The link between dangerous driving and other criminal behaviour: A scoping review

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Abstract:

Purpose: This paper explores the link between dangerous driving and other criminal behaviour.

Methodology: Arksey & O’Malley’s (2005) five step process for scoping reviews to identify, summarise, and classify identified literature was used. Within the thirty year timeframe (1990-2019), twelve studies met the inclusion criteria.

Findings: This review indicates that individuals who commit certain driving offences are more likely to also have a general criminal history. In particular, driving under the influence, driving unlicensed, and high-range speeding offences were associated with other forms of criminal behaviour. Seven of the studies mentioned common criminological theories; however, they were not integrated well in the analysis. No studies used explanatory psychosocial theories that investigate social and contextual factors.

Research implications: Future research in this area would benefit from exploring individual and social influences that contribute to criminal behaviour in both contexts.

Practical implications: There is the potential to develop an information-led policing approach in order to improve safety on the roads and reduce wider offending behaviour. However, it is critical that road policing officers continue to focus on ensuring the road system is as safe as possible for users.

Originality: Criminal behaviour on the roads is often seen as a separate from other types of offending. This paper explores if, and how, these two types of offending are linked.

Keywords: road policing; traffic enforcement; criminological theory; offender; deterrence theory; traffic offence; self-selection policing
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Introduction

International research considering the link between dangerous driving and other criminal behaviour has fluctuated over time. A few early academic studies in the 1960s and 1970s found that approximately 20% of serious traffic offenders also offended in general crime (see for example Eysenck, 1964; Willett, 1964). Some later studies in the 80s and 90s suggested dangerous driving offenders were more likely to also commit theft, burglary and assault (Argeriou et al., 1985; Sugg, 1998). Notwithstanding these examples, there is no consistent body of work in this area. A reason for this scarcity is how the flow of information may occur within different police agencies or that the examination of information systems and structures in these organisations has not attracted the interest of researchers. For instance, if different business units within police agencies operate on a siloed basis, bespoke operational datasets remain separate, making it difficult to achieve the full potential of these datasets in terms of tracing criminal histories or patterns of offending (Sheptycki, 2007; Griffiths et al., 2016). Although ethical and privacy considerations are central to data protection practices, information about crime patterns are lost. Actively tracing criminal histories would allow police agencies to use information-led surveillance and plan education interventions targeting recidivist offenders. This scoping review summarises the research in this area to provide a synopsis for road safety researchers, policy professionals in road policing and road agencies. This will provide a basis that can be used to develop interventions and operational procedures that can benefit both road safety and potential crime prevention.

Road policing

The use of road policing to change driver behaviour is a key strategy to reduce road crashes (Bates et al., 2012; Faulks et al., 2012). Deaths and injuries from transportation are a significant burden internationally and increased between 1990 and 2010 (Murray et al., 2012) although the rate of increase has stabilized in recent years (World Health Organization, 2018). Prenzler, Manning and Bates (2015) argue there is a need for greater attention on road safety from police agencies, particularly when the harm prevention perspective is considered. Road policing practice has an impact on perceptions of police held by individuals (Corbett, 2008; Wells, 2016). For instance, research has shown that even a brief encounter between police officers
and drivers where a breath sample is taken to assess if drink driving is occurring can result in more positive views of police officers and agencies depending on how the interaction occurs (Mazerolle et al., 2013).

**Road traffic offending and ‘dangerous driving’**

Many governments rely on traffic law enforcement to positively influence driver behaviour. Traffic law enforcement involves the establishment of laws that specify how drivers should control their vehicles, the policing of those laws and the application of penalties when individuals are caught breaking the laws (Bates et al., 2012). Thus, road traffic offending occurs when the traffic laws are broken. Depending on how traffic laws are drafted, it is possible for some actions to be considered both a traffic offence and general offence. Unlicensed driving is an example of this. For the purposes of this paper, dangerous driving is defined as operating a motor vehicle in such a manner that it is possible or likely that harm will occur to members of the public. This includes driving while impaired, high-range or intentional speeding and driving while unlicensed. We also define criminal behaviour as offences that have been or would be recorded by police agencies and is not a category of driving offence such as driving under the influence (DUI).

**Criminological theories commonly used in road safety studies**

Theories and conceptual frameworks are important as they explain and give meaning to complex phenomena and thus form the basis for effective interventions. There are a range of psychological theories that have been used to examine various types of road offending or road policing activities including the Theory of Planned Behaviour (Eren and Gauld, 2022; Sullman et al., 2021) and Akers’ social learning theory (Watling et al., 2018; Al-Reesi et al., 2015). While these, and other theoretical frameworks from the fields of behavioural science and psychology are relevant in criminal behaviours, common criminological theories used in the dangerous driving and road safety literature include deterrence theory, routine activity theory, the theory of self control and problem behaviour theory. This paper focuses on criminological approaches.

Deterrence theory and Routine Activity Theory are both sub-fields of Rational Choice Theory. Deterrence theory proposes that individuals are prevented from re-offending due to the certainty, swiftness and severity of that punishment (Homel, 1988; Bates et al., 2020). Stafford and Warr (1993) reconceptualised deterrence theory introducing the idea of *punishment*...
avoidance. Punishment avoidance occurs when an individual commits an offence but is not punished, thereby increasing the likelihood of reoffending. Within road policing, punishment avoidance is particularly relevant as the chance of being apprehended for some driving offences is low (Bates and Anderson, 2021). Routine Activity Theory proposes that crime is explained by the opportunities of everyday life and the rational choice to commit that crime (Clarke and Felson, 1993). Moreover, all crimes are mediated by context, cognitive impairment, and emotional state (O'Grady et al., 2000).

