12 penalty units o Driving a non-motor vehicle, first offence: 6 penalty units

Department	Act	Details
	Road Safety Road Rules 2017	S244V: Use of mobile by users of electric personal transporters A person travelling on an electric personal transporter on a road or road related area must not use a mobile phone while the electric personal transporter is moving Maximum penalty: 10 penalty units. S272: Interfering with the driver's control of the vehicle etc. A passenger in or on a vehicle must not interfere with the driver's control of the vehicle or obstruct the driver's view of the road or traffic. Maximum penalty: 3 penalty units. S297: Driver to have proper control of a vehicle etc. A driver must not drive a vehicle unless they have proper control of the vehicle, and a clear view of the road and traffic ahead, behind, and to each side. This includes not driving a vehicle with an animal in the driver's lap and not riding a motorbike with an animal between rider and handlebars, or in any position that interferes with the rider's ability to control the motorbike or have a clear view of the road. Maximum penalty: 5 penalty units. Exception: a motorbike rider can ride with an animal between the rider and handlebars for up to 500m for the purpose of a farming activity. S299: Television receivers and visual display units in vehicles One must not drive (inc. stationary but not parked) a vehicle with a television receiver or VDU if it is visible to the driver from the normal driving position or likely to distract another driver. Maximum penalty: 10 penalty units. Exceptions: if the driver is a bus driver and the VDU is a bus sign, the VDU is a driver's aid (e.g. GPS, rear view screen) and is not held by the driver, or the VDU is fitted to a police or emergency vehicle S300: Use of mobile phones A driver must not use a phone while the vehicle is moving or in stationary but not parked. Maximum penalty: 10 penalty units. Exceptions: the phone used to make or receive a call or is a driver's aid and is secured in a mounting affixed to the vehicle or does not require the driver to touch the phone, or the vehicle is an emergency or police vehicle. Additional: a total ban on all phone use for L platers, P platers, and motor cyclists who have held a license for less than 3 years. Same penalties apply (maximum 10 penalty units). Additional: The rider of a bicycle, or a person travelling in or on a wheeled recreational device, or the driver of a vehicle that is not a motor vehicle, must not use a mobile phone while the bicycle, wheeled recreational device or vehicle is moving, or is stationary but not parked. S15: What is a vehicle A vehicle includes, a motor vehicle, trailer, tram, bicycle, animal-drawn vehicle, and an animal that is being ridden or drawing a vehicle, a motorised wheelchair that can travel at over 10km/h (on level ground); but does not include another kind of wheelchair, a train, a wheeled recreational device, a wheeled toy or electric personal transporter.
	Road Safety (Drivers) Regulation 2019	S61: Peer passenger restriction for P1 probationary drivers A P1 driver must not drive a motor vehicle with more than one passenger between the ages of 16 and 21, except for immediate family. Maximum penalty: 10 penalty units. Exemptions: the driver is a police or emergency driver in the course of their duties, or the P1 driver is driving next to a passenger holding a full driver license.

Department	Act	Details
Western Australia		
Department of Transport (administrator) **West Australian Police (enforcement)**	Road Traffic Act 1974	S59BA: Careless driving causing death, grievous bodily harm or bodily harm. Driving without due care and attention, causing the death, grievous bodily harm or bodily harm to another person. Maximum penalty: disqualification from holding or obtaining a driver's licence for a at least 3 months and; 3 years imprisonment or fine of 720 penalty unit. S62: Careless driving. Driving without due care and attention. Maximum penalty: fine of 30 penalty units.
	Road Traffic Code 2000	S246: Interfering with driver's control of vehicle A person shall not in any way interfere with the driver's control of the vehicle, or prevent the driver and their signals from being seen by other road users. Maximum penalty: fine of 1 penalty unit. S263: Drivers to have uninterrupted and undistracted views etc. A person shall not drive a vehicle unless they under in such a position behind the steering wheel where they have full control of the vehicle, full and uninterrupted view of the road and traffic ahead, behind and to either side. Any objects attached to the windshield, window of vehicle or any other place that is likely to obstruct the driver's vision counts as a distraction. Similarly, driving with a person or animal in the driver's lap is a distraction. Maximum penalty: 1 point and fine of 2 penalty units. S264A: Dogs etc. on motor cycles. Not riding a motorbike with an animal between rider and handlebars, or in any position that interferes with the rider's ability to control the motorbike or have a clear view of the road. Maximum penalty: 1 point and fine of 2 penalty units. Exception: a motorbike rider can ride with an animal between the rider and handlebars for up to 500m for the purpose of a farming activity. S264: Use of visual display units etc. in vehicle. One must not drive (inc. stationary but not parked) a vehicle with a television receiver or VDU if it is visible to the driver from the normal driving position or likely to distract another driver. Maximum penalty: 3 points and fine of 6 penalty units. Exceptions: if the driver is a bus driver and the VDU is a bus sign, the VDU is a driver's aid (e.g. GPS, rear view screen) and is not held by the driver, or the VDU is fitted to a police or emergency vehicle S265: Use of mobile phones A driver must not use a mobile phone to make or receive phone calls or as a driver's aid unless the phone is secured in a mounting affixed to the vehicle or does not require manipulation from the driver's body to control, unless parked. Maximum penalty: fine of 10 penalty units, and during a holiday period, 6 points, during a non-holiday period, 3 points. A driver must not operate any other function on their phone, unless the car is parked. Maximum penalty: fine of 20 penalty units, and during holiday period, 8 points, during non-holiday period, 4 points. Exception: use of phone in relation to work by a driver in control of an on-demand vehicle, but not in a restricted area. (On demand vehicle prescribed under Transport (Road Passenger Services) Act 2018 section 4(1)). *S3: Vehicle* does not include a wheeled toy or wheeled recreational device

Department	Act	Details
Northern Territory		
Department of Infrastructure, Planning and Logistics (administration) **Transport and Road Safety Northern Territory** **Northern Territory Police (enforcement)**	Traffic Act 1987	S30: Dangerous driving Driving a vehicle negligently, recklessly, at a speed or in a manner dangerous to the public. Maximum penalty: 20 penalty units or 2 years imprisonment. Additionally, the driver will be disqualified from holding a licence for at least, for a first offence, 6 months, or for subsequent offence, 12 months. Exceptions: emergency or police vehicles in the process of their duties.
	Traffic Regulations 1999	S15A: Prohibition on mobile phone usage. A learner or provisional driver must not use a phone at all unless the vehicle is stationary and in a place other than a marked lane or line of traffic on a road. Maximum penalty: 20 penalty units or 6 months imprisonment. S18: Careless walking or riding. A person must not drive a vehicle in a disorderly manner on a road or public place. Penalty unstated. S86C: Modification of rules 299 and 300 in Australian Road Rules: when vehicle is not parked. Instead of requiring the car to be parked, a car can be stationary and in a place other than a marked lane or line of traffic on a road.
	Australian Road Rules (applicable under S71 of Traffic Regulations 1999, can be found in Traffic Regulations, Schedule 3).	S272: Interfering with the driver's control of the vehicle etc. A passenger in or on a vehicle must not interfere with the driver's control of the vehicle or obstruct the driver's view of the road or traffic. Offence provision. S297: Driver to have proper control of a vehicle etc. A driver must not drive a vehicle unless they have proper control of the vehicle, and a clear view of the road and traffic ahead, behind, and to each side. This includes not driving a vehicle with an animal in the driver's lap and not riding a motorbike with an animal between rider and handlebars, or in any position that interferes with the rider's ability to control the motorbike or have a clear view of the road. Offence provision. Exception: a motorbike rider can ride with an animal between the rider and handlebars for up to 500m for the purpose of a farming activity. S299: Television receivers and visual display units in vehicles One must not drive (inc. stationary but not parked) a vehicle with a television receiver or VDU if it is visible to the driver from the normal driving position or likely to distract another driver. Offence provision. Exceptions: if the driver is a bus driver and the VDU is a bus sign, the VDU is a driver's aid (e.g. GPS, rear view screen) and is not held by the driver, or the VDU is fitted to a police or emergency vehicle S300: Use of mobile phones A driver must not use a phone while the vehicle is moving or in stationary but not parked. *Modification from S86C of Traffic Regulations 1999: mobile phone use is allowed when a car is in stationary in a place other than a marked lane or line of traffic on a road.* Offence provision. Exceptions: the phone used to make or receive a call or is a driver's aid and is secured in a mounting affixed to the vehicle or does not require the driver to touch the phone, or the vehicle is an emergency or police vehicle. S15: What is a vehicle A vehicle includes, a motor vehicle, trailer, tram, bicycle, animal-drawn vehicle, and an animal that is being ridden or drawing a vehicle, a motorised wheelchair that can travel at over 10km/h (on level ground); but does not include another kind of wheelchair, a train, a wheeled recreational device, a wheeled toy.

<table>
<tr><th>Department</th><th>Act</th><th>Details</th></tr>
<tr><td colspan="3">Tasmania</td></tr>
<tr><td rowspan="2">Department of State Growth (administrator)
Tasmanian Police (enforcement)</td><td>Traffic Act 1925</td><td>S32: Reckless driving
A person must not drive on a public street negligently.
Maximum penalty is dependent on effect:
○ Causes death of another person, a subsequent offence: fine of 20 penalty units and 3 years imprisonment
○ Causes death of another person, a first offence: fine of 10 penalty units and 2 years imprisonment
○ Causes grievous bodily harm to another person, subsequent offence: fine of 20 penalty units and 18 months imprisonment
○ Causes grievous bodily harm to another person, first offence: fine of 10 penalty units and 1 years imprisonment.
○ Otherwise: fine of 5 penalty units.

S42: Use of loudspeakers on or from vehicles
A person must not use a loudspeaker on or from a vehicle unless they have a permit to do so, or are a police officer, emergency worker or transport inspector in the course of their duty.
Maximum penalty: fine of 10 penalty units.

S15: What is a vehicle
A vehicle includes, a motor vehicle, trailer, tram, bicycle, animal-drawn vehicle, and an animal that is being ridden or drawing a vehicle, a motorised wheelchair that can travel at over 10km/h (on level ground); but does not include another kind of wheelchair, a train, a wheeled recreational device, a wheeled toy</td></tr>
<tr><td>Road Rules 2019</td><td>S272: Interfering with the driver’s control of the vehicle etc.
A passenger in or on a vehicle must not interfere with the driver’s control of the vehicle or obstruct the driver’s view of the road or traffic.
Maximum penalty: fine of 10 penalty units.
S297: Driver to have proper control of a vehicle etc.
A driver must not drive a vehicle unless they have proper control of the vehicle, and a clear view of the road and traffic ahead, behind, and to each side. This includes not driving a vehicle with an animal in the driver’s lap and not riding a motorbike with an animal between rider and handlebars, or in any position that interferes with the rider’s ability to control the motorbike or have a clear view of the road.
Maximum penalty: fine of 10 penalty units.
Exception: a motorbike rider can ride with an animal between the rider and handlebars for up to 500m for the purpose of a farming activity.

