

Issues of Image and Identity for Electric Vehicle Drivers

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This thesis is submitted in partial fulfilment of the
requirements of the award of Doctor of Philosophy

June 2016

Acknowledgements

First and foremost, I would like to express deep thanks to my PhD supervisors, Dr Mark Burgess (Director of Studies) and Professor Margaret Harris (second supervisor). This PhD would not have been possible without their ongoing inspiration, enthusiasm, and guidance.

I am also indebted to my colleagues and fellow research students, past and present, in the Department of Psychology. Special thanks go to Sarah Mansbridge and Dr Louise Bunce, whose friendship and advice have been a lifeline throughout and beyond the course of this project. I am also very grateful to Wakefield Morys-Carter, with his expertise in all areas, and Dr Elisa Lewis, who initially encouraged me to apply to join the electric vehicle team. The Department has provided a fantastic experience, and the commitment and camaraderie of its members have made it far more than a place of work.

I would like to express gratitude to the Faculty of Health and Life Sciences for my PhD studentship, and for the annual research allowance which has opened invaluable opportunities for me to present my work at national and international conferences. I also owe much appreciation to the electric vehicle drivers of the Technology Strategy Board Ultra Low Carbon Vehicle Demonstrator programme, whose energy and insight made conducting the interviews a pleasure.

Finally, of course, it goes without saying that I would like to thank my family for their constant love and support.

Abstract

Battery electric vehicles (BEVs) could play a crucial role in helping to reduce greenhouse gas emissions around the world. The UK Government has highly ambitious aims for developing a strong domestic market to meet the targets of the 2008 Climate Change Act, and achieve a steep decrease in carbon dioxide emissions by 2050. BEV technology has now evolved to the point where it is potentially capable of fulfilling the daily needs of a large number of people. A critical turning point is now approaching for the widespread acceptance of BEVs, but it is currently unclear how the UK market will develop. This is largely due to consumer behaviour, as the general public does not yet appear to see BEVs as particularly desirable.

Much research to date has focused on the practical barriers to BEV uptake, such as the high upfront purchase costs and limited driving range. While easy to identify, however, these barriers are very difficult to remove. Comparatively little research has addressed the psychological barriers and facilitators to BEV adoption, such as issues of image and identity. These could play a key role in transforming mainstream market opinions, but findings from existing studies on this topic are diverse and fragmentary.

This thesis took a primarily qualitative approach to examine data from 53 BEV drivers in the UK's Technology Strategy Board (TSB) Ultra Low Carbon Vehicle Demonstrator programme. Application of thematic analysis to semi-structured interviews, supported by relevant questionnaire data, revealed four overarching themes: the 'green' image of BEVs; the 'green' identity of BEV drivers; the 'innovative technology' image of BEVs; and the 'innovative technology adopter' identity of BEV drivers. Together, these contained a number of complex and conflicting subthemes. Emergent subtleties sometimes contradicted the logical assumptions made by other papers; many of the TSB drivers, for example, regarded the 'green' image as being ambiguous or undesirable.

The social identity perspective provided the best theoretical fit for the data, and offered a set of unique insights into the TSB drivers' perceptions. One large psychological barrier to BEV usage appeared to be the 'stereotype threat' phenomenon, as drivers often felt that other people viewed them as belonging to a devalued social group comprising people such as eccentric environmentalists or 'geeky' technophiles. One important psychological facilitator, however, appeared to be a new sense of belonging to a team of adventurous pioneers, embracing the role of opinion leaders and trailblazing the way for the mainstream market. Potential strategic interventions to remove these barriers and promote the facilitators were suggested and discussed. These novel findings carry significant implications for stakeholders in the electric vehicle field.

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Chapter 1

Battery electric vehicles and the issue of uptake

This opening chapter establishes the background for this thesis, and provides justification for the research question presented at the end. It is divided into seven sections. Section 1.1 offers an overview of the current situation for battery electric vehicles (BEVs), and explains why they are now being promoted so strongly by stakeholders around the world. Section 1.2 then gives a brief outline of the history of BEV development, and summarises the differences between BEVs and internal combustion engine (ICE) vehicles. Section 1.3 explains and discusses the main practical barriers to BEV uptake, a topic which has already been addressed by a large body of research. Section 1.4 moves on to discuss the issue of psychological barriers to BEV uptake, a topic which has received comparatively little attention to date. Section 1.5 introduces the specific concepts of image and identity, and explains the significant influence that these underexplored issues could have on consumer perceptions of BEVs. Section 1.6 outlines and justifies the research aims of the thesis, and states the research question. Lastly, section 1.7 provides an overall summary and a synopsis of the following chapters.

1.1. Putting BEVs on the roads: An overview

The automobile industry is facing a global revolution. New regulations to reduce greenhouse gas emissions that contribute to global warming are forcing governments around the world to consider alternatives to vehicles powered by the traditional internal combustion engine (ICE), which releases large amounts of carbon dioxide (CO₂) into the atmosphere through burning fossil fuels. Electric vehicles (EVs) present one possible solution for decarbonising the transportation sector. Powered by rechargeable batteries, they do not produce CO₂ tailpipe emissions, and thus offer the potential to significantly help to combat climate change. EV technology has now developed to the point where it is ready for mass commercialisation. The big challenge confronting manufacturers, policymakers, and other stakeholders is how to create suitable

markets, gain consumer acceptance, and make the vehicles a reality by getting them out in large numbers onto the roads.

The UK's Office for Low Emission Vehicles (OLEV), located within the Department for Transport (DfT), has described its vision of the revolution as 'bold' and 'hugely ambitious' (OLEV, 2013, p. 4). The UK Government wants almost all cars and vans in the country to be virtually emission-free by 2050, and for other vehicle sectors to follow this example (OLEV, 2013). This commitment was reiterated clearly at the Paris Climate Conference (COP21) in December 2015 (DfT, OLEV, & Jones, 2015). As stepping stone objectives, the Government aims for 60% of new cars and vans to be ultra low emission vehicles (ULEVs) by 2030, and for all new cars to be ULEVs by 2050. It sees electrification as being 'at the core' of the project, although hydrogen fuel cell vehicles could play a role as well (OLEV, 2013, p. 7). The Government proposes to significantly decarbonise the national electricity system by 2030, which will further advance the environmental credentials of EVs. The plan as a whole will help the UK to meet its legally binding carbon reduction targets set out by the 2008 Climate Change Act, which requires an 80% reduction in greenhouse gas emissions by 2050 as compared to the 1990 baseline level.

As well as cutting down CO₂ production, pure BEVs offer many other potential benefits (OLEV, 2013; Rowney & Straw, 2013; Royal Academy of Engineering, 2010; Tsang, Pedersen, Wooding, & Potoglou, 2012). Large-scale uptake could considerably improve local air quality by removing all other ICE exhaust fumes (including particulate matter, oxides of nitrogen, and oxides of sulphur) that are harmful to human health and damaging to buildings and ecosystems. This would make towns and cities cleaner and more attractive, and decrease the growing pollution problems caused by rapidly expanding global urbanisation and rising car demand. It would facilitate a shift from depleting finite fossil fuels to generating renewable energy resources. On the political front, it would provide energy independence by reducing reliance on imported oil supplies from a limited number of regions. Economically, it could ultimately reduce transport costs and provide a new way of balancing supply and demand on electricity grids, which would save money for both companies and consumers. Overall, a successful switchover to BEVs could position the UK as a world leader

in innovative transport technology, and a thriving centre for vehicle production and export (OLEV, 2013; Rowney & Straw, 2013).

The future outlook for BEV adoption is unclear, however. The UK Government sees uptake as 'inevitable' in the long run (OLEV, 2013, p. 14), and sales momentum is beginning to build as new BEVs enter the market and costs continue to fall. Despite a large surge in ULEV sales in 2015, however, the total number of pure electric non-commercial cars (9,934) registered in the UK over the course of the year formed only 0.38% of the overall number of non-commercial cars registered in the UK over the same time period (Society of Motor Manufacturers and Traders [SMMT], 2016a). There is no unanimity on how close the global industry stands to the critical tipping point of mainstream market penetration, and some organisations remain sceptical as to whether pure BEVs will eventually come to dominate the domestic vehicle sector at all (Kay, Hill, & Newman, 2013). Like many other nations, the UK has launched a range of initiatives, invested significant governmental funding to promote purchase, and commissioned research to attempt to identify barriers to consumer acceptance and develop appropriate strategies to counter them. It is yet to be determined whether any of these will accelerate BEV adoption to a sufficient degree.

