



Personality domains and traits that predict self-reported aberrant driving behaviours in a southeastern US university sample

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ABSTRACT

Personality traits are meaningful predictors of many significant life outcomes, including mortality. Several studies have investigated the relationship between specific personality traits and driving behaviours, e.g., aggression and speeding, in an attempt to identify traits associated with elevated crash risk. These studies, while valuable, are limited in that they examine only a narrow range of personality constructs and thus do not necessarily reveal which traits in constellation best predict aberrant driving behaviours. The primary aim of this study was to use a comprehensive measure of personality to investigate which personality traits are most predictive of four types of aberrant driving behaviour (Aggressive Violations, Ordinary Violations, Errors, Lapses) as indicated by the Manchester Driver Behaviour Questionnaire (DBQ). We recruited 285 young adults (67% female) from a university in the southeastern US. They completed self-report questionnaires including the DBQ and the Personality Inventory for DSM-5, which indexes 5 broad personality domains (Antagonism, Detachment, Disinhibition, Negative Affectivity, Psychoticism) and 25 specific trait facets. Confirmatory factor analysis showed adequate evidence for the DBQ internal structure. Structural regression analyses revealed that the personality domains of Antagonism and Negative Affectivity best predicted both Aggressive Violations and Ordinary Violations, whereas the best predictors of both Errors and Lapses were Negative Affectivity, Disinhibition and to a lesser extent Antagonism. A more nuanced analysis of trait facets revealed that Hostility was the best predictor of Aggressive Violations; Risk-taking and Hostility of Ordinary Violations; Irresponsibility, Separation Insecurity and Attention Seeking of Errors; and Perseveration and Irresponsibility of Lapses.

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1. Introduction

Decades of scholarly research have indicated that descriptive dimensional personality traits (e.g., neuroticism, extraversion, conscientiousness) have tremendous predictive validity in terms of important life outcomes. For instance, large-scale longitudinal studies have found that personality traits are of at least equal predictive utility of mortality, divorce, and occupational attainment as cognitive variables (e.g., intelligence) and socioeconomic status (see Roberts et al., 2007, for a review). Within the road safety literature, several studies have investigated the relationship between specific personality traits and driving behaviour, for example, the relationship between narcissism and aggressive driving (Edwards et al., 2013). Such investigations allow researchers to identify individuals who are more likely to commit traffic violations and/or be

involved in road crashes, which is relevant for targeting interventions and strategies to reduce dangerous driving. These studies, while valuable, are limited in that they typically examine only a narrow range of personality constructs. This means that although they find associations between specific personality traits and driving behaviour, they do not necessarily reveal which traits are most predictive of aberrant driving behaviours. The current study therefore aimed to assess the relationship between personality and self-reported driving behaviour using a comprehensive personality inventory, to determine which facets of personality best predict distinct aspects of driving behaviour.

1.1. Measuring driver behaviour

Most research on personality and driving behaviour uses self-report measures of driving behaviour, because research probing individual differences in personality traits requires large sample sizes and most studies recruit several hundred drivers. It would be extremely labour-intensive and expensive to conduct these

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large studies using research methods that directly measure driving behaviour, such as driving simulators or on-road studies using instrumented vehicles. These methods are also limited in that they generally provide only a one-off measure of driving behaviour. Naturalistic driving studies (e.g., Klauer et al., 2014) involve continuous measurement of real-world driving over an extended time period and are therefore more representative of everyday driving behaviour, but are even more cost prohibitive. Some research has attempted to link personality to driving outcomes, specifically crashes and moving violations (i.e., tickets); however, these measures also have limitations, and self-reported crashes are subject to the same memory and response biases as self-report measures of driving behaviour. Although official crash records are considered more objective by some, they often represent underreports since not all crashes will be reported to police. Consequently, there is only a moderate correlation between official and self-reported crashes, with official vs. self-reported crashes capturing distinct event types (Arthur et al., 2001, 2005). Self-report measures of driving behaviour have been found to have reasonable validity (Lajunen and Summala, 2003), albeit with some limitations, and they represent the most cost-effective method of investigating individual differences in driving behaviour.