S299: Television receivers and visual display units in vehicles
One must not drive (inc. stationary but not parked) a vehicle with a television receiver or VDU if it is visible to the driver from the normal driving position or likely to distract another driver.
Maximum penalty: fine of 5 penalty units.
Exceptions: if the driver is a bus driver and the VDU is a bus sign, the VDU is a driver’s aid (e.g. GPS, rear view screen) and is not held by the driver, or the VDU is fitted to a police or emergency vehicle

S300: Use of mobile phones
A driver must not use a phone while the vehicle is moving or in stationary but not parked.
Maximum penalty: fine of 5 penalty units.
Exceptions: the phone used to make or receive a call or is a driver’s aid and is secured in a mounting affixed to the vehicle or does not require the driver to touch the phone, or the vehicle is an emergency or police vehicle.</td></tr>
<tr><td colspan="3">Australian Capital Territory</td></tr>
<tr><td>Department of Infrastructure and Transport and Regional Development
Justice and Community Safety Directorate
Australian Federal Police</td><td>Road Transport (Safety and Traffic Management) Act 1999</td><td>S6: Negligent driving
A person must not drive a motor vehicle on a road or related area negligently.
Maximum penalty dependent on effect:
○ If causes death: 200 penalty units, 2 years imprisonment or both.
○ If causes grievous bodily harm: 100 penalty units, 1 years imprisonment or both.
○ Otherwise: 20 penalty units.</td></tr>
</table>

Department	Act	Details
	Road Transport (Road Rules) Regulation 2017	S272: Interfering with the driver's control of the vehicle etc. A passenger in or on a vehicle must not interfere with the driver's control of the vehicle or obstruct the driver's view of the road or traffic. Maximum penalty: 20 penalty units. S297: Driver to have proper control of a vehicle etc. A driver must not drive a vehicle unless they have proper control of the vehicle, and a clear view of the road and traffic ahead, behind, and to each side. This includes not driving a vehicle with an animal in the driver's lap and not riding a motorbike with an animal between rider and handlebars, or in any position that interferes with the rider's ability to control the motorbike or have a clear view of the road. Maximum penalty: 20 penalty units. Exception: a motorbike rider can ride with an animal between the rider and handlebars for up to 500m for the purpose of a farming activity. S299: Television receiver or visual display unit in vehicles One must not drive (inc. stationary but not parked) a vehicle with a television receiver or VDU if it is visible to the driver from the normal driving position or likely to distract another driver. Maximum penalty: 20 penalty units. Exceptions: if the driver is a bus driver and the VDU is a bus sign, the VDU is a driver's aid (e.g. GPS, rear view screen) and is not held by the driver, or the VDU is fitted to a police or emergency vehicle S300: Use of mobile device A driver must not use a phone while the vehicle is moving or in stationary but not parked. Maximum penalty: 20 penalty units. Exceptions: the phone used to make or receive a call or is a driver's aid, or to play/stream/listen to music/audio files, and is secured in a mounting affixed to the vehicle or does not require the driver to touch the phone at any time, or the vehicle is an emergency or police vehicle, or the vehicle is taxi, rideshare or hire car and the device is used as a driver's aid in relation to the transport of passengers. Mobile device: includes: a mobile phone and any other wireless handheld or wearable device designed or capable of being used for telecommunication; but does not include a CB radio or any other two way radio S300AA: Use of mobile device –learner and provisional license holders A total ban on mobile phone usage for learner and provisional license holders. Maximum penalty: 20 penalty units. Exceptions: phone being used as a drivers aid, is secured in a mounting affixed to the vehicle, and does not require manipulation of the driver of any kind (including voice control). S15: What is a vehicle A vehicle includes, a motor vehicle, trailer, tram, bicycle, animal-drawn vehicle, and an animal that is being ridden or drawing a vehicle, a motorised wheelchair that can travel at over 10km/h (on level ground); but does not include another kind of wheelchair, a train, a wheeled recreational device, a personal mobility device, or wheeled toy.

List F.2: Sources

Queensland:

- Transport Operations Act 1995: https://www.legislation.qld.gov.au/view/html/inforce/current/act-1995-009
- Transport Operations Regulation 2009: https://www.legislation.qld.gov.au/view/html/inforce/current/sl-2009-0194
- Transport Operations Regulation 2010: https://www.legislation.qld.gov.au/view/pdf/inforce/2019-04-01/sl-2010-0206

South Australia

- Motor vehicles act 1959: https://www.legislation.sa.gov.au/LZ/C/A/MOTOR%20VEHICLES%20ACT%201959/CURRENT/1959.53.AUTH.PDF
- Road Traffic Act 1961: https://www.legislation.sa.gov.au/lz/c/a/road%20traffic%20act%201961.aspx
- Australian Road Rules: https://www.legislation.sa.gov.au/LZ/C/R/Australian%20Road%20Rules.aspx
- Road Traffic Regulations 2014: https://www.legislation.sa.gov.au/LZ/C/R/Road%20Traffic%20(Road%20Rules%20-%20Ancillary%20and%20Miscellaneous%20Provisions)%20Regulations%202014.aspx
- Penalties: https://lawhandbook.sa.gov.au/media/Traffic%20Offences%20and%20Penalties%20as%20at%20May%202014.pdf

New South Wales

- Road Transport Act 2013: https://www.legislation.nsw.gov.au/view/whole/html/inforce/current/act-2013-018
- Road Rules 2014: https://www.legislation.nsw.gov.au/view/whole/html/inforce/current/sl-2014-0758#sec.299
- Road Transport Regulation 2017: https://www.legislation.nsw.gov.au/view/html/inforce/current/sl-2017-0450#sec.40
- Penalties: https://www.rms.nsw.gov.au/documents/roads/safety-rules/demerits-general.pdf

Victoria

- Road Safety Act 1986: https://content.legislation.vic.gov.au/sites/default/files/2020-12/86-127aa203%20authorised_0.pdf
- Road Rules 2017: https://content.legislation.vic.gov.au/sites/default/files/2020-12/17-41sra010%20authorised.pdf
- Road Safety (Drivers) Regulation 2019: https://content.legislation.vic.gov.au/sites/default/files/2020-12/19-100sra006%20authorised.pdf

Western Australia

- Road Traffic Act 1974: https://www.legislation.wa.gov.au/legislation/prod/filestore.nsf/FileURL/mrdoc_43537.htm/$FILE/Road%20Traffic%20Act%201974%20-%20%5B14-n0-00%5D.html?OpenElement
- Road Traffic Code 2000: https://www.legislation.wa.gov.au/legislation/prod/filestore.nsf/FileURL/mrdoc_43465.htm/$FILE/Road%20Traffic%20Code%202000%20-%20%5B05-r0-00%5D.html?OpenElement

Northern Territory

- Traffic Act 1987: https://legislation.nt.gov.au/en/Legislation/TRAFFIC-ACT-1987
- Traffic Regulations 1999: https://legislation.nt.gov.au/Legislation/TRAFFIC-REGULATIONS-1999

- Traffic Regulations, Schedule 3: https://legislation.nt.gov.au/en/Legislation/TRAFFIC-REGULATIONS-SCHEDULE-3-ARRs-1999

Tasmania

- Traffic Act 1925: https://www.legislation.tas.gov.au/view/whole/html/inforce/current/act-1925-038
- Road Rules 2019: https://www.legislation.tas.gov.au/view/whole/html/inforce/current/sr-2019-061

Australian Capital Territory

- Road Transport (Safety and Traffic Management) Act 1999: https://www.legislation.act.gov.au/DownloadFile/a/1999-80/current/PDF/1999-80.PDF
- Road Transport (Road Rules) Regulation 2017: https://www.legislation.act.gov.au/View/sl/2017-43/current/PDF/2017-43.PDF

General

- Driving with animals: https://www.blackhound.com.au/australian-road-rules-travelling-dog-risking-fine/

Appendix G: Workplace Health and Safety Legislation regarding a vehicle as a workplace

Table G.1: Workplace Health and Safety Legislation

Legislation	Details	Act	Details
Queensland			
Work Health and Safety Act 2011	S8: Meaning of workplace. A vehicle is included as a workplace. S17: Management of risks. Workers must eliminate or minimise risks to health and safety as much as possible. S20: Duty of persons conducting businesses or undertakings involving management or control of workplaces. A person in a management or control of a workplace position must ensure risks to health and safety associated with the workplace are minimised. S27: Duty of officers An officer must exercise due diligence to ensure their employees are complying with legislation, and ensure they minimise health and safety risks. S28-29: Duties of workers / other persons at the workplace. A person at the workplace must take care of their own health and safety, others' health and safety, and comply with legislation and policies. S34A-34D: Industrial manslaughter. If a worker dies due to a person's conduct or negligence at work, they are liable for up to 20 years imprisonment, or as a body corporate, 100 000 penalty units. S80-82: Issue resolution. Inspectors, health and safety representatives, etc. can require a worker/organisation or resolve a health and safety issue. S84: Right of worker to cease unsafe work. A worker may cease or refuse to carry out work if they have a reasonable concern that the work has serious risk to their health or safety. S90-102: Provisional improvement notices. A health and safety representative may issue a provisional improvement notice requiring workers to remedy, prevent or mitigate a contravention to this Act. S160-197: Functions and powers of inspectors. Details how inspectors investigate contraventions of this Act, can assist in the resolution of work health and safety issues, including seizing the workplace or parts of the workplace or issuing improvement or prohibition notices.	WorkSafe Queensland	A partnership led by Workplace Health and Safety Queensland, working with WorkCover, Worker's Compensation Regulatory Services and the Electrical Safety Office. The administering and enforcing organisation of the Act, in partnership with of Workplace Health and Safety Queensland, Electrical Safety Office, Workers' Compensation Regulatory Services and WorkCover Queensland. **While the legislation defines a vehicle as a workplace and attempts to minimise road trauma, distracted driving is discussed as part of a larger problem in their legislation.**

Legislation	Details	Act	Details
Work Health and Safety Regulations 2011	S32-38: Managing risks to health and safety. Details how a duty holder must identify hazards, manage risks, implement control measures, and periodically review the risks. Maximum penalty: 36 penalty units, or for a body corporate, 60 penalty units. S39: Provision of information, training and instruction. States that anyone conducting a business or undertaking must ensure that adequate information, training and instruction is provided to workers, including education of the risks (this includes driving a work vehicle).	WorkSafe Queensland	The administering and enforcing organisation for the regulations
Vehicles as a Workplace: Work Health and Safety Guide 2019	Developed nationally in 2019 and published on the Queensland WorkSafe website, the guide outlines risk management processes, legislations, and risk factors. **Section 5.6 specifies unsafe drivers, lists the risks and potential control strategies of distraction and inattention, focussing primarily on mobile phone usage.**	National partnership of state work health and safety and road authorities	Partnership created the guide to reduce road trauma from work-related driving across all states.
Road Safety Manual 2016	Published 2016 as a summary of the Work Health and Safety Act and its' Regulations, the TORUM act and its' Regulations, and others. Details that all employees must be provided with training and information, and how employers must perform risk management. **Specifies 6 risks, nominates mobile phone use and other driving distractions as high risks. Covers legislation, statistics, and provides suggestions for reducing risks.**	Department of Housing and Public Works	Publishing department of the manual. Similarly publishes factsheets, run educational campaigns, and contain information on their website for employers and employees.
		WorkSafe Queensland	The administering department for Work Health and Safety Act.
		Department of Transport and Main Roads	The administering department for the TORUM Act.

Legislation	Details	Act	Details
South Australia			
Work Health and Safety Act 2012	S8: Meaning of workplace. A vehicle is included as a workplace. S17: Management of risks. Workers must eliminate or minimise risks to health and safety as much as possible. S20: Duty of persons conducting businesses or undertakings involving management or control of workplaces. A person in a management or control of workplace position must ensure risks to health and safety associated with the workplace are minimised. S27: Duty of officers An officer must exercise due diligence to ensure their employees are complying with legislation, and ensure they minimise health and safety risks. S28-29: Duties of workers / other persons at the workplace. A person at the workplace must take care of their own health and safety, others' health and safety, and comply with legislation and policies. S80-82: Issue resolution. Inspectors, health and safety representatives, etc. can require a worker/organisation or resolve a health and safety issue. S84: Right of worker to cease unsafe work. A worker may cease or refuse to carry out work if they have a reasonable concern that the work creates serious risk to their health or safety. S90-102: Provisional improvement notices. A health and safety representative may issue a provisional improvement notice requiring workers to remedy, prevent or mitigate a contravention to this Act. S160-197: Functions and powers of inspectors. Details how inspectors investigate contraventions of this Act can assist in the resolution of work health and safety issues, including seizing the workplace or parts of the workplace or issuing improvement or prohibition notices.	SafeWork South Australia	Administrators and enforcers of the Act. **While the legislation defines a vehicle as a workplace and attempts to minimise road trauma, distracted driving is discussed as part of a larger problem in their legislation.** Publishes the Queensland Work Health and Safety Guide to specify the Act's applications to driving. In section 5.6, unsafe drivers distraction and inattention listed as a problem. Risks and management of mobile phone distraction discussed,but do mention other distractions in passing. On their website specify distracted driving as a hazard for vehicle use and detail that employers must inform and train workers on their policies and procedures, including those on distracted driving, and that workers must remove distractions such as mobile phones.
Work Health and Safety Regulations 2012	S32-38: Managing risks to health and safety. Details how a duty holder must identify hazards, manage risks, implement control measures, and periodically review the risks. Maximum penalty: 36 penalty units, or for a body corporate, 60 penalty units. S39: Provision of information, training and instruction. States that anyone conducting a business or undertaking must ensure that adequate information, training and instruction is provided to workers, including education of the risks (this includes driving a work vehicle).	SafeWork South Australia	Administrators and enforcers of the regulations.