1.2. BEVs: The background

The recent rise of BEVs is a revolution in the most literal sense of the word: a full-circle turning of the wheel. The electric motor was the first type of car propulsion system to be invented, and pioneering BEVs were developed in the early nineteenth century (Anderson & Anderson, 2005; Guarnieri, 2011a; Høyer, 2008). When private motorized vehicles became popular in the late 1890s and 1900s, BEVs occupied a large proportion of the market alongside ICE cars and cars powered by steam. They enjoyed their heyday at the turn of the twentieth century, especially in the US, the UK, and France, where they were seen as the ideal form of urban transport. After the 1920s, however, their popularity declined rapidly due to the development of modern road systems which permitted long-distance travel, and the mass production of cheaper ICE cars which offered higher performance and a greater driving range. By 1935, ICE vehicles had established worldwide dominance, and BEVs were reduced to a

few niche market products such as golf carts, fork-lift trucks, and slow-moving delivery vans (Anderson & Anderson, 2005; Guarnieri, 2011b; Høyer, 2008).

In the second half of the twentieth century, concerns over air pollution and responses to oil crises led to brief resurgences of interest in alternative ways of powering transport, but these were short-lived and the innovations that emerged were never viable enough to compete with the robust ICE industry. It was not until the 1990s that awareness of climate change led to BEV options being seriously considered once more (Anderson & Anderson, 2005; Høyer, 2008). Over the last two decades, BEV technology has evolved dramatically. One of the first modern BEVs on the UK market was the tiny G-Wiz, launched in 2001 and legally classified as a 'quadricycle', but by September 2015, a total of 14 pure electric car models (plus various pure electric vans, and additional second-hand pure electric car models no longer in production) were available on the commercial market for UK consumers (Gibbs, 2015). These included brands such as the top-selling 5-seater Nissan Leaf, which looks no different from the outside to a conventional car.

The main differences between BEVs and ICE vehicles are currently the driving range (a maximum of around 100 miles for a BEV on a single charge, compared to the 400+ miles offered by a full tank of petrol or diesel), the recharging system (BEVs require connection to the mains electricity supply via charging points or normal plug sockets, and a complete charge can take 4-10 hours compared to the 5-10 minutes needed for a petrol or diesel refuel), and the instant acceleration, regenerative braking, and lack of gears in a BEV. Other new car innovations also rely on electric batteries to varying degrees, and these vehicles form a scale with BEVs at the most electrified end and hybrid electric vehicles (HEVs) at the other; in between lie extended range EVs (EREVs) and plug-in hybrid EVs (PHEVs). Detailed descriptions of each, plus their advantages and disadvantages, are given in a number of reports (e.g., Kay et al., 2013; OLEV, 2013). The BEV is the only vehicle to have no internal combustion engine at all and therefore zero tailpipe emissions, although EREVs and PHEVs are included at present in the UK Government's classification of 'ULEVs'. This may change as regulations tighten.

1.3. Practical barriers to BEV uptake

As the preceding sections outline, the question of how to get BEVs out into the mainstream market is now a vital concern across the globe. An extensive number of papers and reports have addressed what are considered to be the major barriers that can make BEVs unappealing to consumers; these include the high upfront purchase costs, limited driving range, and lack of public charging infrastructure. Much recent research has analysed these factors in great detail, and outlined a variety of countering strategies such as providing financial purchase subsidies, standardising tax incentives, and improving public charging infrastructure accessibility and compatibility (e.g., Accenture, 2011a; Hjorthol, 2013; HM Treasury, 2008; Kay et al., 2013; Lane, 2011; OLEV, 2013; Rowney & Straw, 2013; Tsang et al., 2012). The UK Government has already invested significant sums in such projects, and announced further ‘unprecedented’ funding commitments (OLEV, 2013, p. 12).

While practical barriers are easy to identify, however, the solutions are harder to put into place. Along with the ‘hundreds of millions of pounds of international government funding’ needed for purchase subsidies alone (Tsang et al., 2012), most strategies would require huge time and labour resources to come anywhere near satisfying mainstream market demands. The UK Government, for example, is currently testing ‘electric highway’ technology which could remove the barrier of limited driving range by using cables buried under roads to generate electromagnetic fields and recharge EV batteries whilst the cars are being driven (Highways England & Jones, 2015; Kelion, 2015), but large-scale installation of this technology would involve substantial digging up of motorways. Research also shows that consumer demands are currently high and unrealistic. A survey of over 7,000 individuals in 13 countries around the world, for example, asked people to rate the importance of various factors which might influence them to buy a BEV/PHEV for their next vehicle, and found that around half of the respondents rated as ‘very important’ factors such as the availability of workplace/public charging, fast charge options (20-30 minutes for a full charge), a battery range equivalent to the full tank of an ICE car, and lower total costs compared to an ICE car (Accenture, 2011b). A larger survey of 13,000 individuals in 17 countries around the world identified similar gaps between consumer expectations and the present reality, as more

than 85% of respondents rated the factors of driving range, convenience of charging, and cost of charging to be 'extremely important' or 'very important' issues to consider when thinking about buying or leasing a BEV (Deloitte, 2011). The majority wanted a driving range much closer to that of an ICE car, full charging times of 2 hours or less, and were not willing to pay an upfront purchase price premium (Deloitte, 2011).

In addition to the enormity of the BEV project, its complexity is another significant obstacle to removing practical barriers. The challenge of implementing even the most simple-sounding of strategies is, in real world terms, often so complicated that essentially basic recommendations such as 'improving public charging infrastructure' necessitate negotiation and collaboration between governing bodies, organisations, and industries on various local, regional, national, and even international levels. One senior researcher in a BEV project group described the co-ordination of multiple stakeholders as 'a real challenge [...] sometimes it seems to be like a flea circus, everyone is heading in different directions' (Wilke, as cited by Sonnenschein, 2010, p. 61). This may now be changing, as the number of UK public charge points is increasing, and industries and other institutions are coming to recognise the importance of joining forces and working together in an integrated attempt to facilitate a shift in the promotion of the new technology. Some stakeholders still maintain vested interests in the project, however; in Europe, for example, France and Germany have developed different and incompatible kinds of charging plugs, and each country wants to promote its own in order to establish dominance in the EU market (Bakker & Trip, 2013).

Solving practical problems also involves a number of 'chicken and egg' situations (Accenture, 2011a, p. 22; OLEV, 2013, p. 11; Sonnenschein, 2010, p. 53). While direct experience of BEVs could almost certainly be a crucial factor in changing consumer perceptions (OLEV, 2013), this will not occur on a large scale until an appropriate proportion of the mainstream market is prepared to accept the cars. It is unlikely that upfront costs will drop significantly or that substantial investments will be made in improving infrastructures until a sufficient number of BEVs have been purchased, but the majority of mainstream consumers will want to see these major barriers removed before considering a switchover to unfamiliar technology. The way to address the

obstacle of unfamiliarity is of course to get more BEVs onto the roads, but the question of how to promote uptake in the first place remains unresolved.

1.4. Psychological barriers to BEV uptake

With practical barriers presenting such impractical problems, an alternative route would be to turn to addressing a different sort of barrier: the psychological ones. These have received relatively little attention to date, but are becoming an increasingly important issue as there is now consensus that uncertainty over future BEV uptake is caused less by the supply side of the market than by consumer behaviour (Deloitte, 2011; Lane, 2011; Rowney & Straw, 2013; Tsang et al., 2012). Despite the elevated consumer expectations outlined above, research has shown that BEVs today could in fact meet the daily needs of a large proportion of the mainstream market. The Final Report for the UK's Technology Strategy Board (TSB) Ultra Low Carbon Vehicle Demonstrator (ULCVD) programme (currently the world's largest multi-vehicle, multi-location BEV trial) found that drivers using BEVs in long-term, UK-wide trials adapted to their vehicles quickly and easily, rated their performance as impressive and sometimes superior to that of ICE cars, and regarded them as viable for everyday life; 80% of the drivers said that they could imagine replacing one of their existing ICE vehicles with a BEV, and 50% expressed an intention to buy one after their participation in the project (Carroll, Walsh, Burgess, Harris, Mansbridge, King, & Bunce, 2013). Although most of the drivers considered a public charging infrastructure to be essential, the majority (79%) agreed at the 3-month stage that they could nevertheless manage to complete their trips without one (Carroll et al., 2013). This raises the question of why the mainstream market currently sets its demands so high for increased driving range, extensive public charging infrastructure, and fast charging times, and suggests that the real challenge now is to shift the focus away from trying to meet ambitious consumer demands (through removing the practical barriers) onto modifying the demands themselves (through identifying the psychological barriers, and developing appropriate psychological strategies to counter them).