Unlike rational choice theories, the Theory of Self Control (originally called the General Theory of Crime) and Problem Behaviour Theory include individual and social context elements. Originally developed by Gottfredson and Hirschi (1990), the Theory of Self Control suggests that individuals gain self control with age due to biological changes (particularly hormonal changes), positive socialisation, and life experience. Individuals with low self control demonstrate developmental immaturity, find it difficult to delay immediate gratification of desires, resulting in poor decision-making and increased risk-taking (Buker, 2011). Keane et al. (1993) used the Theory of Self Control when examining DUI behaviours in Canada. They identified that those who exhibited a lifestyle lacking in self control were more likely to have higher levels of alcohol in their blood.

Jessor’s (1992) Problem Behaviour Theory suggests that dysfunctional and criminal behaviours are a product of person-environment interaction experienced in youth and young adult life. Jessor and colleagues’ earliest formulation of the theory originated in the early 60’s. Early work involved simple comparative studies between different ethnic groups - Native Americans, Hispanics, Whites/Anglos (Jessor et al., 1968). These early studies were cross sectional in design but did not investigate causal direction or impact. In contrast, later work (beginning in the mid late 60s and culminating in the late 70s) involved longitudinal studies of youth populations with the aim of identifying risk factors and protective factors for problem behaviours and outcomes. A later study extended the study population to young adult populations (Jessor et al., 1991). The most recent reformulation of the theory employs the language of protective factors and risk factors (Jessor, 1991). Jessor (1987) applied his theory to adolescents and identified that those who engaged in deviant behaviours, drinking, smoking and marijuana use were more likely to engage in risky driving behaviours.
**Self-selection Policing**

Road safety researchers are beginning to explore more nuanced frameworks to explain possible links between general crime and dangerous driving (Broughton, 2007; Rose, 2000; Roach and Pease, 2014; Roach, 2019). Self-Selection Policing (SSP) is an emerging framework that proposes potential serious criminal offenders can be identified by other offences they commit (Roach, 2019; Nunn, 2020). While the SPP framework was first posited by Roach and Pease (2014; 2016) and Roach (2019), it builds on previous work by Broughton (2007) and Rose (2000). These studies suggest recidivist criminals do not always specialise in a single offence (Roach and Pease, 2014) and offences can be used to predict more serious crime. Thus, a key benefit of this approach is that it identifies serious offences by focusing on smaller ‘trigger’ offences which may frequently be driving related. One conceivable benefit of this approach is that it focuses on individual behaviours such as erratic driving, an unroadworthy looking vehicle or other factors that draw attention to that vehicle and driver as opposed to demographic factors like race or gender (Roach, 2007).

A recent United Kingdom based study by Nunn (2020) examined the criminal histories of individuals who were arrested for drug driving in metropolitan London. New traffic offence data was compared to historical records within the national Criminal Record Office (CRO). Researchers logged number of previous arrests, types of offences, and convictions. Offence data was collated and coded, finding offenders were generally young (mean = 28.6) and male (96%). Within the sample, 82% had a prior criminal history with an average of 14 offences each. Of the individuals with a previous criminal record, 89% had a previous drugs offence and 54% of these had been convicted for a serious drugs offence. Moreover, 57% of those who had a previous offence were repeat offenders. Nunn concludes the study results are similar to Rose (2000) and Roach (2007) who found that disqualified drivers had extensive and varied criminal histories when compared to the general population. Moreover, Nunn argues the SSP framework is consistent with the constructs of Routine Activity Theory and Rational Choice, suggesting propensity to commit crime is based on the opportunities of everyday life. In short, the everyday habits and personal associations of criminality influence more offending. Nunn (2020) concludes that traditional interventions based on rehabilitation, education and deterrence may not be effective for recidivist serious offenders and suggests surveillance and strict enforcement may be a better approach.
This paper

A key role of police is to ensure compliance with the law (Tudor-Owen, 2021). Developing an understanding of the individuals who engage in dangerous driving behaviours and the association with other offending behaviours may reveal opportunities for enhanced intervention and therefore improved road safety and crime reduction. Given the relationship between these two behaviours is likely complex, the use of theories and conceptual frameworks can assist our understanding of this relationship. Thus, this scoping review locates and summarises the recent international literature regarding the link between dangerous driving and other criminal behaviour. The paper answers two main research questions:

RQ1: To what extent does the literature suggest a relationship between dangerous driving and other criminal behaviour?

RQ2: What criminological theories are used in the literature to explain dangerous driving?

Method

Scoping studies are designed to map the extant literature regardless of discipline, methodology, or the quality of the studies (Arksey and O'Malley, 2005). A scoping review is used to either (1) examine the extent, range, nature of research activity, (2) to determine the value of undertaking a systematic review, (3) to summarise and disseminate research findings, or (4) to identify research gaps in the existing literature. This paper addresses aims 3 and 4; to summarise prior work undertaken in this area and identify possible gaps in the literature. Scoping reviews differ from meta-analysis, another form of systematic literature review, in that they do not involve the use of statistical techniques (Arksey and O'Malley, 2005).

The authors followed the five stage scoping review guidelines originally outlined by Arksey and O'Malley (2005): (1) identifying the research questions, (2) identifying relevant studies, (3) study selection, (4) charting the data, and (5) collating, summarising, and reporting results. This methodology has been used in previous scoping reviews in road policing and road safety (e.g. Bates et al., 2019b; Bates et al., 2019a; Tabary et al., 2021) and other fields (e.g. Bates, Matthews, Simpson & Bates, 2016; Jones et al., 2016)(e.g. Bates, Matthews, Simpson & Bates, 2016; Jones et al., 2016). Studies were included if they contained empirical research or reviews of empirical research articles and examined the relationship between dangerous driving and other criminal behaviour. Peer reviewed journal articles and a range of grey literature (e.g.
conference papers and government reports) were selected if they met the inclusion criteria.