Legislation	Details	Act	Details
SA SafeWork Road Transport	Summarises legislation, including the South Australia Road Traffic Act 1961 and its' Regulations, and Work Health Safety Act 2012 and its' Regulations. However, distracted driving (e.g. mobile phones) is mentioned as a hazard, but no further mentions.	Department for Infrastructure and Transport	Administrators of the document.
		SafeWork South Australia	Partners for the document.
New South Wales			
Work Health and Safety Act 2011	S8: Meaning of workplace. A vehicle is included as a workplace. S17: Management of risks. Workers must eliminate or minimise risks to health and safety as much as possible. S20: Duty of persons conducting businesses or undertakings involving management or control of workplaces. A person in a management or control of workplace position must ensure risks to health and safety associated with the workplace are minimised. S27: Duty of officers An officer must exercise due diligence to ensure their employees are complying with legislation, and ensure they minimise health and safety risks. S28-29: Duties of workers / other persons at the workplace. A person at the workplace must take care of their own health and safety, others' health and safety, and comply with legislation and policies. S80-82: Issue resolution. Inspectors, health and safety representatives, etc. can require a worker/organisation or resolve a health and safety issue. S84: Right of worker to cease unsafe work. A worker may cease or refuse to carry out work if they have a reasonable concern that the work has serious risk to their health or safety. S90-102: Provisional improvement notices. A health and safety representative may issue a provisional improvement notice requiring workers to remedy, prevent or mitigate a contravention to this Act. S160-197: Functions and powers of inspectors. Details how inspectors investigate contraventions of this Act can assist in the resolution of work health and safety issues, including seizing the workplace or parts of the workplace or issuing improvement or prohibition notices.	SafeWork New South Wales	The administrating and enforcing department of the Act. For the most part, **SafeWork does not focus on driving or distracted driving** specifically, rather partnering with Transport for NSW to publish more specific information.

Legislation	Details	Act	Details
Work Health and Safety Regulations 2017	S32-38: Managing risks to health and safety. Details how a duty holder must identify hazards, manage risks, implement control measures, and periodically review the risks. Maximum penalty: 36 penalty units, or for a body corporate, 60 penalty units. S39: Provision of information, training and instruction. States that anyone conducting a business or undertaking must ensure that adequate information, training and instruction is provided to workers, including education of the risks (this includes driving a work vehicle).	SafeWork New South Wales	The administrating and enforcing department of the regulations.
Work Health and Safety Procedure: Safe driving 2017	Published in 2017 to educate workers on road safety when driving for work. The handbook provides risk management strategies in work-related driving, states that managers and employers must train their employees and outlines the largest factors in road fatalities. The guide does not specifically mention distracted driving.	Transport for New South Wales	Publishes the procedure and have factsheets on their website for employers, employees, and sample risk management documents.
		SafeWork New South Wales	The department creating the legislation forming the basis for the procedure.
Road Safety and Your Work: A Guide for Employers 2018	Published in 2018 as part of the New South Wales Government' Road Safety Plan 2021. The guide focusses on risk management and suggests specific strategies for a large variety of factors, **including distracted driving.** Additionally mentions specific legislation around mobile phones, **and encourages to minimise legal usage of phones (hands-free use)**; pp. 18 & 25	Transport for New South Wales	The department publishing the guide as part of their larger Road Safety Plan 2021.
		SafeWork New South Wales	The department creating the legislation forming the basis for the guide.

Legislation	Details	Act	Details
Victoria			
Occupational Health and Safety Act 2004	S5: Definitions. Defines a vehicle as a workplace. S21: Duties of employers to employees. An employer must provide and maintain a safe working environment for their employees, including risk management procedures, and providing information and training. If they do not, it is an indictable offence with a maximum penalty of 1800 penalty units, or 9000 penalty units to a body corporate. S22: Duties of employers to monitor health and conditions etc. Includes that an employer must monitor workplace conditions and provide information concerning health and safety risks to employees. If they do not, a maximum penalty of 60 penalty units applies, or 300 penalty units for a body corporate. S23-24: Duties of employers / self-employed persons to other persons. They must ensure they do not expose others to health and safety risks. Maximum penalty for offence is 1800 penalty units, or 9000 penalty units for a body corporate. S25: Duties of employees. While at work, an employee must take care for their own and others' health and safety. If they act recklessly, misuse equipment or parts of the workplace, it is an indictable offence with a maximum penalty of 1800 penalty units. S39: Workplace manslaughter. S39A-F covers the definitions and basics, 39G covers the offences. A worker must not engage in negligent conduct that breaches their duty to another person, causing their death —maximum penalty of 25 years or 100 000 penalty units for a body corporate. S58-66 and 98-120 outline the powers of Health and Safety representatives, inspectors and enforcement. Outlines their power to seize equipment or part of the workplace, and their power to issue improvement and prohibition notices.	WorkSafe Victoria	Administrating and enforcing department for the Act. Additionally publishes information on website regarding work-related driving, but does not specify distracted driving.
Occupational Health and Safety Regulations 2017	S18: Proper installation, use and maintenance of risk control measures. Risks must be effectively controlled, with periodical reviews. S22-25: Issue resolution procedures. Details how employers must resolve issues, including reporting the issue and mitigating the hazards.	WorkSafe Victoria	Administrating and enforcing department for the legislation.
Guide to safe work-related driving 2008	The Victorian Parliamentary Road Safety Committee's Inquiry into Driver Distraction in 2006 provided a recommendation that an occupational health and safety approach be applied to distracted work-related driving. The guide was published in 2008 to assist employers address occupational road safety. Outlines the duty of care of employers (risk management, and information and training for employees) and employees (abiding by road rules and driving safely). **Specifies both mobile phone use and in-vehicle distractions as risk factors, suggesting ways to reduce these risks, pp.19**	WorkSafe Victoria	Partnered with the Traffic Accident Commission to follow up on the Road Safety Committee's suggestions, providing a guide for safe work-related driving.
		Traffic Accident Commission	Partnered with WorkSafe to provide guidance, aiming to reduce road trauma from work-related driving.
		VicRoads	Research partner.
		Royal Automobile Club of Victoria	Research partner.

Legislation	Details	Act	Details
		Victorian Automobile Chamber of Commerce	Research partner.
		Monash University	Research partner.
Employee Safety Handbook 2016	Published as part of the new Safety Management System (of roads and transport) in 2016. Outlines workplace health and safety in relation to driving. Specifies legislation, the implementation of risk management, and that all employees should have a safety induction. **Further specifies legislation around mobile phones and that reckless driving is unlawful, but does not mention distracted driving as a whole.**	VicRoads	Publishing department of the handbook. They have little other information about work-related driving on their websites.
		WorkSafe Victoria	The administrating department for the legislation outlined in the handbook.
Driving VicRoads Vehicles Safe Driving Policy 2010	Took effect in 2010, the policy outlines the safe use of VicRoads (government) vehicles for employees. S2.9: Traffic infringements. Outlines how all road rules apply, and that in addition to any penalties, any traffic infringements by an employee driving a VicRoads vehicle will be reported to their manager. The policy suggests that employees with repeated infringements should be counselled by managers with the aim of improving safety, in particular driving behaviour; and employees with repeat offences will be required to provide evidence of licence currency and validity. Employees will personally incur the penalties and demerit points attached to all infringements. S2.12: Mobile phones. Details legislation associated with mobile phones, and additionally encourages to keep legal use of hands-free phones to a minimum.	VicRoads	Department publishing the policy and providing government work vehicles.

Legislation	Details	Act	Details
Western Australia			
Occupational Safety and Health Act 1984	S3: Terms used. Defines a vehicle as a workplace. S19: Duties of employers. An employer must provide and maintain a safe working environment for their employees, including risk management procedures, and providing information and training. S19A: Breaches of S19. In circumstances of gross negligence causing the death of or serious harm to an employee, they are liable up to 5 years imprisonment and a fine of $550 000 for a first offence or $680 000 for a subsequent offence. In circumstances not of gross negligence, but causing the death of or serious harm to an employee, they are liable for up to a fine of $400 000 for a first offence, or $500 000 for a subsequent offence. If the employer contravenes any section outlined in S19, but does not cause the death or serious harm of an employee, they are liable for up to: a fine of $250 000 for a first offence, or $350 000 for a subsequent offence. S20: Duties of employees. Employees must ensure they do not expose themselves or others to health and safety risks. S20A: Breaches of S20. In circumstances of gross negligence causing the death of or serious harm to another, they are liable for up to: a fine of $100 000 for a first offence or $120 000 for a subsequent offence. In circumstances not of gross negligence, but causing the death of or serious harm to an employee, they are liable for up to: a fine of $80 000 for a first offence, or $100 000 for a subsequent offence. If the employer contravenes anything outlined in S19, but does not cause the death or serious harm of an employee, they are liable for up to: a fine of $40 000 for a first offence, or $50 000 for a subsequent offence. S21: Duties of employers and self-employed persons. Employers and self-employed persons must take care to ensure their own and others health and safety at work. S21A-C: Breaches of S21. In circumstances of gross negligence causing the death of or serious harm to an employee, they are liable up to 5 years imprisonment and a fine of $550 000 for a first offence or $680 000 for a subsequent offence. If they are a body corporate, they are liable for a fine up to $2 700 000 for a first offence or $3 500 000 for a subsequent offence. In circumstances not of gross negligence, but causing the death of or serious harm to an employee, they are liable for up to: a fine of $400 000 for a first offence, or $500 000 for a subsequent offence. If they are a body corporate, they are liable for a fine up to $2 000 000 for a first offence or $2 500 000 for a subsequent offence. If the employer contravenes anything outlined in S19, but does not cause the death or serious harm of an employee, they are liable for up to: a fine of $250 000 for a first offence, or $350 000 for a subsequent offence. If they are a body corporate, they are liable for a fine up to $1 500 000 for a first offence or $1 800 000 for a subsequent offence. S22: Duty of persons who have control of workplaces.	WorkSafe Western Australia	A group with the Department of Mines, Industry Regulation and Safety, the administering department for the Act. Provide information about work-related driving on website; however, main focus is driver fatigue, nothing specific mentioned regarding distracted driving.