One key factor contributing to the discrepancy between perceived and actual consumer needs appears to be the fact that many people currently hold invalid or outdated beliefs about BEVs. OLEV (2013) presented this as a 'headline finding',

observing that ‘most people have little, if any, knowledge of ULEVs. Insufficient or inaccurate information can put off potential buyers’ (p. 10). OLEV also recognised that people ‘tend to be confused by negative or inaccurate media information, or be hampered by concerns over the “unknown”’ (p. 78). These statements have been supported by many other publications spanning a number of years (e.g., Accenture, 2011b; Anable, Lane, & Kelay, 2006; Hjorthol, 2013; Lane, 2011; Lane & Potter, 2007; smart, 2010), and OLEV stated that its aim to address this longstanding problem was to apply the very practical strategy of considering a ‘national consumer communications campaign’ and a ‘platform for providing robust and authoritative consumer information on ULEVs, supported by awareness raising activity’ (p. 13). While it acknowledged that consumer behaviour can vary greatly, and that some people may purchase on impulse, it assumed that ‘as ULEVs are a new kind of technology, research tends to be more thorough’ (OLEV, 2013, p. 78). It therefore concluded that what potential consumers require is ‘clear and consistent messages from [the] Government’ (OLEV, 2013, p. 85).

This view is optimistic and biased towards rationality. Although access to reliable updates about BEVs will obviously be important for consumers, what the report neglected to take into account is the fact that while people *who are already thinking about buying a BEV* may well be predisposed to seek authoritative, accurate information and conduct thorough and logical research, this is unlikely to be the case at present for the majority of the mainstream market. Psychological studies have established that when making judgements and decisions, consumers often tend to rely on fast and intuitive thinking as opposed to slower and more deliberate forms of reasoning which require cognitive effort; this is outlined in theories such as the Elaboration Likelihood Model (Cacioppo & Petty, 1984; Petty & Cacioppo, 1981a, 1981b, 1983; Petty, Cacioppo, & Schumann, 1983). In addition, people can be swayed by the powerful influence of emotion, and this may be particularly true for products such as vehicles (Belk, 2004; Sheller, 2003; Steg 2005). The difference between choosing everyday food items and potentially life-changing cars was summed up succinctly in a marketing paper from 1960:

Cereals and cars are different. Habitual and rational forces are more at work with cereals, irrational forces with cars. Consumers identify with and

get more involved emotionally with automobiles than with cereals.
(Woods, 1960, p. 16)

It cannot be assumed, however, that even the most mundane of products are invariably selected by all consumers in a rational, utilitarian way. A classic paper on the subliminal perceptions attached to buying instant versus traditional coffee in the US in the 1940s emphasised the importance of acknowledging non-objective factors in marketing research:

It is a well accepted maxim in merchandizing that, in many areas, we are selling the sizzle rather than the steak. [...] The sizzle is the subjective reaction of the consumer; the steak the objective characteristics of the product. The consumer's behavior will be based on the former rather than the latter set of characteristics. (Haire, 1950, p. 649)

Large numbers of subsequent studies have expanded on the findings of this paper, revealing how all kinds of products can hold emotional resonance for some consumers, and influence their purchasing decisions in both positive and negative ways. A paper focusing on 'anti-consumption' and 'brand avoidance' presented the example of an interview participant stating how she would never buy low quality toilet paper because it carried reminders of her childhood in a low-budget household (Lee, Motion, & Conroy, 2009, p. 173).

The impact of emotion and irrationality on BEV perception can perhaps best be illustrated by the issue of driving range. According to the National Travel Survey 2012, 98% of car journeys in the UK were less than 50 miles and 99% were less than 100 miles (DfT, as cited by OLEV, 2013, p. 26); this provides clear-cut evidence that the available range of BEVs on a single charge is more than adequate for almost all daily journeys for UK drivers. One large barrier to BEV uptake, however, is currently the phenomenon of 'range anxiety' – the fear of running out of battery power and potentially getting stranded. This affect-laden phrase has been used by researchers, manufacturers, politicians, and drivers alike, and jumped on by journalists who have delighted in describing the 'heart-stopping terror' they experienced when the battery power of their test-drive BEVs began to fall (Lyndon, 2014, para. 9), leaving them feeling 'like a bomber pilot coming back from a distant raid, praying that a friendly airport would appear' (Cheney, 2011, para 5). Such memorable emotive assessments can carry more weight than sensible statistics, and coupled with the established lack of knowledge and numerous misconceptions surrounding BEVs, it is

reasonable to infer that they assist in blurring individual practical barriers into more general assumptions which might be linked only loosely to the reality of BEV capabilities today.

1.5. Image and identity barriers to BEV uptake

The psychological barriers to BEV acceptance do not simply consist of a set of affect-driven responses to the cars, however; this is just the tip of the iceberg. It is widely acknowledged that ICE car choice is also closely bound up with the more complex issues of image and identity (e.g., Csikszentmihalyi & Rochberg-Halton, 1981; Steg, 2005; Steg, Vlek, & Slotegraaf, 2001). Cars can help to define and project self-images and social status, and people may use them to communicate their identification with (or dissociation from) particular social groups and social norms (e.g., Grubb & Hupp, 1968; Sirgy, 1985). From such evidence, it is reasonable to assume that these factors will play a part in influencing BEV purchase decisions, and affect trends in sales. Using range anxiety again as an example, it could be argued that such an experience does not stem merely from an instinctive emotional reaction, but also from the more complex beliefs that BEVs may curtail drivers' sense of independence, freedom, and control; some of the well-established associative meanings of conventional ICE cars (Frankel, 2014; Kemp, Schot, & Hoogma, 1998; Redshaw, 2007; Stokes & Hallett, 1992).

Alongside the amount of effort put into analysing the practical barriers to BEV uptake, research into the image of BEVs has been minimal. Publications that do refer to the subject have rarely attempted to analyse it in depth, and many of the major reports do not mention it at all (e.g., Accenture, 2011a; Deloitte, 2011; HM Treasury, 2008; Kay et al., 2013; OLEV, 2013; Rowney & Straw, 2013). This gap in the literature has been highlighted by two recent papers (which will be discussed in more depth in Chapter 3). I co-authored the first of these papers with my PhD supervisors and a former colleague (Burgess, King, Harris, & Lewis, 2013), and it used interview data from the TSB ULCVD programme to analyse mainstream perceptions of BEVs through BEV drivers' reported interactions with the public. It revealed that the meanings of BEVs are currently in a state of flux, as the majority of non-BEV users appeared to view the cars negatively or ambivalently, holding stereotypes which were not always rooted

in reality but seemed to provide an accessible way of representing the unfamiliar technology and/or preserving particular social values. The second paper (Schuitema, Anable, Skippon, & Kinnear, 2013) also emphasised the importance of recognising the role of non-instrumental attributes of BEVs in creating consumer attitudes and influencing purchase intentions. The implications for BEV uptake are significant.

The reasons for this lack of attention given to issues of image and identity attached to BEVs appear to be due to several interrelated factors. Researchers in the EV field are often based in departments, institutions, and industries orientated towards collecting and analysing objective, quantitative data; they seek information which is clear and precise, and prefer to provide facts and figures in their publications. This approach does not lend itself to addressing the topics of image or identity, which are complex, nuanced, subjective, and require in-depth interpretation. Datasets available in relation to EVs are usually of the 'hard' variety, comprising technical, economic, or other numerical types of data sourced from surveys. The data collection methods were designed to gain information which could be analysed using quantitative methods. This leads to subtle implications in much existing research that image-related barriers surrounding BEVs are subsidiary to the practical ones. They may be seen as abstract, overly complex, too 'soft', or too vague. It is often implied that removing practical barriers will also remove the psychological ones, and therefore the focus remains firmly on the former.

In recent years, however, a growing amount of research has drawn attention to the limitations of established rational economic models and traditional consumer choice theory. In an influential book, for example, psychologist Ariely (2008) challenged these models and theories by proposing that consumers are not rational actors but 'irrational reactors'; he argued that their irrationality is nevertheless predictable, and outlined a number of potential opportunities for marketers to use this to their advantage. In another publication, a working paper for the US National Bureau of Economic Research, McFadden (2013) provided a comprehensive review of new evidence on consumer behaviour and decision making from a number of fields, including cognitive psychology, sociology, anthropology, and neurology. He explained how this seriously undermined the utilitarian approach which has dominated economic studies

since the eighteenth century, but how it has also opened up a multitude of potential future pathways for research. In the context of such suggestions for a major shift in marketing approaches, the challenges thrown up by the global need to get BEVs out into the mainstream market as quickly as possible could provide an ideal opportunity to develop and evaluate new methods of persuading consumers to adopt new products. Successful strategies could have far-reaching implications for other future innovations, some of which might also help to preserve the environment on local and global levels, and to limit climate change.

1.6. Research aims of the thesis

This thesis aims to address the above gap in the literature, and to advance the small body of research which has already begun to explore issues of image and identity associated with BEVs, plus the potential role that they could play in facilitating mainstream market uptake. A brief outline of the chosen dataset, methodological approach, and theoretical approach is presented below; further details are provided in Chapters 2 and 4. One important point to note here is that the word ‘symbolism’, and associated terms such as ‘symbol’ and ‘symbolic’, are deliberately avoided in this thesis. ‘Symbolism’ is a term which is used in numerous studies investigating the consumer perceptions of products, but it is also an extremely broad and complex concept, and is often applied only loosely in the field of consumer research. It is therefore narrowed down in this thesis into a more specific and easily accessible concept: the ‘product image’. A definition of this concept is outlined in the first section of Chapter 2, where a fuller explanation for avoidance of the term ‘symbolism’ is also given.