* Deleted studies included clinical trials, driver distraction studies, small sample investigations, technology studies (e.g. in vehicle telematics), simulator studies, other transport studies (e.g. bicycles), studies on economic effects of road traffic crashes, insurance/legal liability studies, road engineering studies, and urban planning studies.

Figure 1 charts the literature review process.

*Figure 1: Scoping review flowchart*
In order to identify relevant studies (step 2), a number of key terms were developed. Search terms were broad in nature to capture studies that focused on dangerous driving offending. Indicative search terms included: (dangerous driv*) OR (risky driv*) OR (road rage) OR (driv* reck*) OR hooning OR (boy race*) OR (aggressive driv*) OR (motor traffic accident) OR (road crash*) OR (driving behav*) AND death OR (serious injur*) OR (grievous bodily harm). Terms were used with key databases within the criminology and road safety fields including Web of Science, Scopus, Informit (including CINCH – Australian Criminology Database), EBSCOhost bundle, ProQuest bundle (including ProQuest Criminal Justice), TRID (Transport Research Board), and Google Scholar. Initial date limiters were set for studies (2009 to 2019). Additional limiters were used to exclude studies from irrelevant academic fields (e.g., clinical/technology focussed, road crash investigations, other forms of transport, economic cost of road traffic accidents, population studies, legal liability studies). After limiters were applied, the initial search located 727 articles relating to dangerous driving within the study field of enquiry.

The third stage of the scoping review was study selection. Screening occurred in several stages. Studies were imported into an Endnote library. 313 duplicates were removed resulting in 414 remaining studies. Studies were then manually screened for relevance. Titles were read by an experienced researcher MA and, if clarification was needed, LB was consulted. At this time, 143 irrelevant studies were deleted. Articles were retained if titles referred to dangerous driving or synonyms of dangerous driving. Articles were removed if they were in languages other than English, only vaguely related to the field of enquiry, or were from obscure sources. 271 studies remained in the Endnote library. At this point MA created a series of Endnote Groups to categorise the remaining ‘dangerous driving’ articles. MA read the abstracts of the 271 articles and identified 4 articles addressing the link, or relationship, between dangerous driving and other criminal behaviour in the original timeframe 2009-2019. These four articles were read in full by MA (including a citation search) identifying a further eight older articles (from the time period 1990-2009) that also met the study criteria. These eight extra articles were imported into the Endnote library.

As very few articles from the original 2009-2019 period met the inclusion criteria, MA and LB decided to extend the timeframe to include the eight earlier articles located during the citation search. One of the earlier articles (Palk and Davey, 2005) identified a limited number of articles in the earlier timeframe 1960-90; however, the researchers decided to limit the study time frame
to the 30-year period 1990-2019. Searching further back was considered inappropriate given the changes in policing approaches and criminal codes over time.

The fourth step involved charting the data. A data extraction template was created and included fields for author/type of study, title, method, summary/key findings/recommendations, jurisdiction, and theoretical framework. Finally, the data was collated, summarised, and analysed.

Results

The articles included in this scoping review use a range of measures to indicate the strength of association (or link) between dangerous driving and general crime offences. It is important to note that, as there are only 12 articles that address the research questions, it is not possible to draw definitive conclusions. Appendix A provides full summaries for each of the included studies in the review.

Link between dangerous driving and other criminal behaviour

Overall, the in-scope studies found a strong relationship between dangerous driving and other criminal behaviour (see Appendix A). Notably, high level speeding\(^1\) and DUI offenders were more likely to offend in other criminal domains (Bailey, 1993; Rose, 2000; Watson et al., 2015; Spolander, 1997; Spolander, 1994; Nunn, 2020), particularly violent crime, burglary, public disorder, and drug related crimes (Watson et al., 2015; Rose, 2000). Moreover, repeat dangerous driving offenders were more likely to commit other serious crimes (Broughton, 2007). Driving unlicensed was also strongly linked to other criminal behaviour (Broughton, 2007; Rose, 2000). The ‘driving unlicensed’ offence is variously classified as a driving offence and general criminal offence in different jurisdictions and contexts. However, this finding was more tenuous as individuals who lost their license and then committed a series of other crimes would, potentially, record a ‘driving while unlicensed’ offence each time they offend, (if they were found to be driving in the other offending events), possibly exaggerating the significance of the finding. Many of the studies included in the review found young, male drivers are more likely to drive dangerously, offend in both criminal spheres, and re-offend (Rose, 2000; Spolander, 1997; Nunn, 2020).

\(^1\) The definitions of high level speeding may differ between studies. However, one example is exceeding the speed limit by more than 30km/hr (Watson, et al., 2015).
**Geographic representation**

Overall, the studies had wide geographic representation with research occurring in New Zealand (Bailey, 1993), Australia (Palk and Davey, 2005; Brace et al., 2009; Watson et al., 2015), Sweden (Spolander, 1997; Spolander, 1994), the United States (Giacopassi and Forde, 2000), the United Kingdom (Rose, 2000; Broughton, 2007; Nunn, 2020; Roach, 2019), and the Netherlands (Junger et al., 2001). Most studies occurred in the United Kingdom (n = 4), although there were three Australian studies.