Legislation	Details	Act	Details
	A person in a management or control of workplace position must ensure risks to health and safety associated with the workplace are minimised. S22A: Breaches of S22. In circumstances of gross negligence causing the death of or serious harm to an employee, they are liable up to 5 years imprisonment and a fine of $550 000 for a first offence or $680 000 for a subsequent offence. In circumstances not of gross negligence, but causing the death of or serious harm to an employee, they are liable for up to: a fine of $400 000 for a first offence, or $500 000 for a subsequent offence. If the employer contravenes anything outlined in S19, but does not cause the death or serious harm of an employee, they are liable for up to: a fine of $250 000 for a first offence, or $350 000 for a subsequent offence. S24-25: Issue resolution. Inspectors, health and safety representatives, etc. can require a worker/organisation or resolve a health and safety issue. S43-49: Functions and powers of inspectors. Details how inspectors investigate contraventions of this Act, can assist in the resolution of work health and safety issues, including seizing the workplace or parts of the workplace or issuing improvement or prohibition notices.		
Occupational Safety and Health Regulations 1996	S2.1-2.8: Matters prescribed for purposes of the Act. Describes the training courses required for employees. S3.1: Identification of hazards, and assessment and reduction of risks, duties of employer etc. as to A person who is an employer, main contractor, self-employed, in control of the workplace or control of the access to a workplace must go through a risk management process (identifying, assessing and reducing risks. If not done, they are liable up to $25 000 for a first offence, $31 250 for a subsequent offence, or if a body corporate, $50 000 for a first offence and $62 500 for a subsequent offence. S3.22: Moving vehicles etc., duties of employers etc. as to A person who is an employer, main contractor, in control of the workplace or control of the access to a workplace **must ensure the use of vehicles is done in a way that minimises risk of injury to others.** If not done, they are liable up to $10 000 for a first offence, $12 500 for a subsequent offence, or if a body corporate, $20 000 for a first offence and $25 000 for a subsequent offence. S3.129-3.134: Driving commercial vehicles. Outlines in further detail requirements for work-related driving and the penalties for breaching the regulations, however nothing specific to distracted driving.	WorkSafe Western Australia	The administering department for the regulations.

Legislation	Details	Act	Details
Northern Territory			
Work Health and Safety (National Uniform Legislation) Act 2011	S8: Meaning of workplace. A vehicle is included as a workplace. S17: Management of risks. Workers must eliminate or minimise risks to health and safety as much as possible. S20: Duty of persons conducting businesses or undertakings involving management or control of workplaces. A person in a management or control of workplace position must ensure risks to health and safety associated with the workplace are minimised. S27: Duty of officers An officer must exercise due diligence to ensure their employees are complying with legislation, and ensure they minimise health and safety risks. S28-29: Duties of workers / other persons at the workplace. A person at the workplace must take care of their own health and safety, others' health and safety, and comply with legislation and policies. S34A-34D: Industrial manslaughter. If a worker dies due to a person’s conduct or negligence at work, they are liable for up to life years imprisonment, or as a body corporate, 65 000 penalty units. S80-82: Issue resolution. Inspectors, health and safety representatives, etc. can require a worker/organisation or resolve a health and safety issue. S84: Right of worker to cease unsafe work. A worker may cease or refuse to carry out work if they have a reasonable concern that the work has serious risk to their health or safety. S90-102: Provisional improvement notices. A health and safety representative may issue a provisional improvement notice requiring workers to remedy, prevent or mitigate a contravention to this Act. S160-197: Functions and powers of inspectors. Details how inspectors investigate contraventions of this Act, can assist in the resolution of work health and safety issues, including seizing the workplace or parts of the workplace or issuing improvement or prohibition notices.	Northern Territory WorkSafe	The administering department for the Act. WorkSafe additionally publishes on its website all guidelines and policies with more detail specific to driving as well as providing risk management samples and assistance.
Work Health and Safety (National Uniform Legislation) Regulations 2011	S32-38: Managing risks to health and safety. Details how a duty holder must identify hazards, manage risks, implement control measures, and periodically review the risks. Maximum penalty: 36 penalty units, or for a body corporate, 60 penalty units. S39: Provision of information, training and instruction. States that anyone conducting a business or undertaking must ensure that adequate information, training and instruction is provided to workers, including education of the risks (this includes driving work).	Northern Territory WorkSafe	The administrating department for the regulations.

Legislation	Details	Act	Details
Safe Driving Guidelines for Workplaces 2020	Developed in 2018 as part of Northern Territory's Towards Zero Road Safety Action Plan 2018-2022, to reduce road trauma. Outlines compulsory risk management processes, associated legislation and risk factors**. Distracted driving is specifically mentioned on pp.7 and what employers and employees can do to minimise the risk.**	Department for Infrastructure, Planning and Logistics	The publishing department for the guidelines. They also have other factsheets for work-related driving on their website.
		Northern Territory WorkSafe	The department responsible for the legislation outlined in the guidelines.
Vehicles as a Workplace: Work Health and Safety Guide 2019	Developed nationally in 2019 and published on the Northern Territory WorkSafe website, the guide outlines risk management processes, legislations, and risk factors. **Section 5.6 specifies unsafe drivers, lists the risks and potential control strategies of distraction and inattention, focussing primarily on mobile phone usage.**	National partnership of state work health and safety and road authorities	Published the guide to reduce road trauma from work-related driving across all states.

Legislation	Details	Act	Details
Tasmania			
Work Health and Safety Act 2012	S8: Meaning of workplace. A vehicle is included as a workplace. S17: Management of risks. Workers must eliminate or minimise risks to health and safety as much as possible. S20: Duty of persons conducting businesses or undertakings involving management or control of workplaces. A person in a management or control of workplace position must ensure risks to health and safety associated with the workplace are minimised. S27: Duty of officers An officer must exercise due diligence to ensure their employees are complying with legislation, and ensure they minimise health and safety risks. S28-29: Duties of workers / other persons at the workplace. A person at the workplace must take care of their own health and safety, others' health and safety, and comply with legislation and policies. S80-82: Issue resolution. Inspectors, health and safety representatives, etc. can require a worker/organisation or resolve a health and safety issue. S84: Right of worker to cease unsafe work. A worker may cease or refuse to carry out work if they have a reasonable concern that the work has serious risk to their health or safety. S90-102: Provisional improvement notices. A health and safety representative may issue a provisional improvement notice requiring workers to remedy, prevent or mitigate a contravention to this Act. S160-197: Functions and powers of inspectors. Details how inspectors investigate contraventions of this Act, can assist in the resolution of work health and safety issues, including seizing the workplace or parts of the workplace or issuing improvement or prohibition notices.	WorkSafe Tasmania	The administrating and enforcing department for the Act. WorkSafe Tasmania has additional information on their website and links some resources, however other than the National Vehicles as A Workplace handbook, there is nothing specific to distracted driving.
Work Health and Safety Regulations 2019	S32-38: Managing risks to health and safety. Details how a duty holder must identify hazards, manage risks, implement control measures, and periodically review the risks. Maximum penalty: 36 penalty units, or for a body corporate, 60 penalty units. S39: Provision of information, training and instruction. States that anyone conducting a business or undertaking must ensure that adequate information, training and instruction is provided to workers, including education of the risks (this includes driving work).	WorkSafe Tasmania	The administering and enforcing department for the regulations.
Vehicles as a Workplace guide	Refers to AustRoads	WorkSafe Tasmania	Requires login

Legislation	Details	Act	Details
Australian Capital Territory			
Work Health and Safety Act 2011	S8: Meaning of workplace. A vehicle is included as a workplace. S17: Management of risks. Workers must eliminate or minimise risks to health and safety as much as possible. S20: Duty of persons conducting businesses or undertakings involving management or control of workplaces. A person in a management or control of workplace position must ensure risks to health and safety associated with the workplace are minimised. S27: Duty of officers An officer must exercise due diligence to ensure their employees are complying with legislation, and ensure they minimise health and safety risks. S28-29: Duties of workers / other persons at the workplace. A person at the workplace must take care of their own health and safety, others' health and safety, and comply with legislation and policies. S80-82: Issue resolution. Inspectors, health and safety representatives, etc. can require a worker/organisation or resolve a health and safety issue. S84: Right of worker to cease unsafe work. A worker may cease or refuse to carry out work if they have a reasonable concern that the work has serious risk to their health or safety. S90-102: Provisional improvement notices. A health and safety representative may issue a provisional improvement notice requiring workers to remedy, prevent or mitigate a contravention to this Act. S160-197: Functions and powers of inspectors. Details how inspectors investigate contraventions of this Act, can assist in the resolution of work health and safety issues, including seizing the workplace or parts of the workplace or issuing improvement or prohibition notices.	WorkSafe Australian Capital Territory	The administering and enforcing department for the Act. Nothing specific regarding driving on their website. As per 14/12/2020 has published a video on mobile phone use as a distraction in the workplace, however not specifically related to driving.
Work Health and Safety Regulations 2011	S32-38: Managing risks to health and safety. Details how a duty holder must identify hazards, manage risks, implement control measures, and periodically review the risks. Maximum penalty: 36 penalty units, or for a body corporate, 60 penalty units. S39: Provision of information, training and instruction. States that anyone conducting a business or undertaking must ensure that adequate information, training and instruction is provided to workers, including education of the risks (this includes driving work).		The administering and enforcing department for the regulations.

List G.2: Sources

- Queensland
  - Act: https://www.legislation.qld.gov.au/view/pdf/inforce/current/act-2011-018
  - Regulation: https://www.legislation.qld.gov.au/view/html/inforce/current/sl-2011-0240#ch.4-pt.4.8
    Road Safety Manual: https://www.hpw.qld.gov.au/__data/assets/pdf_file/0015/3381/roadsafetymanual.pdf
  - Distractions fact sheet: https://www.hpw.qld.gov.au/__data/assets/pdf_file/0018/9702/driverdistractions.pdf
- South Australia
  - Act: https://www.legislation.sa.gov.au/lz/c/a/work%20health%20and%20safety%20act%202012.aspx
  - Regulation: https://www.legislation.sa.gov.au/LZ/C/R/Work%20Health%20and%20Safety%20Regulations%202012.aspx
  - SafeWork transport: https://www.safework.sa.gov.au/industry/transport-and-stevedoring/road-transport
- New South Wales
  - Act: https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2011-010#sec.196
  - Regulations: https://www.legislation.nsw.gov.au/view/html/inforce/current/sl-2017-0404#sec.184A
  - WHS procedure: https://www.rms.nsw.gov.au/safety/work-health-safety/documents/procedure-pn066p13.pdf
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- Victoria
  - Act: https://content.legislation.vic.gov.au/sites/default/files/2020-10/04-107aa034%20authorised.PDF
  - Regulations: https://content.legislation.vic.gov.au/sites/default/files/2020-09/17-22sra007%20authorised_0.pdf
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  - WorkSafe driving: https://www.worksafe.vic.gov.au/planning-safe-work-related-driving
  - Handbook: https://www.vicroads.vic.gov.au/-/media/files/documents/utilities/about-vr/ohs/ohs_safety_handbook_july_2016.ashx?la=en&hash=6BA1656284351B266FA276393A7AC2EE
  - VicRoads vehicles: https://www.vicroads.vic.gov.au/-/media/files/documents/utilities/about-vr/ohs/ohs-safe-driving-policy.ashx?la=en&hash=BE2B238CA283189E39DA842B07842364
- Western Australia
  - Act: https://www.legislation.wa.gov.au/legislation/prod/filestore.nsf/FileURL/mrdoc_43441.pdf/$FILE/Occupational%20Safety%20And%20Health%20Act%201984%20-%20%5B07-k0-00%5D.pdf?OpenElement
  - Regulations: https://www.slp.wa.gov.au/pco/prod/filestore.nsf/FileURL/mrdoc_43452.pdf/$FILE/Occupational%20Safety%20and%20Health%20Regulations%201996%20-%20%5B10-n0-00%5D.pdf?OpenElement
  - Department's factsheets: https://www.commerce.wa.gov.au/publications/fact-sheet-driving-commercial-vehicles
- Northern Territory