In terms of the data, this thesis draws on a rich and unique dataset collected by a research team in the Department of Psychology at Oxford Brookes University as part of the TSB ULCVD programme (Carroll et al., 2013). Jointly funded by the UK’s TSB and OLEV, the programme (2008-2012) was designed to support the development and assessment of technologies and markets for ULEVs through sustained multi-driver, real-world testing in a variety of regions across the UK. It involved eight consortium groups, 18 vehicle manufacturers, and 349 vehicles, over 90% of which were BEVs. These vehicles were leased to out to participants for long-term trials (mostly between 6-12 months), and drivers incorporated

them into their everyday lifestyles and provided detailed feedback on their experiences. Data collection methods used by the Oxford Brookes research team (on which I worked for 1 year prior to starting this PhD) comprised a combination of interviews and questionnaires, which provided a wealth of psychological material ideal for a PhD seeking to advance understanding of consumer perceptions of the new technology. In comparison to much of the existing literature on EVs (discussed in Chapter 3), these data offer insight into the perspectives of people who were familiar with regular BEV usage, and were able to talk about their thoughts and feelings in contextualised and discerning ways.

In terms of the methodology, this thesis uses a mixed methods approach but focuses primarily on qualitative analysis of the interview data, supported by descriptive analysis of relevant questionnaire items. Qualitative methods have recently gained a strong footing in social psychology, and are ideal for conducting exploratory investigations of novel areas (Stebbins, 2001). As opposed to using established findings from existing research to construct deductive (top-down) hypotheses and establish a pre-determined analytical framework, this thesis examines the data with an open-minded and inductive (bottom-up) approach, focusing on interpreting the drivers' statements rather than assessing whether they match certain pre-set expectations. This kind of qualitative approach allows the complex aspects of image and identity to be studied in sufficient depth, and the underlying subtleties and ambiguities to be investigated. The choice of analytical method is thematic analysis, a flexible and accessible method well suited to datasets containing multiple patterns of meaning (Braun & Clarke, 2006).

Thematic analysis is not bound to any particular theory, but appropriate theoretical approaches can be readily applied to the data. This thesis draws to an extent on 'image congruity theory' (e.g., Sirgy, 1980, 1981, 1982a, 1982b), which examines the relationship between product images and consumer identities, but the overarching theoretical framework which captures the key findings is the 'social identity perspective' (e.g., Tajfel, 1978; Tajfel & Turner, 1979; Turner, 1984, 1985; Turner & Brown, 1978). This provided the best match for the data-driven themes; it was not the case that it was selected prior to analysis in order to shape the initial coding. The earlier stages of the analysis

suggested that Sirgy's theory offered a good explanation for the findings, but the subsequent stages revealed it to have several limitations which the social identity perspective could address in a better way. Ultimately, both theories were retained because they formed a complementary, dovetailed model which allowed both the 'personal' and the 'social' dimensions of identity to be addressed. Using a clear theoretical approach sets this thesis apart from much of the existing literature on EVs.

1.6.1. Research question

The specific research question for this thesis is:

What are the potential image and identity-related barriers and facilitators to BEV adoption?

The findings will carry significant implications for developing strategies to remove the barriers and to promote the facilitators, and to identify which kinds of consumers to target at this stage of BEV development.

1.7. Conclusion

To summarise, this chapter has established the background context for this thesis and justified the choice of topic, narrowed down to a specific research question. It has explained why BEVs are a critical current issue, and how large-scale uptake could offer many benefits on both a local and a global level. To achieve the UK Government's ambitious targets, however, mainstream market purchase behaviour will need to increase very rapidly over the next few decades. Existing research has focused predominantly on the objective, practical barriers to BEV acceptance by mainstream consumers, but these barriers are problematic to remove, and attention is now turning towards the barrier presented by elevated consumer demands. Although issues of image and identity may be seen as overly complex and abstract by many stakeholders in the transportation field, they present a compelling topic for a psychological study, and while removing practical barriers to BEV uptake may on one hand help to improve mainstream attitudes towards BEVs, this may also work the other way around; removing psychological barriers and negative images of the

cars may have the potential to change unfavourable consumer perceptions of the practical situation as it stands.

To give an overview of the structure of this thesis, it is divided into seven chapters. Following on from the current chapter, Chapter 2 provides a definition and discussion of the terms ‘image’ and ‘identity’, along with a more detailed outline and justification of the theoretical approach. Chapter 3 then presents an overview and critical analysis of the existing literature, focusing on the small and diverse body of research which has already examined issues of image and identity in relation to EVs and their drivers. Chapter 4 outlines the method used for selection and analysis of the data, and includes a more detailed description of the TSB ULCVD programme. Chapter 5 presents the first set of findings, orientated around the *environmental* image of BEVs and the implications for BEV drivers. Chapter 6 presents the second set of findings, orientated around the *technological* image of BEVs and the implications for BEV drivers. Lastly, Chapter 7 offers a discussion and conclusion which draw together the findings of the thesis by outlining and evaluating its key contributions, and suggesting how the findings could be applied strategically in a real-world context.

Chapter 2

Definition and discussion of ‘image’ and ‘identity’

The preceding chapter established that this thesis will focus on the underexplored topic of issues of image and identity for BEV drivers. The concepts of ‘image’ and ‘identity’ are very broad and can be applied in many different ways, so this chapter presents an overview and discussion of how the two terms will be used in the context of this PhD. It is divided into three sections. Section 2.1 (divided into a further six subsections) provides a definition of the term ‘image’, narrowed down to ‘product image’, using examples from studies which have analysed the images of ICE cars. Section 2.2 (divided into a further four subsections) then moves on to address the concept of ‘identity’, narrowed down to ‘consumer identity’. It outlines the two theoretical approaches which will be used in the following chapters: image congruity theory (subsection 2.2.1) and the primary theoretical framework of the social identity perspective (subsection 2.2.2). Lastly, section 2.3 presents an overall conclusion by clarifying the specific gap in the existing literature that this thesis intends to address.

2.1. Definition and discussion of ‘product image’

The term ‘image’ carries a multitude of meanings. This thesis focuses on the specific definitions used in marketing and consumer research. These also have multiple meanings, some of which are conflicting or contradictory (see Dobni & Zinkhan, 1990, and Stern, Zinkhan, & Jaju, 2001, for detailed overviews and discussions). As observed by Kunkel and Berry (1968), there appears to be an ‘inherent difficulty’ in pinning down the concept of an ‘image’ in the marketing field; it has characteristically been conceived as a ‘vague, amorphous, virtually immeasurable phenomenon’ (p. 21) and is therefore undefined (or under-defined) by some researchers, but over-defined by others on a variety of assumptions. Stern and colleagues (2001) argued that ‘ambiguous usage’ over the last half-century has led to the term being employed ‘so inconsistently’ that it is not clear whether any two researchers are referring to the same thing

(p. 202). This section provides an overview of the term and draws together some of the most salient points from the existing literature that are relevant to this thesis.

2.1.1. Basic definition of 'product image'

On the most basic level of definition, a 'product image' is something with which an object on the market is thought to be associated, or to possess. This refers to the way in which the product is perceived by consumers. 'Perceived' in this sense does not simply mean viewed in a visual way, however. The word 'image' evolved from a technical term in Greek poetics – 'ikon', meaning 'verbal creation of [. . .] something in the "mind's eye"' – and in this context it refers to a mental representation of the item (Stern et al., 2001, p. 204). This representation may range from a relatively simple snapshot to a more complex construction drawing on deeper meanings; a luxury ICE car may, for example, be regarded as 'prestigious' (Batra & Homer, 2004, p. 318), 'elegant, suitable for a banker, and likely to be seen at the opera' (Reynolds, 1965, p. 72), or as 'a trope of managerial masculinity, a success symbol [. . .] the escape from culture – from reliance on mass transit [. . .] a high-tech escape from the iron cage of modernity' (Schroeder & Zwick, 2004, pp. 38-40).

For some products, at certain times, a single image may be accepted by many people. A car in the 1960s described as 'big and black', for example, would probably have been envisaged by most consumers in the US as something 'heavy, expensive, conservative, comfortable, and prestigious' (Reynolds, 1965, pp. 74-75). It is not always the case, however, that the majority of people in a culture or community will perceive a product image in the same way. An image can be unique to particular individuals or households, and associated with personal and private 'idiographic' meanings as well as or instead of socially-shared 'normative' ones (Belk, Wallendorf, & Sherry, 1989; see also Reynolds, 1965; Wright, Claiborne, & Sirgy, 1992). Several studies have shown that people may assign highly personalised images to their cars (Aggarwal & McGill, 2007; Beh, 2009; Belk, 2004); in a doctoral thesis from the field of marketing, Beh (2009) gave the example of an interviewee stating that his ICE Mini car was 'called Bertha. She's a little lady with wide hips and big eyes. Sort of like a grandmother that surprises you with her strength and grace' (p. 182).

