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Road anger expression—Changes over time and attributed reasons

M. Møller*, S. Haustein

Technical University of Denmark, Department of Management Engineering, DK-2800 Kgs., Lyngby, Denmark

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ABSTRACT

Based on the results from three independent surveys conducted in Denmark in 2005, 2008 and 2016, this paper provides an overview of the development of road anger expression in general and in demographic sub-groups of road users. In addition, it investigates how people explain own and other people's road anger expression and if attributed reasons are related to demographic factors and level of anger expression measured based on the short form of the driving anger expression inventory (DAX-short). From 2005 to 2016 the percentage of people involved in anger expression incidents increased particularly in the densely populated Capital Region of Denmark. The increase was most pronounced for "yelling" and "threatening". Men were more often involved than women both as aggressor and as victim, but the gender difference decreased from 2008 to 2016. Generally, own anger expression was more often explained with getting frightened (non-hostile attribution), while anger expression by other road users was more often explained by not being able to control own anger or by wanting to show that one made a mistake (hostile attribution). However, people scoring high in aggressive anger expression often explained own anger expression by "not being able to control anger", thereby indicating self-reflection and a potential for behavioural change. Behavioural reactions to being frightened are to some extend mistakenly interpreted as expressions of anger by other road users. Results indicate that cognitive and behavioural interventions, possibly as part of the driver education, are relevant to reduce aggressive anger expression in traffic.

1. Introduction

Knowledge on anger and anger expression in traffic is important not only because being a victim of other road users' anger expression is unpleasant and has long lasting negative impact (Novaco et al., 1990), but also because it poses a risk towards road safety (Wickens et al., 2016).

Anger and anger expression in traffic has been addressed in numerous studies using a variety of methods such as diaries (e.g., Wickens et al., 2013), observations (e.g., Shinar and Compton, 2004), naturalistic driving (e.g., Precht et al., 2017), simulations (e.g., Deffenbacher et al., 2003a), surveys (e.g., Berdoulat et al., 2013; Hennesy, 2016; Parker et al., 2002), social media postings (e.g., Stephens et al., 2016), and meta-analysis (e.g., Bogdan et al., 2016; Nesbit et al., 2007; Zhang and Chan, 2016). Most studies focus on driver anger and so far, only few studies have addressed road anger in relation to other transport modes. Examples of the few exceptions include a study comparing anger levels of motorcyclists and drivers (Rowden et al., 2016), and a study comparing anger expression among drivers and cyclists (Møller and Haustein, 2017). In addition, a few studies have explored anger expression among professional drivers for example a study by Feng et al. (2016) on Chinese bus drivers, and a study by Sullman et al. (2013) on Turkish taxi drivers.

The concept of driver anger regards anger triggered off while driving and originally stems from the work of Deffenbacher and colleagues and their development of the Driving Anger Scale (Deffenbacher et al., 1994) and later on the Driving Anger Expression Scale (DAX) (Deffenbacher et al., 2002). Since then, the DAX has become one of the most commonly used measures of anger expression while driving (Stephens and Sullman, 2014), and has been used to identify differences in anger expression based on individual factors such as age, gender, personality and demographic factors (see Sullman, 2015).

Over the years, a relationship between anger and aggressive driving has been established and confirmed many times (e.g., Bogdan et al., 2016; Dahlen et al., 2005; Deffenbacher et al., 2003b; González-Iglesias et al., 2012; Lajunen and Parker, 2001). Furthermore, recent studies show a clear relationship between anger and increased accident risk in traffic (Kaiser et al., 2016; Wickens et al., 2016) thereby confirming the relevance to the area of road safety. This is further supported by a recent study by Precht et al. (2017) showing that the accident risk related to anger is based on deliberate and therefore changeable behaviours as opposed to unintended errors and mistakes.

To prevent risk increasing anger expressions, further knowledge is

* Corresponding author.
E-mail address: mette@dtu.dk (M. Møller).

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needed not only about the traffic situations in which anger appears, and the people likely to express their anger in an aggressive way, but also about the underlying individual motivations and psychological attributions. It is well known, that the interpretation of a situation influences behaviour so that hostile attributions are more likely to lead to aggressive behaviours compared to non-hostile attributions (e.g., Crick and Dodge, 1996; Lemerise and Arsenio, 2000). However, this knowledge has only been applied to the area of road traffic anger to a very limited extend. A scenario-based study by Yagil (2001) based on male drivers showed that aggressive behavioural reactions were positively related to negative expectations and beliefs about other road users, and that more hostile attributions were directed towards male drivers compared to female drivers. In 2006 Britt and Garrity (2006) looked into different types of attributional processing related to anger-provoking traffic situations and their relation to anger expression. Results showed that higher levels of anger expression and aggressive behaviour were found when participants attributed the anger expression to stable characteristics of the other road user. In addition, attributing hostile intentions to the anger expressing road user was related to increased aggression. Lennon and Watson (2011) found that similar behavioural expressions may have different underlying motives, and a study by Lennon et al. (2011) showed that victims and aggressors focus on different aspects in their interpretation of the situation.