        - Act: https://legislation.nt.gov.au/Legislation/WORK-HEALTH-AND-SAFETY-NATIONAL-UNIFORM-LEGISLATION-ACT-2011
        - Regulations: https://legislation.nt.gov.au/Legislation/WORK-HEALTH-AND-SAFETY-NATIONAL-UNIFORM-LEGISLATION-REGULATIONS-2011
        - Workplace guidelines: https://roadsafety.nt.gov.au/__data/assets/pdf_file/0006/814686/safe-driving-guidelines-for-workplaces.pdf
        - Vehicles as a Workplace: Work Health and Safety Guide: https://www.worksafe.qld.gov.au/__data/assets/pdf_file/0020/21629/vehicles-as-a-workplace-national-guide.pdf
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        - Act: https://www.legislation.tas.gov.au/view/html/inforce/current/act-2012-001
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        - WorkSafe guidelines: https://worksafe.tas.gov.au/topics/Health-and-Safety/hazards-and-solutions-a-z/hazards-and-solutions-a-z-pages/v/vehicles-as-workplaces
    - Australian Capital Territory
        - Act: https://www.legislation.act.gov.au/View/a/2011-35/current/PDF/2011-35.PDF
        - Regulations: https://www.legislation.gov.au/Details/F2011L02664
    - General:
        - Guide: https://www.worksafe.qld.gov.au/__data/assets/pdf_file/0020/21629/vehicles-as-a-workplace-national-guide.pdf

Appendix H: A reflection of education and awareness campaigns

Table H.1: Reflection

Initiative	Synopsis	Department	Roles, responsibilities and actions
Queensland			
Safer Roads, Safer Queensland 2015-2021	Developed as part of Queensland's road safety strategy for 2015-2021, which includes Road Safety Action Plans 2015-2017, 2017-2019 and 2020-2021, as well as heavy vehicle and speed specific actions. Aim of the initiative: reduce fatalities and injuries on the road by examining all factors, including, but not limited to, distracted driving. The 2015-2017 plan introduced double demerit points for each subsequent mobile phone offence committed within one year, developed mobile phone detection cameras, and implemented careless driving legislation. The 2017-2019 plan investigated distracted driving in young people specifically, introducing L and P1 plater specific legislation. The 2020-2021 introduced new penalties for mobile phone use and commenced a trial of mobile phone detection cameras.	Department of Transport and Main Roads	Administration of the strategy and responsible for creating action plans. Responsible for introduction of new legislation and creation of educational campaigns.
		Queensland Police Service	Enforcement and runs public education campaigns.
		Centre for Accident Research and Road Safety (QUT)	Primary research partner for the Road Safety Action plans. Promotes road safety campaigns and provide educational opportunities in schools.
		Department of Energy and Public Works (in 2018 renamed from Department of Housing and Public Works)	Under this action plan, promoted distracted driving in the workplace, commencing in the 2015-2017 plan. Their aim is to create more accessible workplaces and reduce road fatalities.
StreetSmarts 2018	'Join the Drive' was re-branded into 'StreetSmarts' end of 2018, as part of the 2017-2019 Road Safer Action plan, and is currently ongoing. The aim: to reduce road fatalities from the 'fatal five' through education and legislation. In 2018, double demerit points for subsequent mobile phone offences in one year were introduced. As part of this initiative, in February 2020, the penalties for mobile phone use were increased to a fine of $1000 and 5	Department of Transport and Main Roads	Administration and creator of the initiative and associated legislation. Setting up public campaigns in the form of education on their website, TV advertisements and a Facebook page. Implemented mobile phone camera detection trials, running until the end for 2020, and increased mobile phone restrictions and penalties.
		Queensland Police Service	Enforcement of the legislation. Runs awareness campaigns.
		Royal Automobile Club of Queensland	Partner assisting with public campaigns. Educate the public by reposting and promoting resources, including distracted driving.

Initiative	Synopsis	Department	Roles, responsibilities and actions
	demerit points to deter this behaviour. Additionally, learner drivers will, and P-platers may lose their license after one mobile phone offence. As part of the campaign, 'QuickSmarts' a video and factsheets were introduced for each of the fatal five, including driver distraction, with the main focus of this area on mobile phone use. Furthermore, the departments associated with StreetSmarts launched 'Queensland Road Safety Week', occurring annually since 2018, focusing on the fatal five. It is designed to involve the whole community, promoting road safety as key figures of the community, and everyday persons sign up for the week, posting photos of this, and thus advertising the campaign. This campaign also involves TV advertisements and creates a hashtag to spread the campaign on social media. Road Safety Week also included a large variety of free, printable activities for children, to educate them on road safety.	Centre for Accident Research and Road Safety	A partnership between Motor Accident Insurance Commission and Queensland University of Technology. The primary research partner for the initiative, CARRS-Q has a strong focus on reducing road trauma, promote resources on their websites, conduct research and encourage and participate in road safety education in schools.
Co-Lab young driver campaigns in QLD	Includes a variety of campaigns aimed to educate young people on safe road usage. In particular, the 'Road to Zero' campaign focuses on the fatal five (in which distracted driving is nominated) and the 'Chin Up' campaign focuses on distracted driving, in particular mobile phone usage. In QLD specifically, Co-Lab is set up regional events for young drivers to educate them on the risks of the fatal five.	Queensland Police Service	Enforcement of the legislation. Runs awareness campaigns.
South Australia			
Towards Zero Together 2020 (launched 2011)	Designed to complement the National Road Safety Strategy 2011-2020, the Towards Zero Together plan is comprised of a 'safe system', dividing road safety into four sections: safer roads, safer speeds, safer vehicles, and safer people. In safer people, the focus is on dangerous driving (including distraction), which is addressed by graduated licensing, enforcement, and education. The 2011-2012 plan was primarily comprised of research, which included focussing on examining young drivers, and driver distraction. They began to increase enforcement of distraction offences, including mobile phone use. The 2013-2016 plan focused on mobile phones, reviewing the phone penalties to better reflect the risks and consequences. Similarly, passenger restrictions for P1 drivers were	Department for Infrastructure and Transport (renamed from Department for Transport, Energy and Infrastructure and Department for Planning, Transport and Infrastructure)	Administrator of the strategy and responsible for creating action plans. Responsible for introduction of new legislation and creation of educational campaigns In 2011-2012, they partnered with the University of Adelaide to conduct research related to graduated licensing. In 2013-2016, they introduced legislation that P1 passengers under 25 years old can only carry one passenger, and partnered with the police to review mobile phone penalties, ultimately increasing the fines and demerit points, and create the 'Safer, Smarter Drivers' initiative. With the Department for Education and the Motor Accident Commission, they conducted education programs in schools. With the Royal Automobile Association, they promoted and expanded a Road Rules Refresher Guide for drivers. With SafeWork, they founded and expanded the 'Smarter Travel @ Work' initiative. Finally, they began to investigate incentive schemes to reward safe driving behaviour. In 2018-2019, they introduced a voluntary road rules refresher test for drivers.

Initiative	Synopsis	Department	Roles, responsibilities and actions
	introduced. 'Safer, Smarter Drivers' and 'Smarter Travel @ Work' were introduced. The 2018-2019 plan focused on work-related driving, improving 'Smarter Travel @ Work', and improving general campaigning. The 2019-2020 plan focused the fatal five, and reducing risks via educational campaigns, expanding the police road safety programs.	South Australia Police	Enforcement of the legislation. Runs awareness campaigns. All plans had a strong focus on improving enforcement. In 2011-2012, there was a focus on improving enforcement of dangerous behaviour from drivers. In 2013-2016, the police established the road safety centre to educate children on road safety. Together with the Department for Infrastructure and Transport, they created 'Safer, Smarter Drivers' initiative and began to review mobile phone penalties. They also established the road safety centre, providing education for children on safe driving behaviours. This includes activities for kids on-site and online and a road safety holiday program that occurs annually since 2018. In 2018-2019, they introduced targeted education campaigns, including against distracted driving, with the Motor Accident Commission. Additionally, the police have online activities for kids, factsheets on distracted driving, a podcast created in 2019 and a Facebook page that promotes safe driving.
		Motor Accident Commission	In 2013-2016, the Commission promoted the use of voluntary technology solutions to block phone calls and messaging while driving (such as do not disturb). With the Department of Education and the Department of Infrastructure and Transport, they assessed road safety education programs in schools. In 2018-2019, they partnered with police to introduce targeted education campaigns, including distracted driving.
		Royal Automobile Association of South Australia	In 2013-2016, together with the Department for Infrastructure and Transport, they created the Road Rules Refresher Guide. They have also published factsheets and information about road safety and distracted driving on their website.
		University of Adelaide	Primary research agency for road safety.
		Department for Education South Australia	In 2013-2016, they assessed road safety education in schools with the Department for Infrastructure and Transport and the Motor Accident Commission, aim: to reduce road fatalities through education.
Safer, Smarter Drivers (launched from 2013-2016 plan)	The launching of the 'MyLicense' website which collates all driving rules and penalties, graduated licensing schemes, resources for drivers, learners, and learner supervisors, and the ability to keep track of your license. The website has significant information on the risks and regulations of distracted driving, and specifically mobile phone usage and passenger distractions.	Department for Infrastructure and Transport	Administrator of the strategy and responsible for creating action plans.
		South Australia Police	Enforcement of legislation
Smarter Travel @ Work (initially established in 2012)	The primary aim is to promote greener and more active travel options to workers, but the initiative does have some focus on overall road safety, including the fatal five, and creates guides for employers.	Department for Infrastructure and Transport	A partner agency for enhancing the initiative under the 2013-2016 road safety plan.
		SafeWork South Australia	Creator of the initiative.
No One's Driving if You're Distracted	A series of advertisements designed to educate the public on the risks of distracted driving. This included a 15 second TV ad on distracted driving as a whole, 30 second radio ads on	Department for Infrastructure and Transport	Administrator for the overall plan and legislation forming the foundation forming the campaign.
		South Australia Police	Creator and publisher of the campaign.

Initiative	Synopsis	Department	Roles, responsibilities and actions
(launched from 2018-2019 plan)	distracted driving from parents and youth, and 6 second digital ads and billboards on specific distractions; eating, mobile phones, personal grooming and tending to children.	Motor Accident Commission	A key partner in road safety.
New South Wales			
Towards Zero Road Safety Plan 2020-2021	Designed to complement the National Road Safety Strategy 2011-2020, the Towards Zero Together plan is comprised of a 'safe system', dividing road safety into four sections: safer roads, safer speeds, safer vehicles, and safer road users. In 2013 an annual Road Rules Awareness week was introduced, promoting road safety through the internet, on the Towards Zero website and the Road Safety Facebook page. Some weeks the focus is on general road rules and mobile phone usage. There is a focus on research to improve penalties on distracted driving, enforced by an integrated system and new technology, and specifically targeting repeat offenders. This led to the inclusion of mobile phones in the double demerits points scheme for subsequent offences in one year, in 2015. It also led to the increase from 3 to 4 demerit points for a mobile phone offence in 2016. In 2019, New South Wales also began trialling mobile phone cameras, which they fully implemented in March 2020. Additionally, there was a focus on road safety for youth, leading to the introduction of P1 platers under 25 only being allowed one passenger under 21 between 11pm and 5am, in 2017. A 'fair go for safe drivers' was also introduced, enabling open license holders, who have held their license for 5 years with no offences to be eligible for up to 50% off their license renewal. There was also some focus on work-related driving and education for schools.	Transport for New South Wales	Administrator for the overall plan and all legislation. They introduced the road Rules awareness week to promote safety and commenced the Towards Zero website, which has information and activities for drivers, as well as educational campaigns for school. In combination with Monash University, they implemented mobile phone cameras, to complement their new legislation.
		New South Wales Police Force	Enforcement of the legislation.
		Revenue for New South Wales	Collector of fines resulting from mobile phone detection cameras.
		Monash University	Primary research partner for how to integrate enforcement, educate on road safety, and implement mobile phone cameras.
		SafeWork New South Wales	Created an employer's guide to road safety under the plan, aiming to educate the workforce on road rules.
		Service for New South Wales	Created the 'fair go for safe drivers' initiative.
'Get Your Hand Off It' 2013 campaign	A campaign that raises awareness on mobile phone usage through TV and radio advertisements and a website.	Transport for New South Wales	Primary organiser of the campaign.
		New South Wales Police Force	Enforcement of the legislation
		Sydney Swans	AFL team partnering with Transport for NSW to promote the risks of mobile phone usage and distracted driving.
'Stop It … Or Cop It' 2017 campaign	An advertisement campaign that raises awareness of the risks and penalties associated with road rules, particularly driver behaviour. This includes distracted driving, with specific advertisements on mobile phone usage.	Transport for New South Wales	Primary organiser of the campaign.
		New South Wales Police Force	Enforcement of the legislation and partner agency for the campaign.
Victoria			
	The initiative was developed to educate children and adolescents on road safety in school, aiming to mitigate road	Department of Education and Early Childhood Development	Primary agency creating and implementing the plan in schools.