**Methodologies used**

The included studies used a range of methodologies and measures. Most studies used existing datasets from government or law enforcement agencies (Spolander, 1997; Spolander, 1994; Giacopassi and Forde, 2000; Rose, 2000; Junger et al., 2001; Broughton, 2007; Watson et al., 2015; Bailey, 1993; Roach, 2019; Nunn, 2020). Although there were two reviews (Rose, 2000; Brace et al., 2009), one article included police interviews (Rose, 2000) and one involved a police task log (Palk and Davey, 2005). The Australian literature review provided a summary of the academic and grey literature in the pre-2009 timeframe (Brace et al., 2009).

**Socio-demographic factors**

The studies identified socio-demographic factors that were more likely to be linked to individuals that engaged in dangerous driving and other criminal behaviours. For instance, they were more likely to be young (Bailey, 1993; Spolander, 1997; Rose, 2000; Watson et al., 2015; Nunn, 2020), male (Spolander, 1997; Watson et al., 2015; Nunn, 2020), and in the case of Watson et al. (2015) hold an intermediate and/or a motorcycle licence. Three studies found that younger drivers were more likely to drive while under the influence of alcohol (Bailey, 1993; Spolander, 1994; Spolander, 1997).

**Types of driving offences**

The review identified studies that found a relationship between DUI and other criminal activity (see Table 1; Bailey, 1993; Spolander, 1997; Rose, 2000; Spolander, 1994; Nunn, 2020). For instance, Bailey (1993) found that DUI offenders were three times more likely than non-DUI offenders to commit other crimes, while Spolander (1997) found that DUI offenders are twice as likely to commit other crimes. Both studies compared government crime statistics in their
analysis. Similarly, Nunn (2020) investigated drug related driving offences in London and found that 82% of offenders had a prior criminal record with an average of 14 offences each.

Table 1 – Dangerous driving offences correlated with general crime

<table>
<thead>
<tr>
<th>Type of offence</th>
<th>Study/ies</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driving while unlicensed</td>
<td>Spolander 1997, Rose, 2000, Broughton, 2007</td>
<td>Driving unlicensed is sometimes considered a low-level driving offence AND a general criminal offence.</td>
</tr>
<tr>
<td>DUI (alcohol or drugs)</td>
<td>Bailey, 1993, Spolander, 1994, 1997, Rose, 2000, Nunn 2020</td>
<td>DUI is the driving offence most strongly associated with other criminal behaviour.</td>
</tr>
<tr>
<td>High level speeding</td>
<td>Watson et al, 2015</td>
<td>High-range speeding offenders more likely to have been in a crash or committed a non-traffic criminal offence.</td>
</tr>
<tr>
<td>Low level speeding</td>
<td>Bailey, 1993, Broughton, 2007</td>
<td><em>Frequent</em> low level speeding was not an indicator of other criminal behaviour.</td>
</tr>
<tr>
<td>Number of driving offences committed</td>
<td>Broughton 2007</td>
<td>Very strong relationship between frequency of unlicensed driving convictions and frequency of other crimes committed.</td>
</tr>
<tr>
<td>Traffic fatality rate (ecological data)</td>
<td>Gioacopassi and Forde, 2000</td>
<td>Relationship between traffic fatality rate and non-traffic homicide for both state and city level data in USA.</td>
</tr>
</tbody>
</table>

The relationship between driving unlicensed and other criminal behaviour is also identified as strong but perhaps more tenuous as unlicensed driving is considered both a driving offence and general criminal behaviour in some jurisdictions. For example, Spolander (1997) found that while individuals involved in vehicle crashes (who were convicted of dangerous driving) were more likely to have a non-traffic related criminal history, at the same time the most frequent criminal offence was ‘driving unlicensed’. Nonetheless Bailey (1993), Spolander (1997), Rose (2000) and Broughton (2007) all found a high correlation between dangerous driving and driving while unlicensed. Thus, unlicensed driving can perhaps be considered an indicator for lawlessness or general criminal behaviour. It is noteworthy to mention that jurisdictions may classify offences differently depending on a range of circumstances and legal structures. For example, in Queensland, Australia, there is a distinction between unlicensed driving and disqualified driving and each offence is categorised by circumstances of the offence. For
example, minor offences include not renewing a licence while major offences include driving unlicensed as a result of disqualification.

Many of the studies also identified high range speeding, high frequency traffic offending and driving causing death as highly correlated with general crime. While some studies did not find a link between speeding and other criminal behaviour (Bailey, 1993; Broughton, 2007), work by Watson et al. (2015) looked specifically at high range speeding offenders. The study found that repeat high range speeding offenders were more likely to have been in a crash in the preceding five year period and approximately one third had committed a previous non-traffic criminal offence. Broughton found a strong correlation between the number of driving offences committed and general criminal behaviour (Broughton, 2007). For example, individuals who were convicted of between four and eight non-motoring offences committed on average 21 times as many serious motoring offences as those that had zero non-motoring offences. In a study involving ecological data from US states in the time period 1985-1996, Giacopassi and Forde (2000) found a significant relationship between the rate of traffic fatalities and (non-traffic related) homicide. Giacopassi and Forde (2000) suggest that traffic fatalities are ‘indices of incivility and aggression’ (p. 402) or lawlessness leading to other serious crime.