In addition, different consumer *groups* may attribute non-identical images to the same products, and these dissimilarities can be subtle or significant. One finding of Beh's (2009) thesis was that members of the UK's classic Mini community (i.e., enthusiasts of the original Mini car, launched by British General Motors in 1959) and the BMW MINI community (i.e., enthusiasts of the new, rebranded MINI, launched by BMW in 2001) tended to hold quite different images of the two types of ICE car. Many expressed strong preferences for the model that they owned, and made detrimental comments about the other type. This reflects to an extent the findings of an earlier study (Birdwell, 1968), which focused partially on how owners of four different types of ICE cars ('prestige cars', 'medium-priced cars', 'low-priced cars', and 'economy compacts') viewed various models in each category. The participants (100 US drivers) were asked to rate 16 different cars on a 7-point scale for polarised pairs of adjectives, e.g., 'Exciting'/'Dull', 'Eccentric'/'Conventional', and 'Masculine'/'Feminine'. Overall, the results supported the hypothesis that 'the average perception of a specific car type and brand is different for several ownership classes', as members of each group appeared to rate their own car categories in a more positive way than members of other groups (e.g., owners of 'low-priced cars' perceived the low-priced Chevrolet much more favourably than owners of 'prestige cars' on dimensions such as 'Sophisticated'/'Unsophisticated', 'Stale'/'Fresh', and 'Elegant'/'Plain') (Birdwell, 1968, p. 85). These findings suggest that BEVs may also be linked to a complex and diverse set of images, comprising a range of favourable and unfavourable meanings for different consumers and consumer groups.

2.1.2. Construction of the 'product image'

The above definition raises an important question: where does the product image come from? Opinions on this topic have altered over the last 50 years. In a paper from the early days of marketing research, Herzog (1963) described the product image as 'the sum total of impressions the consumer receives from many sources' (p. 82). Slightly further down the line, Reynolds (1965) flagged this quote up as an oversimplification, and emphasised the more complex and active role of the consumer in helping to create the image. He described it as a 'mental construct developed [. . .] on the basis of a few selected impressions',

and argued that it came into being ‘through a creative process in which these selected impressions are elaborated, embellished, and ordered’ (Reynolds, 1965, p. 69). Reynolds explained the process as a ‘funnel-shaped’ channelling of marketing messages into a few selected ‘bits of information’ in the consumer’s mind; these fragments of detail – ‘beliefs’ rather than ‘facts’ – form a starting point from which many more interdependent beliefs can emerge, and these in turn may help to build a complete image of the product ‘in the same way that a palaeontologist can reputedly reconstruct a dinosaur from a single bone’ (pp. 69-70). The ultimate image of the product is then fleshed out with further beliefs and feelings, including ideas about ‘the people most likely to use it’ and ‘evaluative attitudes and emotional overtones’ (Reynolds, 1965, p. 70).

This definition influenced subsequent researchers, who generally acknowledged the contributions of both consumers and marketers in constructing the product image. Dichter (1985) highlighted the subjective and potentially unstable nature of the concept by summarising it as:

the total impression an entity makes on the minds of others [. . .] not anchored in just objective data and details. It is the configuration of the whole field of the object, the advertising, and, most important, the customer’s disposition and the attitudinal screen through which he observes. (p. 75)

This quote indicates how manufacturers cannot simply rely on creating a good image for a product and communicating it to consumers, but must attempt to direct consumers towards a particular impression through various cues, and *persuade* them to view the item as desirable. Taking consumer perceptions into account can help manufacturers to revise, adapt, and even transform images if necessary. The marketing of the Volkswagen Beetle offers a good example; as explained in a paper by Aaker (1992), this was originally promoted as a ‘people’s car’, designed to suit the functional needs of the mass market in Germany, but by the 1960s it had come to be viewed by consumers as an ‘ugly, funky car’ that made a statement and demonstrated ‘independence – a willingness to go against the grain, irreverence for convention, being young (or young in spirit) admitting to a sense of humour, and possessing a logical, practical mind’ (p. 183). Volkswagen embraced and enhanced the new image, with a resultant success in sales. Such an approach may be crucial for BEVs, as a large proportion of UK consumers currently appear to hold entrenched

negative stereotypes of the vehicles (Burgess et al., 2013; this point is discussed more fully in Chapter 3).

2.1.3. Power of the 'product image'

It is widely accepted in the marketing field that images can have a powerful influence on consumer attitudes and behaviours. As stated by Graeff (1996), in a paper which drew on evidence from a number of other studies, attractive images 'are often more important to a product's success than are its actual physical attributes and characteristics' (p. 4). The image is recognised as playing a particularly significant role in late consumer capitalist societies. There are various reasons for this, including a huge variety of competing products and brands on the market, increased consumer affluence, and advances in technology which have taken advertising and consumer communication to a whole new level (Goulding, 2003; Levy, 1994; Meenaghan, 1995). The theory of postmodernism, which has influenced many academic disciplines since the 1970s, attaches 'unprecedented importance' to the concept of the image (Goulding, 2003, p. 154), and some proponents of postmodernism have claimed that consumers now value the image above the actual product (Baudrillard, 1981), that images float free of the original items and comprise a new reality (Baudrillard, 1981, 1983), and that the consumer 'becomes a consumer of illusions' (Debord, 1967, para. 47). In this condition of 'hyperreality', the image becomes the marketable entity and the product merely strives to live up to its own image (Baudrillard, 1981, 1983, 1988; Firat, 1991; Firat, Dholakia, & Venkatesh, 1995). While this proposition is controversial, it has been seized on by many marketing researchers, especially in the field of advertising (Firat et al., 1995). A more moderate view is perhaps that the image can 'precede' a product (Dichter, 1985), as in this sense it does not necessarily rely on the product's actual existence to be able to have an effect on people. It is likely that this will be the case for innovations such as BEVs, which many consumers have not yet encountered and must therefore rely on other sources to form their initial impressions.

To give an example of findings from the field of vehicle marketing, Homer's (2008) paper explored the relationship between product quality and image by focusing on 'brands plagued by negative impressions' (p. 715). At the beginning,

Homer highlighted the power of the image by citing US media reports related to car brands, explaining how Hyundai had had to continue to confront strong negative images in some quarters despite high reported increases in product quality, whereas Mercedes had managed to maintain a good product image despite encountering quality issues for some models. One key finding of Homer's subsequent experimental study was that consumers (288 US undergraduate participants) exposed to invented information (product descriptions, press release excerpts, and third-party consumer evaluations and objectives) about an imaginary new ICE car appeared to find low brand image to be *more* off-putting than apparent low quality. This led Homer to conclude that for marketers, 'strides in quality are not as powerful as efforts aimed to enhance brand image, at least for some product categories such as cars' (p. 721).

2.1.4. Distinction between 'product image' and 'brand image'

The distinction between 'product image' and 'brand image' should be clarified here, as both are used frequently in the marketing field. The concept of the 'product image' is implicit within that of the 'brand image', and vice versa. Although the two terms overlap, however, the 'brand image' advances beyond the impression of a specific item, reflecting the relationship of all of the brand's products to each other and to the overall corporation (Meenaghan, 1995; Olins, 1989). The differences between 'brand' and 'product' image are sometimes highlighted in the literature (Dobni & Zinkhan, 1990; Kim, 1990; Meenaghan, 1995), but other researchers use the two terms in very similar or almost interchangeable ways. This usually depends on the focus of the research, as brands are more important for some products and some consumers than for others. This thesis focuses on the 'product image', because at the time of the TSB trial, BEVs were generally perceived as one more-or-less homogenous product category.

2.1.5. Distinction between 'image' and 'symbol'

As noted in Chapter 1, this thesis avoids using the words 'symbolism', 'symbolic', and 'symbol'. These terms proliferate in much of the existing literature which touches on issues of how consumers perceive their cars

(including ICE vehicles, HEVs, and BEVs). This is not surprising given that there is a significant degree of overlap between 'image' and 'symbolism', and some researchers in the field of marketing use the two terms synonymously (Dobni & Zinkhan, 1990). 'Symbolism' in its true form is a much more complex concept, however, and intellectual interest in the subject has spanned hundreds of years, generating vast amounts of literature and multiple theories. At the heart of the concept is the notion that a symbol is something which ultimately functions as a 'stand-in' for 'other ideas or feelings' (Levy, 1959, p. 210). While an item can *have* an image, it cannot *have* a symbol; it *is* a symbol, and therefore does not possess the same ontological status of the 'real' thing that it represents. This approach is problematic for addressing the meanings of BEVs, as vehicles leased out to drivers for everyday usage are entities in their own right, and cannot be reduced solely to symbols. Although these cars may fulfil the role of symbols *to some extent*, their physicality and functionality are also of great importance, and the term 'symbolism' in its true sense cannot capture all of their meanings. The term 'image' provides a better match for the TSB dataset, because unlike a 'symbol', an 'image' can communicate the meanings of a product without affecting its ontological status. A car which has an 'image' is still assumed to be more real than the image, despite the significance of the image and its potential power.

