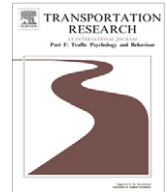




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Electric vehicle drivers' reported interactions with the public: Driving stereotype change?

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ABSTRACT

Image and symbolic meanings of cars play a key role in their desirability and in consumers' purchasing behaviour. Drivers in the United Kingdom Technology Strategy Board funded Ultra Low Carbon Vehicle trial were interviewed regarding their interactions with the general (non-EV driving) public. EV drivers' accounts suggest that EVs are particularly susceptible to stereotyping, but that the stereotyping is in a state of flux. Three different categories of meaning emerged. A *Traditional*, affective-based negative stereotype exists, despite reflecting outdated associations with milk floats and older EV models. However, the current period of widespread EV trialling in the UK sees the emergence of additional EV stereotypes. Drivers encountered categories of meaning that were *Ambivalent*: cognitively-based, ambivalence showed people to hold negative views and reservations but also to reveal a willingness to assess the current capabilities of EVs. Finally, drivers encountered people holding *Positive* meanings of EVs. Greater contact with drivers of contemporary EVs helped to develop these further. Based on a combination of affect, cognition and behaviour, it shows a segment of non-EV drivers to be engaged with the new technology and to see EVs as well developed now and also as cars of the future. We discuss the key factors underpinning each of the categories of meaning and indicate the ramifications for the likely future success of EV uptake.

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1. Introduction

In this introduction we briefly outline the breadth of meanings commonly associated with vehicles before focusing on people's perceptions of electric vehicles (EVs) and their drivers. We then point to the potential for new meanings to be associated with EVs and introduce our investigation into contemporary drivers' reported interactions with non-EV driving members of the public.

A variety of meanings can be conveyed through driving a particular car. In addition to utilitarian benefits, vehicles provide a wealth of symbolic associations that serve to define and express self-identity and social status (Heffner, Kurani, & Turrentine, 2005, 2007a, 2007b; Steg, 2005; Steg, Vlek, & Slotegraaf, 2001). These image-related benefits can override more rational, utility-based calculations (Lane, 2011). Symbolic benefits influence consumers' purchase decisions, and may be responsible for trends in sales (GjØen & Hård, 2002; Heath & Scott, 1998; Heffner et al., 2005, 2007a, 2007b).

Different types of cars have distinct appeals: a luxury sedan, for example, may convey affluence and sophistication, whereas a sports car may project an image of youth and bravura (Heffner et al., 2005). Particular brands can have specific

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and well-established meanings, influencing others' perceptions of the owners (Grubb & Hupp, 1968; Heath & Scott, 1998). It is not the case, however, that electric vehicles (EVs) have well-established meanings that vary with individual vehicle type. While the symbolic dimensions of this emerging breed of vehicles are important, the meanings of new products take time to develop and become available to consumers (Heffner et al., 2007b). At present, general stereotypes of EVs and their drivers tend to be unfavourable (Graham-Rowe et al., 2012).

The general public currently has a low understanding of EVs. According to a survey of 500 respondents across the UK (SMART Plugged-in Report, 2010), the vast majority of consumers felt that they did not have enough knowledge about this new technology. Other UK-based research indicates that people lack awareness of how EVs actually work (Anable, Lane, & Kelay, 2006; Lane, 2011; Lane and Potter, 2007); have little detailed knowledge about the driving experience or potential benefits (Lane, 2011); and do not possess fully shaped ideas about the financial implications (SMART, 2010). Misconceptions are also evident, and these are usually linked to negative attitudes or perceived barriers (Anable et al., 2006; Lane and Potter, 2007). The danger for EV manufacturers is that consumer preconceptions such as these risk becoming embedded in public opinion (Lane, 2011) and thereby limit potential market uptake.

