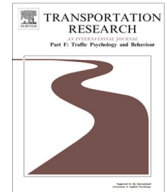




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## Time to drive: Present vs. future orientation and self-reported driving behaviour

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### ABSTRACT

Understanding the individual-level factors that influence driver decision-making and behaviour has important applied implications for driver training and intervention programmes. Time orientation is one factor that is known to influence behaviour across all domains of life, yet research examining the association between time orientation and driving behaviour specifically is limited. This study explores associations between driving behaviour and three indicators of time orientation; the Consideration of Future Consequences Scale (CFC), a newly-developed driving-specific CFC scale (CFC-driving), and the Mindfulness Attention Awareness Scale (MAAS), in a sample of 386 adult drivers. The aims were: (a) to explore associations between the CFC and both risk and safety-related driving behaviours; (b) to examine domain specificity in CFC in relation to driving; (c) to explore associations between trait mindfulness and driving behaviour; and (d) compare the predictive utility of the CFC-driving and the MAAS measures, as each capture a distinct facet of present orientation. Findings support an overall association between time orientation and driving behaviour, and evidence the utility of a driving-specific CFC measure over a general measure. The CFC-driving subscales differentially predicted driving behaviours. Trait mindfulness significantly predicted both risk and safety-related driving behaviour independent of the CFC-driving subscales. The research has applied implications for the development of driving safety campaigns and interventions that target risky driving behaviour, as well as theoretical implications for time orientation conceptualisation and measurement.

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## 1. Introduction

According to the [World Health Organization \(2015\)](#), more than 1.2 million people die, and between 20 and 50 million people sustain non-fatal injuries, as a result of road-traffic accidents each year. Some road-traffic accidents occur as a result of unsafe road infrastructure or weather conditions ([Gopalakrishnan, 2012](#)). However, the majority can be attributed to driver behaviours such as speeding, drink driving, driving unsafe vehicles, or driver distraction ([WHO, 2015](#)). Understanding the individual level factors that influence both positive and negative driving behaviour is critical for informing driver education and training programmes, legislation and media campaigns. The current study examines a construct that has been somewhat neglected in the driving-safety literature: Time orientation.

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### 1.1. Time orientation and driving

Driving is a domain that encompasses a complex collection of behaviours that require intentional decision-making, both behind the wheel (e.g. deciding whether to speed up or slow down when approaching a traffic light), and independent of the driving task itself (e.g. decision-making regarding seatbelt use). When deciding whether to perform a particular behaviour, individuals often engage in a decision-making process whereby the present and/or future costs and benefits of the behaviour are evaluated. There are individual differences in the extent to which individuals consider and value the present and the future, a concept known as time orientation (Van Beek, Handgraaf, & Antonides, 2017). Although a number of time orientation conceptualisations and measures currently exist (Van Beek et al., 2017), the most widely studied aspect is the Consideration of Future Consequences (CFC; Strathman, Gleicher, Boninger, & Edwards, 1994). Defined as “the extent to which people consider the potential distant outcomes of their current behaviours and the extent to which they are influenced by these potential outcomes” (p.743), the construct is measured using the 14-item CFC scale (Joireman, Shaffer, Balliet, & Strathman, 2012; Strathman et al., 1994). The CFC can be conceptualised as either a unidimensional or a bidimensional construct. In the unidimensional conceptualisation, items that measure concern for immediate behavioural outcomes are reverse scored and summed (or averaged) with the remaining future CFC items. As such, individuals receive one total CFC score that represents the extent to which they consider future behavioural outcomes (low to high). Alternatively, the bidimensional conceptualisation consists of two related, yet distinct, 7-item subscales; the CFC-immediate subscale (CFC-I), where high scores represent greater concern for short-term outcomes (i.e. present orientation), and the CFC-future subscale (CFC-F), where high scores represent greater concern for future outcomes (i.e. future orientation). The distinction between the CFC-I and CFC-F subscales holds theoretical implications for increased understanding of the mechanisms through which the CFC influences decision-making and behaviour; it is possible that some behaviours are predominantly driven by concern for either immediate or future consequences. Converging evidence seems to suggest that the construct indeed consists of two factors (e.g. Joireman, Kees, & Sprout, 2010; Joireman et al., 2012; McKay, Percy, & Cole, 2013; McKay, Perry, Percy, & Cole, 2016; Milfont, Vilar, Araujo, & Stanley, 2017). However, debate regarding the dimensionality of the scale is on-going (Crockett, Weinman, Hankins, & Marteau, 2009; Hevey et al., 2010; Petrocelli, 2003; Rappange, Brouwer, & Van Exel, 2009; Ryack, 2012).

Studies have found significant associations between CFC, decision-making and behaviour across a range of domains, including health behaviour, environmental behaviour and spending behaviour (for a review, see Joireman & King, 2016). Future-oriented individuals are more likely to consider the long-term outcomes associated with a given behaviour, and findings typically show significant associations between high CFC (or CFC-F) scores and protective behaviours which encompass long-term benefits (e.g. physical exercise; Ouellette, Hessling, Gibbons, Reis-Bergan, & Gerrard, 2005). Alternatively, present-oriented individuals tend to prioritise maximising immediate benefits (Strathman et al., 1994), and researchers typically report significant associations between low CFC (or high CFC-I) scores and risk behaviours that encompass immediate pay-off (e.g. cigarette smoking; Daugherty & Brase, 2010). Similar to behaviours in other domains such as health, the outcomes associated with driving risk and safety behaviours are temporally situated (i.e. outcomes that can be classed as either immediate or future). Yet research exploring the association between CFC and driving behaviour specifically has been relatively limited, despite a rational theoretical basis for which individual differences in CFC may influence driver behaviour. A driver who considers future consequences may be more likely to engage in protective driving behaviours for which the associated outcomes are predominantly long-term (e.g. frequent tyre checking to avoid the consequences of wear and tear). Conversely, a driver who focuses on the immediate outcomes of some driving behaviours may place greater emphasis in immediate benefits of certain behaviours despite the associated risks (e.g. speeding to arrive at a destination faster, or eating when driving to satisfy hunger).

Of the handful of studies that have explored associations between CFC and driving behaviour, findings have been mixed. Moore and Dahlen (2008), and Wickens, Toplak, and Wiesenthal (2008) reported significant associations between low CFC scores and intentional driving violations. Alternatively, Lin (2009) and Piko (2008) failed to find an association between CFC and other risky driving behaviours such as drink driving and phone use when driving. Similarly, Daugherty and Brase (2010) found a positive association between high CFC scores and seatbelt use, whereas Piko (2008) did not. This inconsistency may be due to the nature of participant samples or driver behaviour assessment. For example, all four studies employed third level student or adolescent population samples with limited driving experience, and in three of the four studies, behaviours were combined to form a composite measure of driving behaviour rather than examined independently (e.g. phone use, drink driving and driving without a seatbelt measures were combined to create one total risk score). Equally, the contradictory findings may be due to CFC conceptualisation. Prior to the year 2012, few researchers distinguished between the CFC subscales, and all of the previously mentioned studies of CFC and driving behaviour were conducting using total CFC scores only. Similar to studies of credit card debt and impulsive spending (Joireman et al., 2010), it may be that some driving behaviours are driven by greater concern for either immediate or future consequences, a possibility which would have been overlooked in studies that did not test associations using CFC subscale scores.

The first aim of the current research is to explore associations between CFC (total and subscale scores) and driving behaviour more thoroughly by examining a range of risk and safety-related driving behaviours independently, using a broader sample of drivers. Based on the outline provided above, we formulated the following hypothesis:

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