Initiative	Synopsis	Department	Roles, responsibilities and actions
Victoria's Road Safety Education Action Plan 2014-2016	trauma. In the plan, there are few specific factors to road trauma mentioned, however there is some focus on passengers of adolescent drivers, referencing passenger distraction as a problem.	Department of Justice	Partner agency assisting with developing the plan.
		Royal Automobile Club of Victoria	Partner agency assisting with developing the plan.
		Traffic Accident Commission	Partner agency assisting with developing the plan.
		Victoria Police	Partner agency assisting with developing the plan.
Towards Zero Road Safety Strategy and Plan 2016-2020	Introduced in 2016 to reduce road related deaths and severe injury. It consisted of the safe system approach of safer roads, speeds, vehicles, and road users. The initiative had a focus on distraction, specifically on mobile phone usage, with promotion for the use of voluntary technology by drivers to control mobile distractions. Additionally, VicRoads introduced an incentive for young drivers: any drivers who are offence free at the end of their P-plate phase get a free three-year license. A review was done in 2018, but there was no mention of distracted driving.	VicRoads	Primary partner involved with developing and implementing the plan and subsequent developing and implementing legislation and campaigns.
		Victoria Police	Partner agency assisting with developing the plan, enforcing the legislation and running awareness campaigns
		Traffic Accident Commission	Partner agency assisting with developing the plan and providing crash statistics.
		Department of Health and Human Services	Partner agency assisting with developing the plan.
		Department of Justice and Regulation	Partner agency assisting with developing the plan.
		Royal Automobile Club of Victoria	Partner agency assisting with developing the plan.
'Think of us before you drive' 2017 campaign	A campaign focussed on road safety by controlling speed, drink driving and distraction. It had a focus on mitigating such factors by promoting the penalties and enforcement. Here, the primary focus of distraction is on mobile phones. The campaign clarified legislation and penalties around mobile phone usage, and involved the new legislation preventing P-platers from all mobile phone use. The campaign heavily promoted using voluntary technology like 'do not disturb' settings to reduce risks. The campaign involved education on their website, Facebook page, and a tv advertisement.	VicRoads	Partner agency assisting with developing the plan.
		Victorian Police	Primary partner that developed the campaign, enforced the legislation in the campaign and further promoted the information.
'When you're on your phone you're driving blind' 2019 campaign	A campaign that focussed on mobile phone distraction. It involved a tv advertisement, educational videos on 'do not disturb' function on phones, and other information on the TowardsZero website and Facebook page.	VicRoads	Primary partner for developing the campaign.
		Victoria Police	Enforcement of the legislation
		Traffic Accident Commission	Partner agency developing statistics and educational videos.
Victorian Road Safety Strategy 2021-2030	The plan continued the aim of the Towards Zero 2013-2020, desiring to reduce road deaths to zero by 2050. There was a stronger focus on distracted driving in this plan, with plans to trial mobile phone cameras and improve enforcement. There is also a strong focus on education programs and public campaigns.	Department of Transport	Primary partner for development and implementation of plan and subsequent legislation and campaigns.
		Victoria Police	Partner agency assisting with developing the plan, enforcement of legislation, and running awareness campaigns
		Department of Health and Human Services	Partner agency assisting with developing the plan.
		Department of Justice and Community Safety	Partner agency assisting with developing the plan.
		Transport Accident Commission	Partner agency assisting with developing the plan and recording statistics

Initiative	Synopsis	Department	Roles, responsibilities and actions
		Monash University	Research partner providing research into factors for road trauma and mitigation technology
Western Australia			
Towards Zero Road Safety Action Plan 2008-2020	Introduced in 2008 to reduce road related deaths and severe injury, it consists of the safe system approach of safer roads and roadsides, speeds, vehicles, and road use. In 2012 new passenger restrictions for P-platers were introduced with the aim to reduce passenger distraction for youth. Additionally, in 2014 minimising distracted driving, especially phone usage became a strong focus. They encouraged voluntary use of technology to minimise phone distractions, and specific focus on educating young drivers and employees.	Road Safety Commission Western Australia	Primary partner for developing the plan.
		Department of Transport Western Australia	Development and administration of legislation
		Western Australian Police	Enforcement of the legislation
		Traffic Accident Commission	Research partner and promoter for the voluntary use of technology.
		University of Western Australia	Research partner.
'Zero heroes' 2016 campaign	A campaign that aimed to normalise safe driving behaviour by recognising Western Australian motorists who drive safer, by nominating those with zero demerit points as 'zero heroes'. The campaign involved TV and online videos, radio advertisements, social media posts and billboards, focussing on all aspects of driver behaviour including distraction.	Road Safety Commission Western Australia	Primary partner developing the campaign.
'Two seconds on your phone is 33m driving blind' 2016 campaign	A campaign involving TV and radio advertisements, and posters on the backs of buses, promoting the dangers of mobile phone usage while driving.	Road Safety Commission Western Australia	Primary partner developing the campaign.
'Closer to home than you think' 2018 campaign	A campaign that had a more general focus on the fatal five, aiming to reduce road fatalities by humanising the death toll. It involved TV advertisements featuring people who had lost loved ones to road fatalities.	Road Safety Commission Western Australia	Primary partner developing the campaign.
'Zero excuses' 2018 campaign	A campaign that focused on the fatal five as a whole, but with some mobile phone specific advertisements. Billboards and social media posts were created, as well as video campaigns with Seven West news personalities.	Road Safety Commission Western Australia	Primary partner developing the campaign.
'Know the distance of distraction' 2019 campaign	The campaign aimed to educate on the dangers of all driving distraction (including mobile phones, grooming, eating, passengers, etc.). Two 30 second TV advertisements were produced, featuring a distracted driver crashing into a pram or fruit stall, as well as radio ads, banners, social media posts and factsheets.	Road Safety Commission Western Australia	Primary partner developing the campaign.
Directions Road Safety Education Action Plan 2017-2019	Part of the Towards Zero campaign, the plan was developed to focus on educating youth through schools on road safety. There was a focus on distracted driving for the 15-18 years age bracket.	School Drug Education and Road Aware	Primary partner developing and implementing the plan.
		Royal Automobile Club of Western Australia	Partner agency creating many of the educational programs in the plan.
		Department of Transport	Partner agency assisting with development of plan

Initiative	Synopsis	Department	Roles, responsibilities and actions
		Road Safety Commission	Partner agency involved in developing campaigns, including those on distracted driving.
		Western Australia Police	Partner agency assisting with development of the plan.
Driving Change Road Safety Strategy 2020-2030	Developed as the follow up plan to the Towards Zero 2008-20 plan. It was decided that there needed to be a stronger focus on several areas including driver inattention, specifically mobile phones. Additionally, the plan aims to further develop the idea of a vehicle as a workplace, reducing road fatalities from work-related driving.	Road Safety Commission Western Australia	Partner agency assisting with development of the plan.
		Department of Transport Western Australia	Development and implementing enforcement legislation
		Western Australian Police	Enforcement of the legislation
		Traffic Accident Commission	Research partner and a strong promoter for the voluntary use of technology.
		University of Western Australia	Research partner.
		WorkSafe Western Australia	A new partner in road safety plans, aiming to reduce road fatalities through the education of those doing work-related driving.
'Danger in the palm of your hand' 2020 campaign	A campaign created to reduce mobile phone distractions. It involved the implementation of mobile phone cameras across 2019-2020, and higher penalties for phone offences. Additionally, 30 second TV and radio ads were produced, as well as social media posts, billboards, and banners on bus backs.	Road Safety Commission Western Australia	Primary partner developing the campaign.
		Department of Transport Western Australia	Primary partner developing the campaign.
		Western Australian Police	Enforcement of the legislation
Northern Territory			
Towards Zero Action Plan 2018-2022	Developed to complement the National Road Safety Strategy 2011-2020, it also utilised the safe system (of safe road use, roads and roadsides, vehicles, and speeds). In 2018, higher penalties for repeat offences, including mobile phone offences, were introduced. Enforcement of traffic offences was also increased. 2019 saw an increase in mobile phone penalties from a $250 fine to a $500 fine, as well as a fine of $500 introduced for improper use of visual display units. In 2020, the plan included development of road safety education in schools and incentive programs for safe drivers. As part of the plan, annual Road Safety week was introduced in Northern Territory to promote road safety through social media.	Department of Infrastructure, Planning and Logistics	Primary partner for the development of the plan, which led to repeat offence penalties, increased phone penalties, introduction of visual display unit penalties, and mobile phone cameras. They similarly supported increased enforcement action and educational campaigns.
		Northern Territory Police	Primary partner, enforcement of legislation and review of improving enforcement as a whole.
		Northern Territory Motor Accident Compensation Commission	Partner agency leading advertisement campaigns for road safety as a whole.
		Department of the Attorney-General and Justice	Partner agency assisting with development of plan
		Department of the Chief Minister	Partner agency assisting with development of plan
		Department of Education	Partner agency assisting with development of plan
		Northern Territory Automobile Association	Partner agency assisting with development of plan
		St John's Ambulance Australia	Partner agency assisting with development of plan
		Northern Territory Fire and Emergency Services	Partner agency assisting with development of plan
		Child Accident Prevention Foundation of Australia	Partner agency assisting with development of plan

Initiative	Synopsis	Department	Roles, responsibilities and actions
		Australian New Car Assessment Program	Partner agency assisting with development of plan
		Rider Awareness Northern Territory	Partner agency assisting with development of plan
		Recording Artists, Actors and Athletes Against Drink Driving	Partner agency assisting with development of plan
'Drive 2 Conditions' 2019 campaign	A campaign consisting mostly of advertisements aiming to educate drivers on driving safely in various road conditions. Included are some references to distraction.	Northern Territory Motor Accident Compensation Commission	Primary partner developing and implementing campaign.
		Northern Territory Police	Partner agency assisting with development of plan
		Department of Infrastructure, Planning and Logistics	Partner agency assisting with development of plan.
Tasmania			
Our Safety, Our Future Road Safety Strategy 2007-2016	Created as a follow up from the 2002-2006 plan and modelled after Sweden's 'Vision Zero' and the Netherland's 'Sustainable Safety' approaches. The plan identified inattention as one of the four, primary behavioural factors of road trauma, but did not outline clear mitigation strategies other than educational campaigns, until the 2011-2013 specific action plan. The 2011-2013 plan had a strong focus on distracted driving, with a large report generated from studying Tasmanian statistics and distracted driving in other countries. Subsequently, mass media campaigns were planned, and the Community Road Safety Partnership program was implemented, aimed at developing road safety awareness around driving behaviours in Tasmania. Additionally, penalties for mobile phone use were increased to a $300 fine and 3 demerit points, which could now be combined with the 'driving without due care and attention' offence (up to $140 fine and 3 demerit points) or the 'driving without reasonable consideration for other road users' offence (up to $100 fine). Finally, the Council began to review engineering solutions that would trigger driver's attention, such as improving streets lighting and introducing audible line marking	Road Safety Advisory Council	The Council consists of the Department of State Growth (created from Department of Infrastructure, Energy and Resources, and others in 2014), Tasmanian Police, Royal Automobile Club of Tasmania, Coroner's Office, Local Government Association of Tasmania, Tasmanian Motorcycle Council, and the Motor Accident Insurance Force. The Council was created to generate and implement road safety strategies.
		Specifically Department of Infrastructure, Energy and Resources	Lead agency within the Council, creating the plan and subsequent legislation changes and engineering solutions to improve distracted driving. Lead agency for introduction of the Community Road Safety Partnership and its' campaigns.
		Especially Tasmanian Police	Enforcement of legislation