**Types of criminal offences**

A broad range of criminal offences were linked with dangerous driving (see Table 2). For instance, both Bailey (1993) and Nunn (2020) found a link between driving under the influence and prior drug use. Additionally, those convicted for driving under the influence of alcohol had convictions for violence and anti-social behaviour (Bailey, 1993). Similarly, Spolander (1997) identified that individuals involved in motor vehicle crashes were more likely to have a non-traffic criminal history, for example driving unlicensed, theft, drug related crimes and driving under the influence.
Table 2 – General crime offences correlated with driving offences

<table>
<thead>
<tr>
<th>Type of criminal offences</th>
<th>Study/ies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burglary/theft</td>
<td>Spolander, 1997</td>
</tr>
<tr>
<td></td>
<td>Rose, 2000</td>
</tr>
<tr>
<td></td>
<td>Roach, 2019</td>
</tr>
<tr>
<td></td>
<td>Watson, 2015</td>
</tr>
<tr>
<td>Disorderly conduct</td>
<td>Watson, 2015</td>
</tr>
<tr>
<td>Drug offences</td>
<td>Bailey, 1987</td>
</tr>
<tr>
<td></td>
<td>Nunn, 2020</td>
</tr>
<tr>
<td></td>
<td>Rose, 2000</td>
</tr>
<tr>
<td></td>
<td>Watson, 2015</td>
</tr>
<tr>
<td></td>
<td>Roach, 2019</td>
</tr>
<tr>
<td>Driving unlicensed (considered a non-traffic</td>
<td>Junger et al, 2001</td>
</tr>
<tr>
<td>related crime)</td>
<td></td>
</tr>
<tr>
<td>Regulation offences (e.g. gaming, prostitution,</td>
<td>Watson et al, 2015</td>
</tr>
<tr>
<td>liquor licensing)</td>
<td></td>
</tr>
<tr>
<td>Vandalism</td>
<td>Junger et al, 2001</td>
</tr>
<tr>
<td>Violent crime</td>
<td>Bailey, 1997</td>
</tr>
<tr>
<td></td>
<td>Rose, 2000</td>
</tr>
<tr>
<td></td>
<td>Junger et al, 2001</td>
</tr>
<tr>
<td></td>
<td>Roach, 2019</td>
</tr>
</tbody>
</table>

Rose (2000) found a link between traffic offenders and serious crimes such as violence, burglary, robbery and drug offences. This finding is consistent with Junger et al. (2001) who found links between risky driving and violent crime, vandalism, property crime and non-serious traffic crime. In Nunn's study (2020) of drug driving offenders, over half of the sample had a previous serious motoring offence. Watson et al. (2015) found links with criminal offences, for example property crime, drug offences, disorderly conduct, assault and regulation offences. In the study conducted by Roach (2019), the most common offences linked with disqualified drivers was theft, violent offences, burglary, public disorder and drug offences.

**Criminological and other theories related to dangerous driving**

Road policing research studies do not always include a theoretical framework although exceptions do sometimes occur. Theoretical frameworks are often used in the field of
dangerous driving research examining particular behaviours (e.g. Watling et al., 2010; Sullman et al., 2021; Hill et al., 2021; Gauld et al., 2014) or demographic groups (e.g. Bates et al., 2017; Bates et al., 2016b; Truelove et al., 2021; Truelove et al., 2020). Of the 12 studies within this review, seven included a theoretical framework, although these were not always integrated within the analysis or discussion (see Table 3). For instance, Junger et al. (2001) mentioned Theory of Self Control and Cross-situational consistency of behaviour within the study’s literature review but did not comprehensively examine the data in relation to these concepts. Likewise, Giacopassi and Forde (2000) refer to the General Theory of Crime (also known as theory of self control or self control theory) in their literature review without applying it directly within their study.

A selection of the study authors integrated theories more comprehensively. For example, several authors asserted that Deterrence Theory is useful when considering effective sanctions to deter dangerous driving behaviours (Watson et al., 2015; Brace et al., 2009; Nunn, 2020). The overriding premise of classical deterrence theory is that sanctions must be swift, certain, and severe (Bates et al., 2020; Castillo-Manzano et al., 2019; Homel, 1988). Watson et al (2015) recommends the use of severe sanctions for serious offenders including vehicle impoundment, behavioural modification intervention programmes, and use of intelligent speed adaptation (ISA) devices. Likewise, Rational Choice Theory and Routine Activity Theory was used to help explain the link between serious traffic offending and other crime. In one Australian study Palk and Davey (2005) used modified police activity logs to map a range of criminal behaviours in several areas of South East Queensland. Palk and Davey (2005) found that time and place considerations could provide police with predictive patterns for planning surveillance and countermeasures in both general and traffic related crime. Moreover, the authors found that serious offenders are likely to offend opportunistically (through rational choice) across many areas of crime (cross situational consistency).
### Table 3 – Theories used in review studies

<table>
<thead>
<tr>
<th>Theories</th>
<th>Study/ies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crime pattern theory</td>
<td>Palk &amp; Davey 2005</td>
</tr>
<tr>
<td>Cross-situational consistency</td>
<td>Junger et al, 2001</td>
</tr>
<tr>
<td></td>
<td>Palk &amp; Davey, 2005</td>
</tr>
<tr>
<td>Deterrence theory</td>
<td>Brace et al, 2009</td>
</tr>
<tr>
<td></td>
<td>Watson et al, 2015</td>
</tr>
<tr>
<td></td>
<td>Nunn, 2020</td>
</tr>
<tr>
<td>Hierarchical approach</td>
<td>Brace et al, 2009</td>
</tr>
<tr>
<td></td>
<td>Palk &amp; Davey 2005</td>
</tr>
<tr>
<td>Problem behaviour theory</td>
<td>Brace et al, 2009</td>
</tr>
<tr>
<td>Rational choice theory</td>
<td>Palk &amp; Davey, 2005</td>
</tr>
<tr>
<td>Routine activity theory</td>
<td>Palk &amp; Davey, 2005</td>
</tr>
<tr>
<td>Self-selection policing *</td>
<td>Broughton, 2007</td>
</tr>
<tr>
<td></td>
<td>Nunn 2020</td>
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<td></td>
<td>Roach and Pease 2016</td>
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<td>Roach, 2019</td>
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<td></td>
<td>Rose, 2000</td>
</tr>
<tr>
<td>Theory of self control/</td>
<td>Giacopassi &amp; Forde, 2000</td>
</tr>
<tr>
<td>General theory of crime **</td>
<td>Junger et al, 2001</td>
</tr>
</tbody>
</table>

* SPP was first posited by Roach and Pease (2016) and Roach (2019) however it builds on previous work by Broughton (1997, 2007) and Rose (2000).