The most widely used self-report measure of driver behaviour is the Manchester Driver Behaviour Questionnaire (DBQ), which was developed in the UK (Reason et al., 1990), but has subsequently been adapted for use in different cultures and languages worldwide (e.g., Kong et al., 2013; Lajunen et al., 2004; Pearson et al., 2013; Sümer, 2003). Many versions have been used in research; scale length ranges from a 9-item Mini-DBQ (Martinussen et al., 2013a) to more than 100 items (Kontogiannis et al., 2002), with many studies including 24–28 items (e.g., Kong et al., 2013; Lajunen et al., 2004; Lawton et al., 1997a; Mattsson, 2012; Pearson et al., 2013; Schwebel et al., 2007; Sümer, 2003). Drivers are asked to report how frequently they engage in specific aberrant driving behaviours, which include both deliberate (e.g., disregarding speed limits) and non-deliberate (e.g., braking too quickly) acts. An initial factor analysis of the DBQ revealed three distinct dimensions of aberrant behaviour: deliberate “Violations”, dangerous “Errors” and relatively harmless “Lapses” (Reason et al., 1990). Extended versions of the DBQ often evidence a four-factor structure reflecting the addition of items that differentiate between two subtypes of violations: “Ordinary” highway-code violations and “Aggressive” interpersonal violations (Lawton et al., 1997b; Özkan et al., 2006a). Subsequent studies have confirmed the general DBQ factor structure in other European samples (Lajunen et al., 2004; Özkan et al., 2006a, 2006b), although the specific items comprising each factor may vary between samples (Mattsson, 2012). Some studies, particularly those sampling in languages other than English, have obtained different factor structures, for example, combining Errors and Lapses as a single “Mistakes” factor (Constantinou et al., 2011). Although factor composition varies, a consistent finding is that the obtained factors differentiate between deliberate acts (i.e., Violations, combining Aggressive and Ordinary Violations) and non-deliberate acts (i.e., Mistakes, combining Errors and Lapses). Some samples show adequate fit for a two-factor model comprising Violations and Mistakes; however, many samples obtain optimal fit for a four-factor model that further subdivides these higher-order factors although, as noted above, the composition of these factors is not always consistent (Lajunen et al., 2004; Özkan et al., 2006a; Mattsson, 2012).

Although the relationship between self-reported and actual driving behaviour is not perfect, due to the effects of response bias and flawed retrospective memory, some research indicates that DBQ subscales correlate with distinct aspects of on-road driving behaviour. In an instrumented vehicle study of 108 US drivers, Zhao et al. (2012) found that drivers scoring high on DBQ

Ordinary Violations had a more aggressive driving style, as they drove slightly faster on average, executed more lane changes, spent more time in the left lane and made more sudden accelerations. Drivers aged over 60 who scored high on DBQ Ordinary Violations also committed more hard braking events. Drivers scoring high on DBQ Lapses showed more variability in speed and steering wheel positioning, as well as more rapid throttle accelerations (Zhao et al., 2012). The pattern for DBQ Errors was less clear; this may be due to the researchers using primarily vehicle-based dependent measures, rather than behavioural measures such as eye-tracking (which would provide direct evidence of errors such as failing to check mirrors before executing a lane change).

1.2. Personality traits correlated with driving behaviour

Several previous studies have investigated zero-order correlations between personality traits and dangerous driving behaviours; many of these used the DBQ as the primary measure of driving behaviour. Some of the most common personality trait dimensions examined include sensation-seeking, aggression, anxiety and conscientiousness. The following review is not exhaustive, but focuses particularly on the major personality traits that have been explored as potential correlates of aberrant driving behaviour as measured by the DBQ.

1.2.1. Sensation-seeking and impulsivity

Sensation-seeking and impulsivity are commonly measured in conjunction with risky driving, on the assumption that individuals high on these traits are more likely to engage in risky behaviour in general (see Jonah, 1997, for a review). Small to moderate zero-order correlations have been found between aspects of sensation-seeking and impulsiveness (e.g., thrill and adventure seeking, disinhibition, nonplanning, attentional impulsiveness) and DBQ scores (Constantinou et al., 2011; Kong et al., 2013; Owsley et al., 2003; Pearson et al., 2013; Schwebel et al., 2006, 2007). Specifically, DBQ Violations have been associated with higher levels of thrill-seeking, impulsivity, disinhibition and negative urgency, whereas Lapses and Errors have been associated with lower attentional control but higher impulsivity and positive urgency. Sensation seeking and impulsiveness have also been found to be positively correlated with risky driving attitudes (Kong et al., 2013; Olstedal and Rundmo, 2006), self-reported risky and aggressive driving behaviour (Dahlen and White, 2006), driving offences (Constantinou et al., 2011; Dahlen and White, 2006; Furnham and Saïpe, 1993; Pearson et al., 2013) and both self-reported and police-recorded crashes (Dahlen and White, 2006; Iversen and Rundmo, 2002; Stevenson et al., 2001), either directly or indirectly (i.e., with the relationship mediated by aberrant driving behaviours).

1.2.2. Anger and hostility

There is a large literature on anger and driving, to the extent that several specific “driving anger” scales have been developed (Sullman and Stephens, 2013; Van Rooy et al., 2006). In relation to the DBQ specifically, trait anger has shown a moderate positive correlation with DBQ Total score (Kong et al., 2013). Trait aggression shows large correlations with both Ordinary and Aggressive Violations, and moderate correlations with DBQ Lapses and Errors (King and Parker, 2008; Schwebel et al., 2006). Social deviance, the tendency to commit illegal or fraudulent acts, shows similar patterns: moderate and extreme social deviance are both positively correlated with DBQ Violations and to a lesser extent DBQ Errors (Lawton et al., 1997b; Meadows et al., 1998). Extreme social deviance also significantly predicts crash rates both directly and indirectly, through violations (Meadows et al., 1998).

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