2.1.6. Summary

In conclusion, the term 'product image' has been used extensively in marketing and consumer research. Despite the acknowledged confusion surrounding usage of the term (Dobni & Zinkhan, 1990; Kunkel & Berry, 1968; Stern et al., 2001), there does appear to be consistency in the background literature across the basic definitions of what the product image is and what it can do. The above discussion shows it to be an influential factor in determining consumer purchase decisions for ICE cars, so it can be inferred that it will also play an important role for the uptake of BEVs. Despite much academic interest in the topic, however, manufacturers and other stakeholders across many domains have varied in their willingness to take such findings into account. Neglect of image-related issues has been targeted by researchers as a 'managerial blind spot', and failure to address this area is described as having potentially

‘pernicious consequences’ for understanding and addressing consumer needs and desires (Rook, 1999, p. 198). This thesis intends to make a clear argument that highlights the relevance of image and identity for real-world BEV promotion, in a way that can be communicated to appropriate stakeholders in the EV sector.

2.2. Definition and discussion of ‘consumer identity’

The issue of the product image is an interesting topic in its own right. In order to gain meaningful understanding of consumer attitudes and behaviours towards products, however, another factor also needs to be taken into account: that of consumer identity. The image of a product can have a significant impact on a person’s sense of self, and likewise, this sense of self can have a significant impact on product evaluation and choice. The relationship between product image and consumer identity can help to explain how consumers interpret the meanings of items, why different consumers (or different consumer groups) can perceive the same item in different ways, and what makes an image attractive or off-putting for various sectors of the market. The importance of the relationship between consumers and products has been recognised in the field of marketing for decades, and generated an extensive amount of investigation (see Sirgy, 1982a, for a critical review).

2.2.1. *Image congruity theory*

This thesis draws to an extent on a well-established theory in the field of consumer research: image congruity theory, sometimes referred to as ‘image congruency theory’, ‘self-congruity theory’ or ‘self-image/product-image congruity theory’ (e.g., Sirgy, 1980, 1981, 1982a, 1982b). This construct examines the relationship between the images of products and the images that individual consumers hold of themselves. One of its main propositions is that purchase motivations are strongest when a positive (i.e., desirable) product-image matches a consumer’s positive self-image, creating ‘positive self-congruity’, and weakest when a negative (i.e., undesirable) product-image contrasts with a consumer’s positive self-image, creating ‘negative self-incongruity’ (Sirgy, 1982a, p. 289). If the consumer’s self-image is negative, however, a positive product-image can lead to ‘positive self-incongruity’ by

helping the consumer approach an ideal self-image, or a negative product-image can lead to ambiguous self-abasing yet self-consistent 'negative self-congruity' (Sirgy, 1982a, pp. 289-290). This theory expands on the findings of earlier studies, such as Birdwell's (1968) paper (discussed above).

Although Sirgy's theory is widely used in marketing research, however, it does carry a number of limitations. One of the main limitations is the fact that it relies heavily on the notion of the 'self-concept' (a multidimensional identity attached to an individual), and Sirgy himself acknowledged that the existence of a vast proliferation of self-concept models 'not only sacrifices theoretical parsimony but also presents theoretical difficulties in describing and explaining the nature of the interrelationship between these constructs' (1982a, p. 294). Sirgy proposed that the self-concept operates across four main dimensions: the 'actual self-image' (how consumers see themselves); the 'ideal self-image' (how consumers would like to see themselves); the 'social self-image' (how consumers believe they are seen by others); and the 'ideal social self-image' (how consumers would like to be seen by others) (e.g., Sirgy, 1980, 1982a, 1982b). Various mathematical models have been developed to examine how self-image/product-image congruity affects consumer product preference and purchase behaviour (see Sirgy, 1982a, for a review). The complexity surrounding the different dimensions of the self-concept can be problematic, however, and studies (using or not using Sirgy's theory) that have tried to categorise consumers on the grounds of their individual personality characteristics have often encountered difficulties in identifying, selecting, and measuring the relevant traits.

To give an example related to vehicles, Feldman and Armstrong (1975) analysed questionnaire data from a large participant sample in the US in an attempt to identify the differences between early buyers, later buyers, and non-buyers of the rotary-engined Mazda car, an ICE model which was launched in the US in 1971. This situation was somewhat similar to that of the present-day shift towards electrification, as the rotary-engined Mazda model was considered to be highly 'innovative' at the time of the study, and it differed from conventional cars in that it was more expensive but offered 'substantive consumer benefits such as freedom from engine noise and vibration' (Feldman & Armstrong, 1975, p. 47). To measure the personality variables of the participants in each

consumer group from two geographical regions, the study focused on four pre-selected trait categories: 'opinion leadership', 'product interest', 'venturesomeness', and 'personal competence' (Feldman & Armstrong, 1975, pp. 48-49). The results were ambiguous, however, and led the authors to conclude that although this may have been due partly to 'defects in the measuring instrument', the results overall implied that 'in general, personality measures are not good predictors of innovative behavior' (Feldman & Armstrong, 1975, p. 52).

A significant weakness of such studies appears to be that in focusing on individual personality characteristics, they largely ignore issues of social context (e.g., cultural communities and identities constructed through group membership). This is a large gap, as other papers taking alternative approaches have emphasised how people use highly visible products such as cars to communicate their affiliations with particular social groups, social values, and social norms (e.g., Beh, 2009; Birdwell, 1968; Grubb & Hupp, 1968; Stokes & Hallett, 1992). In a paper on vehicle advertising, for example, Stokes and Hallett (1992) described the car as 'a powerful public symbol of clan membership', arguing that 'people are maybe buying cars as much for the desire to belong to a clan as the desire for efficient mobility' (p. 178). In another paper, Grubb and Hupp (1968) revealed that US drivers of two different types of car (the Volkswagen and the Pontiac) perceived themselves to be similar to drivers who owned the same brand, and significantly different to those who owned the other brand (p. 60). The authors concluded that 'promotion of a particular brand requires development of a strong consumer perception of the kind of people who own and use the product' (Grubb & Hupp, 1968, p. 63). This form of identification with social groups, and the assignment of consumers to specific social categories, cannot be fully captured or explained by Sirgy's theory.

Bearing these findings in mind, along with the inductive findings that emerged from the TSB data, this thesis does not focus primarily on attempting to identify and analyse the complex individual personality traits of the BEV drivers in great detail. It seeks instead a broader and more generalisable explanation of the most important image and identity issues related to BEVs. Although image congruity theory provides some interesting insights on a basic level into how

some of the drivers perceived themselves and their cars, it cannot explain everything that was raised in the interviews. This thesis therefore uses a different approach as its overarching theoretical framework: the social identity perspective.

2.2.2. *The social identity perspective*

2.2.2.1. *Social identity theory*

Social identity theory (SIT) is a core construct in the field of social psychology. The name was used by Tajfel (1978), Tajfel and Turner (1979), and Turner and Brown (1978) to encapsulate the ideas that had emerged in their work from the early 1970s onwards (e.g., Tajfel, 1974; Tajfel, Flament, Billig, & Bundy, 1971; Turner, 1975). The theory focuses on the centrality of social context as opposed to individualism for explaining psychological processes, and it examines intergroup relations and collective behaviour. The key premise is that people develop and define their sense of self through group membership; that groups are differentiated from each other through social comparison; and that shared group norms and values underpin individual responses. It assumes that people strive to achieve and maintain positive social identities and self-esteem using various strategies to obtain ingroup 'positive distinctiveness' (Tajfel & Turner, 1979). Social identity in this context is defined as 'the group in the individual' as opposed to 'the individual in the group' (Hogg & Abrams, 1988, p. 3).