** Hirschi and Gottfredson originally developed the General Theory of Crime (1990). The theory is also known as the theory of self control and the self control theory of crime.

The Theory of Self Control (General Theory of Crime) suggests that those who engage in risky driving behaviours may also engage in other criminal behaviour (Gottfredson and Hirschi, 1990). Junger et al. (2001) examined the premise that behaviour is consistent across life domains, demonstrating links between dangerous driving and other forms of violent crime. While explaining the association between life domains is strong, Junger argues that underlying/hidden psychosocial variables should be examined before assuming broad consistency or designing particular interventions. Likewise, Problem Behaviour Theory is useful within the context of dangerous driving as it emphasises that problem behaviour is part of a multifaceted system, containing other challenging and standard behaviours as well as
contexts, values, and emotions (Jessor, 1992). In their 2009 review, Brace and colleagues discussed a range of variables associated with recidivist criminal behaviour including alcohol consumption, ethnicity, and socio-economic factors. Brace suggests that while studies show a positive relationship between traffic offences and other serious criminal behaviour, a partial explanation could be coincidence. For example, recidivist criminals may have higher exposure to traffic (speeding to exit a crime scene) perhaps explaining the relationship between general crime and dangerous driving.

**Self-Selection Policing Approach (SSP)**

Self-selection policing is an emerging theory that explores the relationship between offending in one area of crime and offending in another area. More specifically, the theory states that serious criminals can be identified by the other crimes they commit (Roach, 2019). In Roach’s (2019) study, 50 disqualified drivers in the United Kingdom were found to later commit serious non-traffic offences. Conversely, Rose (2000) and Broughton (2007) found individuals who committed serious crimes (e.g. theft and assault) also committed road offences. Roach argues that SSP could be used as a surveillance measure (trigger) for general policing although he identifies methodological barriers to this practice. For example, in some places, criminal databases are not formally linked, nor is data sharing a common practice between jurisdiction/authorities. However, the implementation of interventions based on SSP would need careful consideration to ensure that over-policing or criminalization of traffic offences does not occur.

**Discussion and conclusion**

A relatively small number of studies (n=12) in the 30-year study period addressed the two research questions, suggesting that a systematic review is not warranted at this time. Moreover, the 12 studies used a variety of methodological approaches and can therefore not be combined in a formal statistical meta-analysis. However, in the future, as more research is published in the area, this scoping review can inform the development of criteria for a systematic review.

The key finding of this paper is that individuals who commit a range of road offences also commit other crime. Criminal offences linked with dangerous driving are varied and include other more serious driving offences, drug offences, violent crimes, vandalism, and property crimes. Driving unlicensed is also strongly associated with other criminal behaviour, however this association is more contentious. The findings imply a potential to develop road policing
interventions that target both road offending and general crime thereby increasing both road and community safety.

Given that several studies in this review identified a link between driving under the influence of alcohol and/or drugs and crime, there is scope to develop a greater understanding of this issue. There are two ways in which psychoactive substances can affect criminal behaviour (Brochu et al., 2001; Armiyau et al., 2017). First, when individuals become intoxicated, they act differently than when they are sober, and are more likely to make inappropriate choices. Second, individuals who are addicted to substances may require large amounts of money, possibly obtained through criminal means, to sustain this addiction (Armiyau et al., 2017). However, the relationship between drugs and crime is not direct or simple (McBride and McCoy, 1993). Goldstein (1985) examined the links between drugs and crime. He suggested that they were linked in three ways (1) psycho-pharmacologically (2) economic compulsively and (3) systematically. Future research could explore this relationship in greater depth in relation to criminological, developmental, behavioural, and psychosocial theories within a dangerous driving context.

There are many different types of unlicensed driving including those with disqualified and cancelled licenses, those who have never been licensed, and those with an expired license. Research suggests that unlicensed drivers should not be viewed as a homogenous group as crimes vary from minor to more serious offences (Watson, 2002). Moreover, driving unlicensed is sometimes classified as a road traffic offence and, at other times, a general criminal offence. This lack of consistency has the effect of ‘muddying the waters’ when comparing the two areas of crime, as the same crime is sometimes counted twice. Spolander (1997), Rose (2000) and Broughton (2007) found a strong relationship between driving unlicensed and more serious criminal behaviour in the United Kingdom. Nonetheless, understanding jurisdictional differences in criminal codes is fundamental to comparative criminal analysis in order to avoid misleading conclusions. Therefore, a possible future area of research is mapping and comparing the laws and regulations relating to road offences internationally.

Many of the studies in this review used administrative datasets but did not include psycho-social variables. This limitation is concerning as prior research indicates a strong association between psychosocial variables (e.g. sensation seeking), risky driving and other criminal behaviours (e.g. Horyniak et al., 2016; Burt and Simons, 2013). Moreover, general anti-social
behaviour and its determinants (e.g. socio-economic status, poor parenting, and cultural context) are also associated with serious road offences and general crime (McGee and Farrington, 2019). Future research should address this gap by including survey methodologies where behavioural and social factors are compared to official datasets. Additionally, future research could also include geographic factors (see Saeed et al., 2020: for examples; Caetano et al., 2020) and opportunity structure variables in order to more thoroughly explore routine activities and rational choice perspectives.

