Safety Science 72 (2015) 153–159

Contents lists available at ScienceDirect

Safety Science

journal homepage: www.elsevier.com/locate/ssci

The expression of anger on the road

Mark J.M. Sullman

Research Group, School of Engineering, Cranfield University, MK43 0AL, United Kingdom

ARTICLE INFO

Article history:
Received 10 February 2012
Received in revised form 28 August 2014
Accepted 28 August 2014
Available online 25 September 2014

Keywords:
Driving anger
Anger expression
Driving behaviour
Angry drivers
Risky driving

ABSTRACT

This research used the Driving Anger Expression Inventory (DAX) to investigate the expression of driving anger amongst a sample of New Zealand drivers. Confirmatory Factor Analysis found that the data fitted a three factor solution, which consisted of: Verbal Aggressive Expression; Use of a Vehicle to express anger, and an Adaptive/Constructive factor. The Personal Physical Aggressive Expression factor was not supported in the present sample. However, in line with previous findings, the present research found that the two aggressive types of anger expression were significantly related to potentially crash related conditions, such as: losing control of the vehicle, loss of concentration and near-misses. The two aggressive types of driving anger were also positively related to trait anger and driving anger, while the Adaptive/Constructive factor was negatively related to both these variables. The present study also confirmed that those drivers who expressed their anger in an aggressive manner are more likely to be male and younger, while those who deal with their anger in a constructive manner were more likely to be older and female.

1. Introduction

Anger is one emotion that is commonly experienced while driving (Underwood et al., 1999). Although research has found that individuals are not more likely to experience anger while driving, than in non-driving situations, those individuals who reported high levels of anger are more likely to be outwardly aggressive when driving (Lawton and Nutter, 2002). This is perhaps one of the reasons that the issue of driving anger appears to have gained popularity amongst researchers over the last 15 years (e.g. Deffenbacher et al., 2001b; Maxwell et al., 2005; Parker et al., 2002; Underwood et al., 1999; Sullman, 2006; Sullman et al., 2007; Sullman and Stephens; 2013). Another reason for the increasing popularity of this topic is that research has found that angry drivers engage more often in aggressive and dangerous driving behaviours (Stephens and Groeger, 2011), putting themselves and others at risk (Deffenbacher et al., 1994; Deffenbacher et al., 2001b; Lajunen et al., 1998; Maxwell et al., 2005; Underwood et al., 1999). Research has also found significant relationships to exist between driving anger and crash related conditions, such as losing control of their vehicle, losing concentration, speeding, tailgating, near misses, and moving violations (tickets) (Deffenbacher et al., 2001b; Deffenbacher et al., 2003a; Deffenbacher et al., 2003b; Sullman et al., 2013).

Although a number of studies have investigated the situations which evoke anger amongst drivers (e.g. Deffenbacher et al., 1994; Lajunen et al., 1998; Parker et al., 2002; Stephens and Groeger, 2009; Sullman and Stephens, 2013), much less research has investigated how drivers react when angry. In order to measure the ways in which individuals respond to anger while driving Deffenbacher et al. (2002) developed the Driving Anger Expression Inventory (DAX). They found that drivers' reactions could be placed into four categories: Verbal Aggressive Expression (VAE) – which measures people's tendency to express their anger through verbally aggressive means (e.g. swearing at the other driver); Personal Physical Aggressive Expression (PAE) – which measures the ways in which the person uses themselves to express anger (e.g. shaking their fist); Use of Vehicle to express anger (UOV) – which measures how often drivers use their vehicle to express their anger (e.g. flashing their lights); Adaptive/Constructive Expression (A/C) – which measures constructive or adaptive behaviours the driver can make in potentially anger inducing situations (e.g. just ignore it). These four subscales have been found to have good internal reliability (range 0.80–0.90).

Although the four DAX subscales have good internal reliability, little research has factor analysed the scale. As few peer-reviewed studies have reported factor analysing the 49-item version of the DAX, there is some degree of uncertainty regarding the scale's underlying structure. Although the study which developed the DAX (Deffenbacher et al., 2002) subjected their data to factor analysis, this was a 62-item scale which was subsequently refined. Most of the following studies using the scale have used the item arrangement reported in the original research and have not subjected their data to any type of factor analysis (e.g. Dahlen and

E-mail address: m.sullman@cranfield.ac.uk

http://dx.doi.org/10.1016/j.ssci.2014.08.013
0925-7535/

Ragan, 2004; Deffenbacher et al., 2001a; Deffenbacher et al., 2003; Jovanović et al., 2011; Moore and Dahlen, 2008), or have factor analysed a slightly different version of the DAX (e.g. Herrero-Fernández, 2011; Villieux and Delhomme, 2010). For example, Villieux and Delhomme (2010) removed all items from the Personal Physical Aggression subscale (11-items) before attempting to fit a three factor solution to their data using CFA. Furthermore, Herrero-Fernández (2011) used a 53-item version of the DAX and fitted a five factor model using CFA. Lastly, Sullman et al. (2013) performed a CFA on the 49-items using Turkish taxi drivers and confirmed the four factor solution, after removing one item from the model. Therefore, although previous research has broadly supported the factor structure of the DAX, the evidence is not extensive.