Initiative	Synopsis	Department	Roles, responsibilities and actions
Road Torque Campaigns 2013-2015	A series of seven, 3 minute segments aired annually on the nightly news, to educate the public on various road safety issues. In 2013 and 2014, the second set of episodes were focussed on driver inattention, explaining the dangers and effects of it. In 2015, the segments were reduced to a series of 5, 3 minute segments, and the fifth episode was focussed on the dangers of texting and driving.	Road Safety Advisory Council	Creation and publishing segments.
Towards Zero Road Safety Strategy 2017-2026	Created as a follow up to the 2007-2016 plan and designed to complement the National 2011-2020 road safety plan, this plan adopted the safe system approach of safe road users, roads and roadsides, speeds, and vehicles. There was a strong focus on distracted driving, with the implementation of mobile phone cameras in 2019 and further educational campaigns against mobile phone use. The strategy also mentions plans to introduce further graduated licensing, including peer passenger restrictions on Provisional license holders, and further explore the idea of vehicles as a workplace to prevent distracted driving.	Road Safety Advisory Council	Lead agency for strategy
		Specifically Department of State Growth (created from Department of Infrastructure, Energy and Resources, and others in 2014)	Lead agency within Council. Responsible for implementing the mobile phone detection cameras.
		Especially Tasmanian Police	Enforcement agency and key partner in the implementation of mobile phone cameras.
		University of Adelaide	Partnered with the Council to review Tasmanian crash statistics and suggest countermeasures.
		WorkSafe Tasmania	A growing partner in the strategy with the plan to utilise ‘vehicles as a workplace’ to combat road trauma, and specifically distracted driving.
Road Torque Campaigns 2017-2020	Series of 5, 3 minute segments aired on the nightly news to educate the public on safe driving. In 2017, the second episode, ‘driving blind’, outlined the dangers of texting and driving. In 2018, the first episode, ‘time doesn’t heal’, is of an interview with a mother who lost her son to unsafe driving. In 2020, the segments were reduced to 2.5 minutes long, and the first episode, ‘family pain’, is an interview with family members who lost a loved one due to distracted driving.	Road Safety Advisory Council	Creation and publishing segments.
		Department of Education, Don College	A partner in the 2017 episodes, with students from Don College participating in the creation of the episodes.
‘Leave your phone alone’ campaigns 2017-2018	Two advertisements that used humour to educate the public on the dangers of phone use while driving. The 2017 advertisement was 30 seconds long, with the slogan of ‘don’t be a goose’, while the 2018 advertisement was shortened to 15 seconds.	Road Safety Advisory Council	Creation and publishing segments.
‘Don’t drive blind’ campaigns 2019-2020	Two 30 second advertisements targeting mobile phone distractions	Road Safety Advisory Council	Creation and publishing segments.
Australian Capital Territory			
Vision Zero Road Safety Strategy 2011-2020	The strategy builds on the 2007-2010 strategy, complements the National 2011-2020 plan, and is heavily influenced by the Swedish ‘Vision Zero’ approach. The strategy also utilises the safe system (safe speeds, roads and roadsides, vehicles, and people and behaviours) approach, with distracted driving as	Justice and Community Safety Directorate	Lead agency for strategy, implementation of legislation changes and educational campaigns.
		Department of Infrastructure, Transport and Regional Development	Key agency in creating legislation changes.

Initiative	Synopsis	Department	Roles, responsibilities and actions
	one of the four main target areas. The key approaches to targeting distracted driving are through education and legislation. In the 2011-2013 Road Safety Action Plan, the partner agencies created an awareness campaign on driver distraction and began to review graduated licensing restrictions. In 2015, penalties for mobile phone offences were increased to a $470 fine and 3 demerit points. Double demerit points were also introduced for subsequent mobile phone offences within one year, aiming to target repeat offenders. In the 2016-2020 plan, further educational campaigns were introduced, as well as the 2018-2025 Road Safety Education Strategy, though this strategy did not have a focus on distracted driving. In 2016, the offence for operating a mobile phone was separated into two. The penalty for operating any function other than a call was increased to a $577 fine and 4 demerit points in 2019, a total ban was introduced for all mobile phone usage for L and P platers.	Australian Capital Territory Policing	Enforcement of legislation and promotion of media engagement.
		National Roads and Motorists Association	Key agency for funding the strategy.
		Territory and Municipal Services Directorate	Partner agency reviewing the engineering component of safe roads.
		Education and Training Directorate	Partner agency implementing education on road safety in schools.
		Health Directorate	Partner agency assisting with development of plan
		Chief Minister, Treasury and Economic Development Directorate	Partner agency assisting with development of plan
		Environment, Planning and Sustainable Development Directorate	Partner agency assisting with development of plan
		Australasian College of Road Safety	Partner agency assisting with development of plan
Vision Zero Road Safety Strategy 2020-2025	The 2020-2025 strategy was a follow up to the 2011-2020 strategy and operated on the same 'safe system' approach. In the 2020-2023 plan, distraction, particularly mobile phones, is again one of the four focus areas. To combat mobile phone use while driving, plans to introduce mobile phone detection cameras began in 2020, and the partner agencies intend to create campaigns encouraging the use of voluntary technologies that prevent mobile phone distractions. The strategy also plans to review graduated licensing schemes, in particular, peer passenger restrictions for provisional license holders.	Justice and Community Safety Directorate	Lead agency for strategy, implementation of legislation changes, educational campaigns and introduction of mobile phone cameras.
		Department of Infrastructure, Transport and Regional Development	Key agency for creating and implementation of legislation changes and introduction of mobile phone cameras.
		Australian Capital Territory Policing	Enforcement of legislation and promotion of media engagement.
		National Roads and Motorists Association	Key agency for funding the strategy.
		Territory and Municipal Services Directorate	Partner agency reviewing the engineering component of safe roads.
		Education and Training Directorate	Partner agency implementing education on road safety in schools.
		Health Directorate	Partner agency assisting with development of plan
		Chief Minister, Treasury and Economic Development Directorate	Partner agency assisting with development of plan
		Environment, Planning and Sustainable Development Directorate	Partner agency assisting with development of plan
		Australasian College of Road Safety	Partner agency assisting with development of plan

List H.2: Sources

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- Queensland
  - StreetSmarts: https://www.tmr.qld.gov.au/Safety/Safety-campaigns and https://streetsmarts.initiatives.qld.gov.au/about
  - Mobile phone cameras: https://www.tmr.qld.gov.au/cameradetectiontrial
  - Mobile phone restrictions: https://www.qld.gov.au/transport/licensing/driver-licensing/applying/provisional/restrictions#mobile
  - Young driver campaigns: https://streetsmarts.initiatives.qld.gov.au/young-drivers/chin-up
  - Safer Roads, Safer Queensland: https://www.tmr.qld.gov.au/Safety/Road-safety/Queensland-Road-Safety-Forums
  - Housing and public works: https://www.epw.qld.gov.au/about/strategy/buy-qld/about/social-outcomes
  - RACQ: https://www.racq.com.au/cars-and-driving/representing-queensland-drivers/road-safety-priorities/distraction-and-inattention
  - Road Safety Week: https://streetsmarts.initiatives.qld.gov.au/qrsw-2020
  -
- South Australia
  - Towards zero together: https://dpti.sa.gov.au/__data/assets/pdf_file/0020/82163/South_Australias_Road_Safety_Strategy_to_2020.pdf
  - Action Plans: https://dpti.sa.gov.au/towardszerotogether/road_safety_strategies/sa_road_safety_action_plan
  - Safer, smarter drivers: https://www.mylicence.sa.gov.au/home
  - Advertisements: https://www.police.sa.gov.au/your-safety/road-safety/road-safety-campaigns
  - Road Safety Centre: https://www.police.sa.gov.au/services-and-events/community-programs/road-safety-education and https://www.police.sa.gov.au/__data/assets/pdf_file/0007/952819/Road-Safety-Section-Foundation-Document.pdf
  - Smarter travel @ work: https://dpti.sa.gov.au/communityprograms/programs/smartertravelatwork/smarter_travel_@_work_at_safework_sa
- New South Wales
  - Road Safety Plan: https://roadsafety.transport.nsw.gov.au/downloads/road_safety_strategy.pdf
  - Towards zero: https://towardszero.nsw.gov.au/roadsafetyplan
  - Road Rules Awareness Week: https://roadsafety.transport.nsw.gov.au/campaigns/roadrules.html
  - Double demerits: https://roadsafety.transport.nsw.gov.au/campaigns/double-demerits.html
  - Get your hand off it: https://roadsafety.transport.nsw.gov.au/campaigns/get-your-hand-off-it/index.html
  - Stop it…or cop it: https://roadsafety.transport.nsw.gov.au/campaigns/enhancedpolice.html
  - Fair go reward: https://www.service.nsw.gov.au/transaction/fair-go-safe-drivers-discounted-licence-renewal
- Victoria
  - Education plan: https://www.vicroads.vic.gov.au/-/media/files/documents/safety-and-road-rules/victoriasroadsafetyeducationactionplan.ashx?la=en&hash=3D731C4CB3A5CBCAEA6F6C59663F1642

        - 2016-2020: https://www.towardszero.vic.gov.au/__data/assets/pdf_file/0010/183556/STU_0206_RS_STRATEGY_2016_web.pdf and https://www.parliament.vic.gov.au/images/stories/committees/lrrcsc/VicRoads_Country_Roads/submissions/334_2018.03.16_-_SUBMISSION_-_Transport_Accident_Commission_TAC.pdf
    - 2021-2030: https://transport.vic.gov.au/-/media/tfv-documents/road-safety-strategy_dec2020.pdf?la=en&hash=8DB08779EC18DEACB8C91CA2F45B359C
    - Campaigns: https://www.towardszero.vic.gov.au/campaign
- Western Australia
    - 2008-20 plan: https://www.roadwise.asn.au/Assets/Documents/Document-Centre/Fact_Sheets/Towards-Zero.pdf
    - 2020-30 plan: https://www.rsc.wa.gov.au/RSC/media/Documents/Driving-Change-Road-Safety-Strategy-WA-2020.pdf
    - Education plan: https://www.sdera.wa.edu.au/media/3247/warsec-directions-2017-2019.pdf
    - Campaigns: https://www.rsc.wa.gov.au/Campaigns
- Northern Territory
    - Plan: https://roadsafety.nt.gov.au/__data/assets/pdf_file/0007/466675/Towards-Zero-Action-Plan-v18.1.pdf
    - Campaigns: https://roadsafety.nt.gov.au/campaigns
    - New rules: https://roadsafety.nt.gov.au/campaigns/2019-nt-road-rule-changes-list
    - Distracted driving plan: https://roadsafety.nt.gov.au/safety-topics/distractions
- Tasmania
    - 2007-16 plan: https://www.transport.tas.gov.au/?a=108469
    - 2011-13 plan report: https://www.transport.tas.gov.au/?a=112000
    - 2017-26 plan: https://www.towardszero.tas.gov.au/__data/assets/pdf_file/0015/142620/Towards_Zero_Discussion_Paper_web.pdf
    - Campaigns: https://www.rsac.tas.gov.au/campaigns/campaigns/ and https://www.youtube.com/user/TheRSACTas/videos
- Australian Capital Territory
    - 2011-20 strategy: https://www.justice.act.gov.au/sites/default/files/2019-08/ACT_Road_Safety_Strategy_2011-2020.pdf
    - 2011-13 plan: https://www.justice.act.gov.au/sites/default/files/2019-08/ACT_Road_Safety_Action_Plan_2011-2013.pdf
    - 2016-20 plan: https://www.justice.act.gov.au/sites/default/files/2019-08/2016-2020_ACT_Road_Safety_Action_Plan_FA.pdf
    - 2020-25 strategy: https://www.justice.act.gov.au/sites/default/files/2020-09/ACT%20Road%20Safety%20Strategy%202020-2025_New.pdf
    - 2020-23 plan: https://www.justice.act.gov.au/sites/default/files/2020-09/ACT%20Road%20Safety%20Action%20Plan%202020-2023_New.pdf

Appendix I: Scoping review protocol

Abstract

Objective: The objective of this scoping review is to map the available literature on distracted driving, including existing countermeasures, and to identify any gaps in the literature. The review will inform the future research program to be developed by the Australian Automobile Association (AAA).