While psychosocial variables were not generally included in study methodologies, approximately half of the studies (n=7) applied theoretical constructs. Deterrence Theory underpins many road policing initiatives (e.g. Armstrong et al., 2018; Castillo-Manzano et al., 2019; Freeman et al., 2015; Truelove et al., 2017; Bates and Anderson, 2021) however it was mentioned in only three of the studies and, in these cases, only to provide background on conventional road rule enforcement practices. Conversely, some authors referred to a range of behavioural and criminological theories to account for their findings. For example, the General Theory of Crime and Routine Activity Theory were used to explain possible motivational and contextual factors associated with criminal behaviours. In a similar vein, the SSP framework contextualises patterns of crime within broader criminological theories (Roach, 2019; Nunn, 2020). Future research could continue to explore the SSP framework in jurisdictions outside of the UK. However, as noted by Brace et al. (2009) approval to link crime statistics across criminal domains may be limited by state privacy laws and institutional ethics processes.

Moreover, other theories and frameworks within road policing could also be considered. For instance, a number of studies have used a procedural justice framework within road policing (e.g. Mazerolle et al., 2015; Mazerolle et al., 2012; Barkworth and Murphy, 2015; MacQueen and Bradford, 2015; Bates et al., 2016b) and other policing contexts (e.g. Sargeant et al., 2018; Woo et al., 2018; Murray et al., 2021; Sunshine and Tyler, 2003). Procedural justice refers to the perceived fairness of laws and regulations and treating potential offenders with respect and dignity during police encounters. Similarly, the third party policing framework, where police use legal levers to enlist organisations or individuals to undertake enforcement actions, has been explored in both road policing (Belsham et al., 2020; Belsham et al., 2019) and broader criminological contexts (e.g. Webster, 2015; Webster et al., 2018; Manning et al., 2016; Mazerolle et al., 2017). There may also be benefits in considering other psychological approaches such as Akers’ Social Learning Theory and the Theory of Planned Behaviour.
These approaches may help develop our understanding of the psychosocial factors that influence these behaviours.

There are some limitations associated with this review. It is important to note that the datasets may not have been able to distinguish between when a dangerous driving offence was committed separately to a general criminal offence and when they occurred simultaneously. For instance, criminals may be caught speeding whilst transporting illegal substances. Additionally, the inclusion of more specific terms such as ‘speeding’, ‘drink-driving’ and ‘drug-driving’ may have yielded some additional articles. However, the use of citation and reference list searches aimed to address this issue. Finally, the term ‘dangerous driving’ could be interpreted differently in a range of contexts. This may have affected the results of this scoping review.

This review has several key implications. The results of the scoping review show a link between individuals that offend both on the road and in other contexts. Given this, it appears possible to develop an information or intelligence led approach to target interventions that have a dual objective of reducing risk on the road and crime more generally through focused strategies that prioritise individuals who are represented in both categories of offending. For instance, intelligence officers within Road Policing Units could investigate whether individuals who commit large numbers of traffic crimes or specific traffic offences associated with criminal offending are engaged in other criminal activities. This approach could be informed by a conceptual framework such as SSP. However, it is critical that there is a still a key focus from police officers working on the roads to ensure that the road system is as safe as possible for drivers and other road users. It is also recommended that existing education programs designed to reduce drink driving or other unsafe road behaviours by repeat offenders (Ferguson et al., 1998; Bamford et al., 2007) are modified slightly to also deliver strategies to reduce criminality more generally. Importantly, to continue to build the evidence base, the effectiveness of these alterations or additions would need to be evaluated.
References