Another issue surrounding research into the expression of driving anger is that most peer-reviewed research has focused mainly or exclusively on introductory psychology students (e.g. Dahlen and Ragan, 2004; Deffenbacher et al., 2001a; Deffenbacher et al., 2002; Deffenbacher et al., 2003; Deffenbacher et al., 2004; Deffenbacher et al., 2007; Esiyok et al., 2007; Herrero-Fernández, 2011; Moore and Dahlen, 2008; Villieux and Delhomme, 2010) who are not necessarily representative of the general population. Only two of the DAX studies did not rely on university students for their sample (Jovanović et al., 2011; Sullman et al., 2013). Furthermore, most of the research has been conducted in the USA (e.g. Dahlen and Ragan, 2004; Deffenbacher et al., 2001a; Deffenbacher et al., 2002; Deffenbacher et al., 2003; Deffenbacher et al., 2004; Deffenbacher et al., 2007; Moore and Dahlen, 2008). There are a small number of studies which have been conducted outside of America, including France (Villieux and Delhomme, 2010), Spain (Herrero-Fernández, 2011), Turkey (Esiyok et al., 2007; Sullman et al., 2013) and Serbia (Jovanović et al., 2011). As research has shown the level of driving anger differs between countries, as does the level of anger evoked by different types of situations (e.g. Deffenbacher et al., 1994; Lajunen et al., 1998; Sullman, 2006; Sullman et al., 2007), it is important to study additional countries.

Given the fact that most research has largely relied on university students (e.g. Dahlen and Ragan, 2004; Deffenbacher et al., 2004; Esiyok et al., 2007; Herrerro-Fernandez, 2011; Villieux and Delhomme, 2010) it is surprising that most research has found the expression of driving anger to differ with age. For example, using a sample of Serbian motor vehicle owners, Jovanović et al. (2011) found a significant negative relationship between age and the total of all the aggressive expression items. In terms of the individual DAX subscales, age was found to be negatively related to Personal Physical Aggressive Expression, Use of a Vehicle and Verbal Aggressive Expression, while Adaptive/Constructive expression was positively related to age (Deffenbacher et al., 2007). Furthermore, despite having a very narrow age range (18–25 years old), using a sample of French university students Villieux and Delhomme (2010) found age was negatively related to Using a Vehicle to express anger and positively related to the Adaptive/Constructive subscale. In addition, in a sample consisting of almost 75% university students, Esiyok et al. (2007) found that age was a significant predictor of two of the aggressive subscales. Furthermore, despite having a sample where 75% of the participants were 30 years old or younger, Herrerro-Fernandez (2011) also found significant differences by age for all but the Adaptive/Constructive subscale. In contrast, research by Moore and Dahlen (2008) found age was not a predictor of any of the DAX subscales. Perhaps the reason for the lack of consistency in the age differences is due to the relatively narrow age spreads in most of the previous research.

As with the research on driving anger, most research on the expression of driving anger has found sex differences. Several studies have found that females reported responding more often in an Adaptive/Constructive manner (e.g. Deffenbacher et al., 2004; Esiyok et al., 2007; Jovanović et al., 2011). Several studies have also found that males report more Personal Physical Aggressive Expression (e.g. Dahlen and Ragan, 2004; Deffenbacher et al., 2004; Esiyok et al., 2007). There were also some inconsistent findings, such as the fact that only Deffenbacher et al. (2004) found males reported Use of a Vehicle to express their anger more often than women and Dahlen and Ragan (2004) found that women reported more Verbal Aggressive Expression than men. Furthermore, there have also been a number of studies that have reported no sex differences (e.g. Deffenbacher et al., 2007; Moore and Dahlen, 2008; Villieux and Delhomme, 2010).

In addition to demographic variables, the DAX has also been found to be related to other important variables. As would be expected, trait anger and driving anger have been found to be positively correlated with the three aggressive types of anger expression and negatively correlated with Adaptive/Constructive expression (Deffenbacher et al., 2001a). Furthermore, the three aggressive types of anger expression have been found to be positively correlated with risky and aggressive driving behaviour (e.g. Deffenbacher et al., 2002; Jovanović et al., 2011). Verbal Aggressive Expression and Use of a Vehicle to express anger both had significant correlations with self-reported involvement in major accidents. Minor accidents, however, were most strongly correlated with Verbal Aggressive Expression of driving anger, as were close calls (Deffenbacher et al., 2001a). In addition, UOV and PAE were correlated with the most crash related to conditions, including risky behaviour and lost concentration (Deffenbacher et al., 2002). Given the relationships the DAX subscales have with variables important to the reduction of traffic crashes, the expression of driving anger appears to be an area worthy of further research.

Therefore, the present study aimed to broaden the knowledge regarding the expression of driving anger in a number of ways. Firstly, the research explored the factor structure of the DAX amongst a sample taken from the general population of New Zealand, a country not previously studied. Furthermore, the relationship the resultant factors had with a number of descriptive variables (e.g. age, gender, experience, speed and annual mileage), the 14-item unidimensional version of the DAS, the TAS and a number of driving related outcomes (e.g. crash involvement, tickets) were also tested. Finally the descriptive variables and the DAS were also used to investigate whether they were significant predictors of the DAX factors.

2. Method

2.1. Materials

The 49-item DAX was used to measure how drivers express their anger whilst driving (Deffenbacher et al., 2002). The scale presents 49 potential reactions to feeling angry while driving and respondents were asked to report how often they react in each of these ways on a four point scale (1 = Almost never, 4 = Almost always).

The 14-item Driving Anger Scale (DAS) was used to provide an overall measure of driving anger (Deffenbacher et al., 1994). The scale presents 14 different situations and asks participants to rate how angry each situation makes them feel on a scale ranging from 1 (Not at all) to 5 (Very much).

The 10-item Trait Anger Scale (TAS) was also used to measure general anger (Spielberger, 1999). The TAS measures how an individual generally responds when angry and is rated on a 4-point scale (1 = Almost never, 4 = Almost always).

The eight violation items from the Driving Behaviour Questionnaire (DBQ; Reason et al., 1990) were used to measure risky driving