Introduction: Driver distraction is a developing field of enquiry describing a range of secondary tasks that negatively affect the task of driving, potentially increasing crash risk. Rapid technological change has increased the level of driver distraction at a faster rate than legislative controls and countermeasures designed to increase safety. This scoping review will provide a snapshot of what is known about distracted driving and identify emerging issues in order to plan for innovative and effective interventions.

Inclusion criteria: The review will map the literature from Australia and comparable overseas jurisdictions who have similar criminal traffic codes and crash rates per 100,000 of population. Targeted literature will primarily report on drivers of motorised vehicles (e.g. cars, trucks, motorcycles) used for work or personal use, although the effect of distracted driving will also necessarily refer to other populations, for example, pedestrians and bicyclists. The construct of 'distracted driving' will be related to four contexts: human behaviour, policy and regulations, technology, and enforcement practice.

Methods: The scoping review will follow Arksey and O'Malley's (2005) five step scoping review method, (1) identify the research questions, (2) identify relevant studies, (3) develop inclusion/exclusion criteria, (4) chart the data, and (5) develop final report using themes/summaries. A separate consultation exercise with government and industry professional will complement the review (see Protocol – Interviews with stakeholders). Database and internet searches for literature will be conducted within a 20-year timeframe (2000-2020) using agreed search terms (see below). Only English language studies will be included from the academic and selected grey literature (government, conferences, business, industry). Search results will be extracted to Endnote. A narrative report will be provided to AAA.

Introduction/background

The review was commissioned by the Australian Automobile Association (AAA) as part of the AAA Road Safety Research Program and will inform future research and policy initiatives in the field of distracted driving. AAA is the peak organisation representing Australia's state-based motoring clubs who provide emergency roadside assistance via their fleets of light and heavy vehicles (REF). AAA is particularly interested in Human Machine Interface (HMI) technologies and how they relate to workplace health and safety issues in fleet management contexts. AAA also conducts wide ranging research into general issues affecting transport systems and frequently participates in parliamentary enquiries relating to road safety.

The field of 'distracted driving' is broad in nature, encapsulating a range of human behavioural factors, technological factors (including HMI issues), policy interventions, and other countermeasures. Safe driving requires individuals to perform a combination of complex activities including controlling speed, route following, obeying road rules, scanning the road environment and monitoring vehicle controls (Goodsell, Cunningham, & Chevalier, 2019). In contrast, distracted driving occurs when attention is taken away from the primary task of safe driving towards a competing secondary activity (Regan, Hallett & Gordon in 2011 Cunningham, Regan, & Imberger, 2017). Secondary activities are varied and include looking at mobile devices (e.g. phones, GPS devices, tablets/computers), interacting with passengers (e.g. peers, children), and cognitive 'mind off the road' distractions (Goodsell et al., 2019).

This scoping review is designed to map the Australian and international literature on distracted driving within four key themes: (1) human behaviour, (2) policies that regulate distracted driving, (3) technologies designed to mitigate distracted driving, and (4) legal and enforcement frameworks that provide the context for enforcement practices. The fourth theme (the legal and enforcement framework) will be supplemented through a separate but interrelated project comprising interviews with key industry professionals and government officials (See protocol for interviews project).

A preliminary search for existing scoping reviews in the field of distracted driving was conducted via Web of Science, Scopus, Proquest, Informit (including CINCH), Google Scholar, and TRID. No existing scoping reviews were found however the searches located a series of other literature reviews, mostly from the time period 2010-2020, although some earlier studies were also found (see for example Eby & Kostyniuk, 2003; Kircher, 2007; Ramney, 2008). A majority of the later studies were from the USA (Caird & Horrey, 2017; Classen et al., 2019; Limrick, Lambert, & Chapman, 2014; Qi, Vennu, & Pokhrel, 2020; United States Department of Transportation, 2011), while others limited their reviews to mobile technologies (Goodsell et al., 2019; Oviedo-Trespalacios, Haque, King, & Washington, 2016; Stavrinos, Pope, Shen, & Schwebel, 2018). A recent study reviewed the literature relating to known countermeasures (Arnold et al., 2019) while another was limited to engineering factors contributing to distracted driving and possible solutions (Chand & Bhasi, 2019). Two very recent reviews of the literature were located however these were selective in scope (Goodsell et al., 2019; Qi et al., 2020).

Goodsell et al's report (Goodsell et al., 2019) was prepared for the Australian government's National Transport Commission (NTC) and examines the scientific literature on driver distraction affected by in-vehicle and mobile devices. The report answers four questions: (1) how does technologically related distraction affect safety, (2) to what extent does technologically based distraction contribute to road trauma in Australia, (3) how is technologically based distraction identified and measured and (4) what guidelines have been developed to reduce the impact of these technologies. Thus, Goodsell et al's report centres primarily on human-machine interface (HMI) technologies and examines moderating factors like driver characteristics and driving demand. Qi, Venuu, & Pochrel's report (2020) was commissioned by the Illinois Center for Transportation and summarises distracted driving research in the USA however some international studies are also cited (see Lam, 2002 in Qi et al., 2020). The report includes discussion on research methodologies used to detect distracted driving, factor analysis, impact on road safety, current laws and enforcement countermeasures in use within the USA, and mitigation technologies for personal and enforcement practice use. Qi et al also examine technologies that help employers reduce distraction in their fleet vehicles (e.g. TRUCE technology, Textalyzer) as well as educational and social media countermeasures.

The preliminary search for existing reviews is encouraging as it indicates a large body of work exists in this area. However, no international scoping review of the literature has been completed to date. Of the two recent reviews, Qi, Venuu, Pockrel's review (2020) is limited to the USA context while Godsell et al's Australian report (2019) is primarily concerned with detection methods (physiological indicators that measure cognitive load) and corresponding technological countermeasures. In contrast to these two reports, our intent is to follow a stepped overarching scoping review methodology using a detailed extraction form, category output tables/diagrams, and a narrative summary that thematically describes the international research in view of the research questions (Arksey & O'Malley, 2005; Peters et al., 2020).

Review questions

Four interrelated research question will guide the review. Questions may be altered later dependent on search results and consultation with AAA.

1. What is known in the academic and selected grey literature about 'distracted driving' and who (age groups, demographics, etc.) is more likely to drive while distracted?
2. What factors increase or decrease distracted driving behaviours (e.g. legislation, HMI technologies, psychosocial factors, cognitive factors)?
3. What countermeasures/interventions have been used internationally to decrease distracted driving? Have these countermeasures been evaluated?
4. What is known in the literature about the management of distracted driving in different workforces (e.g. light and heavy vehicle fleets). Could this knowledge be used to inform interventions, government policy, and road safety legislation generally?

Eligibility criteria

Concept: Distracted driving is when a secondary task interferes with the primary task of driving a vehicle. Secondary tasks include using mobile or wearable technology, eating, drinking, grooming, talking with passengers, as well as a range of out of vehicle distractions (e.g. looking at billboards or watching people on the side of the road). New technologies, for example mobile phones and in vehicle GPS devices, have led to increasing levels of distracted driving. For the purposes of this study the concept of distracted driving will include any secondary task/activity performed by the driver inside the vehicle. Drug and alcohol studies will not be included as these are activities that (usually) occur before taking control of a vehicle. Moreover, the field of alcohol and drug driving is considered a separate area of research within the literature.

Context: This review is commissioned by the AAA with the specific aim of mapping the Australian and international literature within four key areas (themes) of distracted driving research: human behaviour, policy and regulation, contributing technologies, and legal frameworks that shape enforcement practice. International research will be limited to countries with similar road traffic governance frameworks who have similar crash rates (deaths and serious injuries per 100,000 of population). For example, the United Kingdom, Canada, New Zealand, the Netherlands, and some Scandinavian countries.

Types of Sources: As scoping reviews are designed to map the existing literature, a broad range of sources will be considered. Exploratory studies, experimental studies, analytical observational studies, and qualitative studies that explore particular populations (e.g. gender-based or age specific research) will be in scope. Literature reviews that meet the inclusion criteria will also be included.

Methods

The scoping review will be conducted in accordance with Arksey and O'Malley's original method (2005) and the recent scoping review checklist provided through the Joanna Briggs Institute (Peters et al., 2020).

Search strategy: The search strategy will aim to locate both published and unpublished studies. A list of search terms will be developed after consultation with the Griffith subject librarian, project team members, and colleagues who work in the field of distracted driving. Indicative search terms used individually and in combination include road safety, drivers, driver distraction, secondary tasks, multitasking, mobile/cellular phones, social media, human machine interface, technology, psychosocial, cognitive function, intervention, countermeasure, policy, legal/legislative/law/policy framework. Search terms will be adapted to each database or information source. Once a shortlist of studies has been selected, reference lists will be screened for additional studies. Only studies published in English within the date range 2000-2020 will be included.

Databases to be searched include Web of Science, Scopus, Informit (including CINCH-Australian Criminology Database), EBSCO host bundle, Proquest bundle (Including Proquest Criminal Justice), TRID (Transport Research Board), and Google Scholar. As mentioned above, team members will also consult with colleagues who work in the field of distracted driving.

Study/Source of Evidence selection: Following the search, all identified citations will be collated and uploaded into the Endnote program, release 9.3 (Clarivate Analysis, PA, USA). Duplicates will be removed. Titles and abstracts will be screened by two project team members for assessment against the inclusion criteria. Potentially relevant sources will be retrieved in full and assessed in detail against the inclusion criteria. Any disagreements that arise between the reviewers at each stage will be resolved by discussion and/or consultation with a third researcher. An Excel worksheet will be used to record iterations of search strategy for each database search. An accompanying word document will document the rationale for changes and the outcomes of each stage of the research. These two documents will inform the final report writing and associated search flow diagram.

Data Extraction: Data will be extracted from the included papers by two reviewers using a data extraction tool (to be developed). The data extracted will include details about participants, concepts examined, context of study (e.g. jurisdiction, naturalistic/simulator study), countermeasures examined, legislation, methods used, and key findings.
Data Analysis and Presentation
The final report will include a narrative thematic summary, a series of tables and diagrams, a list of recommendations, and a complete reference list. The report will answer the three main research questions developed in collaboration with AAA. A separate project (mentioned above), involving interviews with industry professionals and policy experts, will feed into the theme development and final recommendations.

Funding

The project is funded by the Australian Automobile Association.

Conflicts of interest

None

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Contact us

CONTACT GRIFFITH UNIVERSITY

For questions about the report, please contact:

Dr Lyndel Bates

Senior Lecturer

Griffith Criminology Institute

Mt Gravatt Campus

176 Messines Ridge Road

Mt Gravatt QLD 4122

L.Bates@griffith.edu.au

For business development enquiries, please contact:

Griffith Enterprise

+61 7 3735 5489

Nathan Campus

170 Kessels Road

Nathan QLD 4111

Gold Coast Campus

Parklands Drive

Southport QLD 4222

For more information about Griffith University, please visit www.griffith.edu.au

Griffith UNIVERSITY

Queensland, Australia