## Appendix A

### Major Studies Discussing the Relationship between Dangerous Driving and Other Criminal Behaviour (1993-2019)

<table>
<thead>
<tr>
<th>Author Type of study</th>
<th>Title</th>
<th>Method</th>
<th>Summary/key findings/recommendations</th>
<th>Jurisdiction/Organisation</th>
<th>Theories/fram eworks</th>
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<tbody>
<tr>
<td>Bailey (1993) Conference paper</td>
<td>Criminal and traffic histories, blood alcohol and accident characteristics of drivers in fatal road accidents in New Zealand.</td>
<td>Matched data from NZ Ministry of Transport, criminal enforcement agency, and post-mortem records held by author. Analysis of traffic and criminal convictions (before and after) of drivers involved in serious or fatal crashes in 1986 (n=395).</td>
<td>The author found a high correlation between DUI and other criminal activity (factor of 3 to non-DUI drivers). Little correlation between previous conviction for speeding and involvement in a serious crash.</td>
<td>New Zealand Institute of Environmental Health &amp; Forensic Sciences</td>
<td>None mentioned</td>
</tr>
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<td>Author Type of study</td>
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<tr>
<td>Spolander (1994) Government report</td>
<td>Crime records of drunken drivers involved in traffic accidents. A study of 30,000 motor vehicle drivers.</td>
<td>Statistical analysis. Population 30,000 drivers.</td>
<td>Eight out of 10 DUI drivers are reoffenders. DUI offenders are three times more likely (than those without a crash history) to have a criminal history. DUI offenders are twice as likely as non-DUI offenders to have a criminal history. DUI offenders have 17 time more likely to have a criminal record than general non-offenders.</td>
<td>Sweden Department of Statistics</td>
<td>None mentioned</td>
</tr>
<tr>
<td>Spolander (1997) Government report</td>
<td>Crime records of drivers of motor vehicle accidents: A comparison of accident involved and accident-free drivers.</td>
<td>Statistical analysis. 5-year period before crash Population 20,000 drivers.</td>
<td>Individuals involved in various types of motor vehicle crashes are more likely to have a non-traffic related criminal history. The highest correlation is between DUI drivers and other criminal histories. Most DUI offenders are male (90%) and below 25 years (30%) and of these 54% had a previous criminal history. The most frequent criminal offence is driving unlicensed. Other frequent types of crimes are theft, drug related crimes and DUI.</td>
<td>Sweden Department of Statistics</td>
<td>None mentioned</td>
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<tr>
<td>Giacopassi and Forde (2000) Peer reviewed academic journal</td>
<td>Broken windows, crumpled fenders, and crime.</td>
<td>Homicide and traffic fatalities were compared from a combined sample of 104 cities during the years 1985-1996. Ecological data from US states and larger cities (pop more than 150,000).</td>
<td>Significant relationship between traffic fatality rate and the homicide rate. Stronger in the later years of the study.</td>
<td>USA University of Memphis University of Chicago</td>
<td>General theory of crime</td>
</tr>
<tr>
<td>Rose (2000) Government briefing note</td>
<td>Criminal Histories of Serious Traffic Offenders.</td>
<td>Statistical analysis. Interviews with police officers. Comparison between national survey on crime and crash data. Sample of 42,000 offenders (March-Nov 1986).</td>
<td>Results show many traffic offenders also commit serious crime (violence, burglary, robbery, drug offences). Sociodemographic profiles were predictors in criminal behaviour. DUI offenders and unlicensed drivers were more likely to also have other criminal convictions.</td>
<td>United Kingdom Home Office</td>
<td>None mentioned</td>
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</table>
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<tr>
<td>Junger (2001) Peer reviewed academic journal</td>
<td>Crime and Risky Behaviour in Traffic: An Example of Cross-Situational Consistency.</td>
<td>Log-linear analysis. Compared relationship between dangerous driving and other criminal behaviour. Random sample of 1,843 persons involved in 1,000 crashes from two police databases (controlled for exposure, gender and age).</td>
<td>Dangerous drivers were on average significantly more likely to have a criminal history. Persons with recorded risky driving behaviour had an odds ratio of 2.6 for violent crime offences, 2.5 for vandalism, 1.5 for property crime, 5.3 for other traffic crime.</td>
<td>The Netherlands Utrecht University</td>
<td>Cross-situational consistency of behaviour. Self control theory</td>
</tr>
<tr>
<td>Palk and Davey (2005) Conference Paper</td>
<td>A comparative analysis of the nature and extent of traffic offences and their relationship to other non-traffic offences.</td>
<td>Comparative analysis. 5-week period police activity log.</td>
<td>The study logged all offences in the same location over a 5-week period. Findings suggest all types of offences occur during similar time/place.</td>
<td>Gold Coast, Australia Queensland University of Technology</td>
<td>Crime pattern theory Routine activity theory Rational choice theory</td>
</tr>
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<td>Author Type of study</td>
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<td>Broughton (2007) Peer reviewed Academic Journal</td>
<td>The correlation between motoring and other types of offence.</td>
<td>Statistical analysis. Matching Driving and Vehicle Licensing Agency (DVLA) and Home Office data Sample of over 50,000 drivers (1999-2003)</td>
<td>Strong correlation between number of driving offences and general criminal behaviour. Driving while unlicensed offenders were more likely to commit other crimes. Speeding was not a predictor of non-traffic offences.</td>
<td>United Kingdom Transport Research Laboratory</td>
<td>None mentioned</td>
</tr>
<tr>
<td>Author Type of study</td>
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<tr>
<td>Watson et al (2015) Peer reviewed journal article</td>
<td>Profiling high-range speeding offenders: Investigating criminal history, personal characteristics, traffic offences, and crash history.</td>
<td>Literature review and statistical analysis. Logistic regression/multivariate analysis. Analysis of three cohort within 84,456 offenders (1996-2007): (1) repeat high-range offenders (2) once only low range offenders (3) other offenders (at least one mid or high-range offence)</td>
<td>In a subsample 1000 speeding offenders 30.4% had a previous criminal offence (e.g. property crime, drug offence, disorderly conduct, assault, regulation offences)</td>
<td>Queensland, Australia Queensland University of Technology</td>
<td>Deterrence theory</td>
</tr>
<tr>
<td>Roach (2019) Peer reviewed journal article</td>
<td>Self-Selection Policing and the disqualified driver.</td>
<td>Literature review and pilot study. Examines 50 disqualified drivers’ criminal histories.</td>
<td>Average of 14 recorded offences per disqualified driver. Only 7 had no other criminal histories. Most common offences were theft, violent offences, burglary, public disorder, drug offences.</td>
<td>United Kingdom University of Huddersfield</td>
<td>Self-selection policing theory</td>
</tr>
<tr>
<td>Author Type of study</td>
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<td>Nunn (2020) Peer reviewed journal article</td>
<td>The criminal histories of drug-drive offenders.</td>
<td>Literature review and statistical analysis. Data sample – individuals arrested for drug driving (2015 – 2016) Compared data sample to previous criminal histories (including drug related offences)</td>
<td>During the study period there were 842 arrests 82% had a previous criminal record with an average rate of 14 offences each. Most had previously committed another drug related offence. 53% had a previous serious motoring offence.</td>
<td>United Kingdom Loughborough University</td>
<td>Deterrence theory Routine activity theory Rational choice theory Self-selection policing theory</td>
</tr>
</tbody>
</table>