In recent years, anger expression has gained increasing popularity as a research field (Sullman, 2015) and media topic (e.g., Smart and Mann, 2002; Li et al., 2014). Whether or not this is just a result of increased awareness of the issue supported by its value to the media as a dramatic and unpredictable event (Roberts and Indermaur, 2005), increased perceived relevance due to increased amount of daily transport (e.g., Galovski and Blanchard, 2004), or an actual increase in the phenomenon is unknown as very few longitudinal studies exist. However, results from a study by Vanlaar et al. (2008) indicate unchanged levels of anger expression, although the large majority believe that the frequency of aggressive driving has increased over the past years. Others have suggested that the improved safety features of modern cars such as airbags may mask a possible increase in anger related collisions due to reduced injury (Davis and Smith, 1998 in Burns and Katovich, 2003).

On this background, the purpose of this study was twofold: First, to provide an overview of the development of road anger expression in Denmark from 2005 to 2016 and to see to what extent possible changes differ in specific sub-groups of the population. Second, to investigate how people explain their own anger expression as well as the anger expression of others, to what extent both attributions are related to each other, to demographic variables and to anger expression measured with a standardised instrument (DAX). The results will be relevant for the development of information and communication strategies aiming at a reduction of road anger expression in Denmark and other countries.

2. Method

2.1. Procedure and participants

Data in 2016 were collected based on an online panel ("Danmarkspanelet") by the market research institute EPINION on behalf of the Danish Road Safety Council. The panel consists of 244,568 members covering all regions of Denmark. Panel membership is rewarded with regular participation in lotteries (see Epinionglobal.com for details). In September 2016, a total of 2000 people aged between 18 and 75 years living in Denmark completed an online questionnaire. The results of this survey were compared with results from two earlier surveys conducted in 2005 (DST and DKR, 2005) and 2008 (DKR, 2009) by the Danish Crime Prevention Council in cooperation with Statistics Denmark. In both studies, data were collected based on telephone interviews as part of a monthly omnibus survey based on random samples of the population drawn from the person register among all people between 16 and 74 years of age living in Denmark. In 2005, a random sample of 1500 people was drawn from the register, 1215 individuals were contacted (net sample), and 965 (79% of the net sample) participated in the survey (DST and DKR, 2005). For the survey in 2008 it is only reported that a similar procedure as in 2005 was used (DKR, 2009). The study in 2016 was not done based on telephone interviews for mainly two reasons: First, the number of people with conventional telephone network is decreasing (Energistyrelsen, 2016) and the remaining population may not be representative. At the same time, internet access and use in Denmark is high (Lauterbach, 2015) and the willingness to participate in online interviews as compared to telephone interviews is increasing. Second, the budget for the study was limited and did not allow for the conduction of telephone interviews.

Table 1
Sample description of the survey in 2005, 2008 and 2016.

		Survey 2005 $N = 965$	Survey 2008 $N = 930$	Survey 2016 $N = 2000$
Gender	Male	50.5	51.1	47.6
Age	16–29[a]/18–29[b]	17.8	16.5	18.0
	30–49	40.4	36.6	31.5
	50–74[a]/50–75[b]	41.8	47.0	50.6
Education	Basic education			9.3
	Short further education			29.9
	Medium further education			42.7
	Long further education			18.1
Region	Capital		25.1	30.6
	Zealand		16.2	13.9
	Southern		22.9	22.1
	Central		24.1	23.0
	Northern		11.7	10.4

[a] Age category in 2005 and 2008 survey.
[b] Age category in 2016 survey.

Table 1 describes the samples of the three surveys. Data in 2016 were weighted by age, gender and region to increase the representativeness for Denmark and to increase the comparability of the three data sources. For data collected in 2005 and 2008 it is only reported that data were weighted and that the sample can be regarded as representative for the population aged 16–74 in Denmark after the weighting (DST and DKR, 2005). Participants' level of education in 2016 was a bit higher than in the general population of Denmark. In Denmark, 20.7% of the population aged 20–69 finalised school after the 9th or 10th grade without any further education (=basic education), while it was only 9.3% in the survey; 10.4% of the Danish population had a long further education (5 years or more, e.g. master degree), while it was 18.1% of the survey population (own calculations based on Statistics Denmark, http://www.statistikbanken.dk).

2.2. Material

In all three surveys, participants were asked about their involvement in five specific types of anger expression in traffic as victim and/or aggressor within the past 12 months: (1) "yelling at other road users/being yelled at"; (2) "giving/getting the finger"; (3) "threatening others/being threatened"; (4) "hitting or kicking other persons vehicle/own vehicle being hit or kicked" and (5) "hitting or kicking a person/being hit or kicked" (see Table 3). These five situations reflect the taxonomy of road anger behaviours suggested by Smart and Mann (2002) apart from causing death of other road users, which was not requested. If involved in any of the five situations, participants were further asked how many times it had happened and which transport mode they and the counterpart used in the most recent situation. From the surveys in 2005 and 2008, the data was not available but only the documentation of results. The five specific situations were originally