Among those with little or no experience of EVs, there is a general perception that they offer a lower level of performance than conventional cars. Perceived inadequacies include reduced range, lower maximum speed, less powerful acceleration, and inconvenient charging requirements (Bunch, Bradley, Golob, Kitamura, & Occhiuzzo, 1993; Lane, 2011; SMART, 2010). This attitude may be particularly prevalent in the UK due to the existence for several decades (and recent decline) of a relatively large fleet of electric milk delivery vehicles, which has established for many the image of EVs as slow, cumbersome, and now quaintly anachronistic. EVs have also been associated with very small vehicles and underdeveloped technology, leading people to express concerns about safety and reliability (Flamm and Agrawal, 2012; Gjøen and Hård, 2002). According to the 'smart move' trial conducted by Cenex, the Centre of Excellence for low carbon and fuel cell technologies (Carroll, 2010), UK consumers' acceptance of EVs increases after real-world trials, suggesting that EVs do in fact out-perform their expectations. Nevertheless, performance scepticism in the general public has psychological correlates in a fear that these vehicles will reduce personal mobility and negate spontaneity, whereas conventional cars are associated with freedom and control (Gjøen and Hård, 2002; Graham-Rowe et al., 2012; Lane, 2011; Pierre, Jemelin, & Louvet, 2011).

The general public's assessments of EV aesthetics are also poor. Small vehicles are usually considered inferior and less desirable than larger, more comfortable cars, and EVs may suffer from this association (Lane, 2011). They can be perceived as 'cute' but impractical (Flamm & Agrawal, 2012), and the 'feminine' image adopted and embraced by some throughout the history of EVs (Gjøen & Hård, 2002; Scharff, 1991) may be off-putting to some male drivers. Style is perceived to be lacking (Lane, 2011), and some people feel the cars' appearance to be uninspiring, ugly, or just downright odd (Axsen & Kurani, 2011; Graham-Rowe et al., 2012; SMART, 2010). The smart survey of 500 respondents from around the UK suggests that only 3% of mainstream consumers think that EVs 'look great' (SMART, 2010). On the positive side, however, their environmental credentials are widely accepted, which may confer a clean and progressive image for the public (Anable et al., 2006; Kurani, Turrentine, & Sperling, 1996) as well as for EV drivers. This is particularly true for hybrids such as the easily recognisable but relatively normal-looking Toyota Prius (Griskevici, Tybur, & Van den Burgh, 2010; Sexton & Sexton, 2011).

EV drivers are perceived in contrasting ways by the general public. On one hand, they may be viewed as ethical, caring and considerate towards the environment (Graham-Rowe et al., 2012; Heffner et al., 2007a; Skippon and Garwood, 2011; SMART, 2010) – a potentially desirable and status-enhancing social identity (Chua, Lee, & Sadeque, 2010; Griskevicius et al., 2010; Lane & Potter, 2007; Sexton & Sexton, 2011). They may also be seen as forward-thinking, technologically-informed, and open to new ideas (Graham-Rowe et al., 2012; Heffner et al., 2007a; Skippon and Garwood, 2011). The drivers in Graham-Rowe and colleagues' UK study (2012) suggest that uptake of EVs will depend on the promotion of such positive and inclusive images.

On the other hand, however, drivers may be perceived negatively as political radicals or ineffectual idealists (Graham-Rowe et al., 2012; Heffner et al., 2005, 2007a, 2007b); as hypocrites concerned primarily with show (Chua et al., 2010); as tree-huggers or 'techno-geeks' (Heffner et al., 2007b); or as dull and sensible people with limited mobility needs (Graham-Rowe et al., 2012). The degree to which these negative perceptions reflect reality is questionable, however, as they emerge mainly from explorations of EV drivers' own *expectations* of how others might view them rather than concrete experiences of how others *actually* view them.

Most work to date on the issue of how EV drivers perceive themselves has been US-based and focused on Hybrid Electric Vehicle (HEV) users. Several studies conducted in California – a region with high HEV sales – reveal how HEV owners appropriate and construct a wide range of symbolic meanings for themselves and for their vehicles (Heffner et al., 2005, 2007a, 2007b). Unlike the limited range of meanings adopted by mainstream consumers, these owners' symbolic associations are rich and complex, including values such as intelligent consumerism; social awareness; responsibility for future generations; frugality as an ethical value; higher efficiency and technological superiority; control and empowerment; and opposing war over resources in the Middle East by distancing themselves from US dependency on foreign oil (Heffner et al., 2005, 2007a, 2007b).

As innovative and rapidly evolving technology, EVs' symbolic meanings could allow scope for different perceptions and definitions to emerge (Axsen and Kurani, 2011; Gjøen and Hård, 2002; Heffner et al., 2005, 2007a, 2007b; Lane, 2011). They may even offer completely new sets of meanings not afforded by other vehicles (Heffner et al., 2007a, 2007b). However, if these meanings do not infiltrate the public imagination, the future for EVs is bleak. A critical point is approaching for the

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