Prior to the emergence of SIT, it was generally assumed by social psychologists that the behaviour of social groups could be explained as the aggregation of individual personality traits or inter-individual interactions. One exception to this arose from studies conducted by Sherif between 1949 and 1954, including the famous 'Robbers Cave' experiment (Sherif, Harvey, White, Hood, & Sherif, 1954, 1961) in which boys in a summer camp were divided into two distinct groups and placed in the social context of intergroup competition. This situation induced the boys to develop strong identifications with their assigned group, and to show great hostility to the rival group. Such findings led Sherif to develop 'realistic conflict theory'. Further research in the 1970s showed that assigning participants to groups on a trivial or arbitrary basis, such as their preference for one painter over another, was sufficient to induce ingroup

favouritism and discrimination towards the outgroup, even in the absence of any actual contact between the group members (Tajfel et al., 1971). These 'minimal group studies' led Tajfel to argue that in some circumstances, people may define themselves through the groups to which they belong as opposed to comparing themselves on an individual basis to other individuals (Tajfel, 1978).

SIT proposes that human interaction takes place on a scale ranging from purely interpersonal at one end to purely intergroup at the other (although the extremes are rare). On the interpersonal side of the scale, a person's self-concept ('personal identity') comprises a unique set of idiosyncratic qualities such as attitudes, memories, behaviours, and emotions. On the intergroup side, people derive their sense of self through association with, and dissociation from, particular groups and their established social norms. This form of 'social identity' revolves around ingroups ('us') and outgroups ('them') as opposed to interpersonal interaction models ('me' and 'you'). Tajfel (1978) defined 'social identity' as 'that part of an individual's self-concept which derives from his knowledge of his membership of a social group (or groups) together with the value and emotional significance attached to that membership' (p. 63). In different situations, one type of identity can take precedence over the other; SIT does not propose that social identity is ultimately more real or more important than personal identity, but it does highlight the need to differentiate between the two, and it focuses on the former. SIT uses the term 'social group' in the most broad and encompassing way, including groups that are large or small, permanent or temporary, assigned or chosen, and interactive or non-interactive. A social group can be summarised as 'a set of individuals who hold a common social identification or view themselves as members of the same social category' (Stets & Burke, 2000, p. 225).

2.2.2.2. Self-categorization theory

In the 1980s, Turner and colleagues developed an extension to the original SIT framework: self-categorization theory (SCT) (Turner, 1984, 1985; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). Although the earlier publications proposed that SCT was a new theory in its own right, it is actually very similar to SIT in many respects, and is now generally considered to be 'part of the same theoretical and metatheoretical enterprise' (Hogg, Terry, & White, 1995,

p. 259). The two theories are usually referred to together as the 'social identity perspective' or the 'social identity approach'. SCT focuses on the cognitive side of social identity, exploring the ways in which people 'depersonalise' group members and come to regard them as 'prototypes' of the social category to which they belong. It challenges the traditional explanation of 'stereotyping', arguing that people do not merely employ stereotypes as a way of simplifying complex cognitive information (the 'cognitive miser approach'), but that they use them to help to interpret social situations and to legitimise the actions of their ingroups (Oakes, Haslam, & Turner, 1994; Spears, Oakes, Ellemers, & Haslam, 1997; Tajfel, 1981). The ways in which people stereotype and categorise themselves, plus the meanings that they attach to these categories, are seen as 'critical determinants of social behaviour' (Reicher, Spears, & Haslam, 2010, p. 54).

2.2.2.3. The social identity perspective applied to ICE vehicle choice

The social identity perspective has been applied to surprisingly few studies in the field of consumer research to date (for examples, see Sowden & Grimmer, 2009; White & Argo, 2009; White, Argo, & Sengupta, 2012; White & Dahl, 2006, 2007). This gap in the literature opens an interesting new avenue for this thesis. Sowden and Grimmer's (2009) conference paper on ICE cars is discussed here as an illustrative example. The authors highlighted the fact that very little academic work has used SIT to examine the relationship between consumers and their cars, despite the fact that a car is a product which can make 'a myriad of social statements about the owner' (Sowden & Grimmer, 2009, p. 2).

The aim of the study was to examine how drivers used their ICE vehicles to create and maintain their social identities. The qualitative part analysed data from semi-structured interviews with five car dealership managers and 22 new car owners. The location was not stated, but from the authors' affiliations it can be assumed to be Tasmania. The findings revealed that two-thirds of the new car owners agreed that they felt similar to other people who drove the same car, and that some comparisons were seen as a source of positive self-esteem. Half of the new car owners compared themselves with drivers of different cars, especially cars that they would *not* want to be seen driving. This also appeared to strengthen their sense of self-esteem. Three-quarters of the new car owners

stated that their cars expressed their social identity, using statements such as 'I think the way that I'm viewed by others is definitely reflected in the car' (Sowden & Grimmer, 2009, p. 4). All of the car dealers stated that people engaged in self-categorisation through car ownership, and all but one of the new car owners agreed that they consciously categorised people according to their cars. This was summed up very clearly by one participant:

I think everyone likes to... pigeon-hole people a bit and so if you drive this car that means you belong to this group therefore I will get along with you; if you drive this sort of car you belong to this type of social group, I don't get along with those types of people. (Sowden & Grimmer, 2009, p. 4)

Sowden and Grimmer (2009) summarised their study as having demonstrated the value of applying SIT to consumer research, as the findings showed how drivers used car ownership to locate themselves in society and enhance their self-esteem. They also stated that the results could prove useful in helping marketers to develop appropriate communications with consumers. The conclusion was very brief, however, and did not attempt to go beyond summarising the obvious main points and linking these tentatively to the broadest assumptions underpinning SIT and SCT. The subtleties of the qualitative findings remained unexplored, and little attention was paid to what factors actually distinguished the cars and their driver groups for the interview participants. No information was given about the vehicles that the interview participants owned, so the ways in which they categorised cars and their drivers could only be inferred from quotes referring to vehicle attributes such as type, brand, cost, and overall condition. This rendered the conclusions quite vague, and it was unclear how the findings from the study could or would be applied in a real-world context.

This thesis uses the social identity perspective on a deeper, more complex, and more targeted level. Drawing on the assumption that group membership plays an important role in constructing drivers' identities, it explores the ambiguities which currently surround the social positioning and status of BEV drivers. At the time of the TSB trial, the UK public tended to view BEVs as one homogenous category that was distinctly different from 'normal' ICE cars (Burgess et al., 2013). They were thus inevitably compared to conventional vehicles, and these comparisons were often ambivalent or negative. BEV drivers faced the

challenge of encountering such attitudes and of being stereotyped as people who diverged from established social norms (Burgess et al., 2013; Graham-Rowe, Gardner, Abraham, Skippon, Dittmar, Hutchins, et al., 2012). The social identity perspective is an ideal framework to apply to this sort of phenomenon, as it evolved from studies of intergroup discrimination and has come to function as a ‘theory of *resistance* to discrimination’, which can lead to social change (Reicher et al., 2010, p. 56). Social change on a large scale will be required for BEVs to establish themselves in the mainstream market, and the application of SIT and SCT may offer unique insights into how groups of people could act together to transform their social worlds.

2.3. Conclusion

In conclusion, this chapter has outlined how the terms ‘image’ and ‘identity’ are applied in this thesis, and justified the theoretical approach. It has highlighted a number of gaps in the existing literature, which are summarised in Figure 1. To briefly explain the diagram, much literature in the field of transportation research has focused on *EVs*; much literature in the field of consumer research has focused on *image and identity*; and much literature in the field of social psychology has focused on the *social identity perspective*. There is some overlap between each pair of fields, i.e., transportation research and consumer research; consumer research and social psychology; and social psychology and transportation research. There is very little literature which attempts to draw all three fields together, however, and a substantial review and critical analysis of existing work presented in the next chapter did not find any studies which applied the social identity perspective to issues of image and identity in relation to EVs. This thesis intends to fill the gap and produce novel findings of high importance to researchers, manufacturers, policymakers, and other stakeholders looking for ways to promote new BEV technology to the mainstream market.

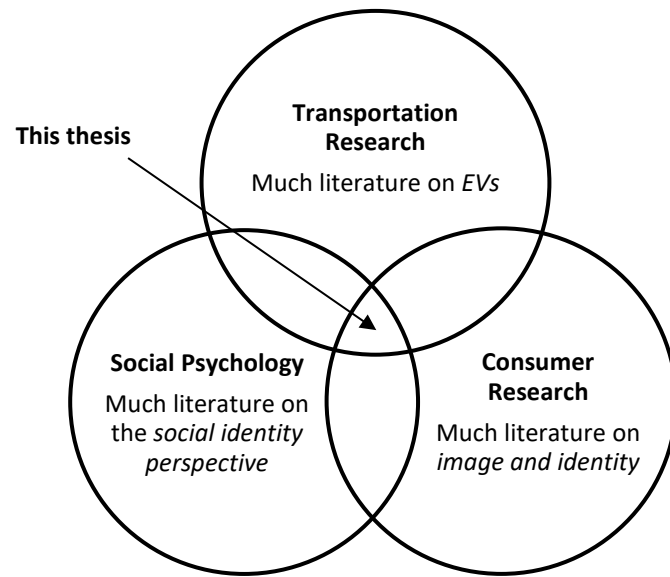


Figure 1. The gap in the existing literature which this thesis aims to address.

Chapter 3

Overview and critical analysis of existing research on issues of image and identity related to EVs

This chapter presents an overview and critical analysis of the existing research which has examined issues of image and identity in relation to EVs (BEVs, PHEVs, and HEVs) and their drivers. It is divided into four sections. Section 3.1 provides a brief outline of the process by which the literature search was conducted. Section 3.2 then examines reports and working papers produced or commissioned by governments, organisations, institutions, and industries, and discusses three relevant examples. Section 3.3 examines academic publications from peer-reviewed journals and other university-based research repositories (divided into two further subsections: 3.3.1 – quantitative studies, and 3.3.2 – qualitative studies), and discusses 14 relevant examples. Lastly, section 3.4 summarises the implications of the overall findings. Following on from Chapter 2, this chapter offers a more specific and focused discussion of the strengths and limitations of publications with direct relevance to the topic of this thesis.

3.1. Outline of the process of the literature search

In the early stages of this PhD project, I conducted a thorough and systematic literature search using a variety of online search engines and appropriate search terms. The purpose was to develop and justify the chosen research question, methodological approach, and theoretical framework. I also conducted supplementary literature searches at regular intervals throughout the course of the PhD. The inclusion criteria were relatively broad, covering all professional publications (i.e., both academic and non-academic literature of sufficient quality) which (a) focused primarily or to a useful extent on EVs, and (b) indicated through the title and/or abstract that they could potentially address issues of image and identity. These criteria allowed exclusion of the vast amount of research which focused solely on the technical or financial

aspects of the vehicles (e.g., papers from journals in the fields of engineering and economics). The criteria also excluded material drawn from the media and social media; although I did examine relevant articles in this field (and draw on some examples in Chapters 5 and 6), these were obviously less robust than the body of professional literature, and the extensive amount of media material available meant that a comprehensive review did not fall within the scope of this thesis.

Overall, a total of 334 relevant publications was identified. The search was not intended to be exhaustive, but it did establish a strong grounding for this thesis to build on. Out of the 334 publications, only a very small number were found to touch on issues of image and identity to any significant degree. 'Identity' in this context is defined as a sense of self linked in some way to the image of EVs. Some papers examined different forms of driver identity, such as how particular personality traits were linked to EV range utilisation (Franke & Krems, 2013a; Pichelmann, Franke, & Krems, 2013), EV risk perception (Wiedmann, Hennigs, Pankalla, Kassubek, & Seegebarth, 2011), or general EV acceptance (Peters, Popp, Agosti, & Ryf, 2011). The findings from these studies were not directly relevant to this thesis, so the papers are not presented in this chapter. In the sections below, a total of 17 publications are discussed in varying degrees of detail; the key points of each are outlined, and the advantages and limitations of both the individual studies and the overall approaches (i.e., quantitative and qualitative) are examined. The papers within each subsection are presented in order of date of publication to give a sense of the direction in which research is moving as EVs continue to evolve.

3.2. Reports and working papers

This cluster of 98 publications (all in English) was accessed online and sourced from a number of nations: Australia (4 publications), Belgium (1), Canada (2), China (4), France (5), Germany (7), Hawaii (1), Italy (2), the Netherlands (1), Norway (3), Spain (1), Sweden (1), the UK (23), and the US (19), as well as from multinational European (10) and global (14) organisations and companies. Publications from the UK were produced or commissioned by various individual and collaborating governmental departments, including the Department for Transport (DfT) (Anable et al., 2006; DfT, 2008; OLEV, 2013) and HM Treasury

(2007, 2008); other national organisations, including the Institute for Public Policy and Research (IPPR) (Rowney & Straw, 2013), the Royal Academy of Engineering (RAEng) (2010), the RAC (Frankel, 2014), the RAC Foundation (Kay et al., 2013; Lane, 2011), the UK Energy Research Centre (UKERC) (Morton, Anable, & Brand, 2014), and the UK Petroleum Industry Association (UKPIA) (Kay et al., 2013); and a number of consortia involved with EV field trials in the TSB ULCVD programme (Carroll et al., 2013; smart, 2010; Switch EV, 2013).

The aim of these publications was typically to outline the current EV situation in national and international contexts, and to communicate clear information to stakeholders and researchers in the transportation field. One publication (Anable, et al., 2006) focused on the broader topic of public attitudes to climate change and transport behaviour, but was included in this literature review because it touched on the issue of image for EVs and was relevant to this thesis. The documents varied in length, with the most substantial ones running to over 100 pages (Anable et al., 2006; Kay et al., 2013; OLEV, 2013; HM Treasury, 2008). Some gave detailed descriptions of the different types of EVs available, and explained levels of consumer interest and purchase rates with extensive usage of facts and figures. The large majority of the publications highlighted the barriers and facilitators to EV uptake, drawing on a wide variety of data sources, and suggested various possible strategies and interventions to improve EV acceptance. These focused almost exclusively on the practical barriers, and the findings could generally be summarised in a concluding statement from a report by the International Energy Agency and Electric Vehicles Initiative (2013): 'The challenges facing vehicle electrification are complex and will therefore necessitate a broad and coordinated effort among all relevant stakeholders to address them' (p. 36).

As noted in Chapter 1, many of these reports and working papers (77/98, 79%) did not mention issues of image and identity at all. Out of the remaining 21 publications, 18 touched tentatively on these issues by acknowledging their existence briefly. The King Review Part I, for example, mentioned the influence on consumer purchase decisions of 'preferences such as appearance, power, image and brand' (HM Treasury, 2007, p. 60); a report commissioned by the US Center for Climate and Energy Solutions observed that 'several personal factors drive consumer demand, including concern for the environment, above average

wealth, personal image importance, and the perceived benefit of ownership' (Ralston & Nigro, 2011, p. 12); and a report commissioned by Roland Berger Strategy Consultants acknowledged that EVs 'must also satisfy [consumer] image requirements with regard to body type and size, manufacturer and brand' (Valentine-Urbschat & Bernhart, 2009, p. 66). Very little further explanation was given as to what sort of images might attract or repel consumers, or how the desirable ones could be promoted. Two reports stated explicitly that such 'soft' factors were subsidiary to quantifiable 'hard' ones: the report commissioned by UKPIA argued that consumer decisions 'can be influenced by image and emotions, particularly for private buyers, but to a large extent the decision is one of value for money' (Kay et al., 2013, p. 118); and a report commissioned by the Fraunhofer Institute stated that 'societal perception and image might help but are certainly not enough to offset the technological and economic hurdles of a mass market roll-out' (Kley, Wietschel, & Dallinger, 2010, p. 1). Out of the 98 publications, only three addressed the topic of image and identity in somewhat greater depth. These three are discussed below.

3.2.1. Reports and working papers addressing issues of image and identity

3.2.1.1. Anable, Lane, and Kelay (2006)

The first was a report by Anable and colleagues (2006), which was commissioned by the UK's Department for Transport to improve the evidence base for Government policy decisions by providing a comprehensive literature review on public attitudes to climate change and transport behaviour. A small section (just under three pages) of the 227-page report discussed 'self-identity and image' in relation to transport choice, outlining various studies and theories and acknowledging that the 'establishment of self-image through the consumption of goods and lifestyles has become an increasingly critical component in defining self-identity' (Anable et al., 2006, p. 99). With regard to EVs, the authors cited an interview-based study by Lane and Potter (2007, in press at the time), which examined consumer attitudes towards low-emission vehicles in the UK, and found that drivers of the Toyota Prius HEV wanted a 'normal' looking vehicle whereas drivers of the G-Wiz BEV enjoyed advertising their 'green' credentials by driving an unusual looking car which could serve to

function as a status symbol (Anable et al., 2006, p. 100). The report posed a number of questions for potential future research, including, 'What are the symbolic meanings attached to cars, buses, bikes etc?', 'Is the effect of identity stronger for some people than others?', and 'How can climate change and green travel be made "trendy"?' (Anable et al., 2006, p. 102). The authors drew attention to the possibility of 'examining ways in which individuals view themselves in society with respect to different travel behaviours', and observed that this would:

involve the development of innovative qualitative techniques to enable researchers to tap into meanings attached to various forms of travel. This will involve the application of a range of disciplinary approaches from semiotics, marketing and social psychology [. . .] to elicit information on how individuals see the stereotypical image of, say, a bus user compared to how they see themselves and the degree to which certain themes are culturally prominent and malleable. (Anable et al., 2006, p. 117)

In conclusion, they highlighted the 'dearth of empirical evidence to provide a detailed understanding of the role of identity with respect to the choice of all travel modes', but argued that existing evidence 'suggests that the status of low carbon cars and alternatives to the car needs to be improved' (Anable et al., 2006, p. 102).

3.2.1.2. Lane (2011)

The second report was by Lane (2011) of Ecolane Transport Consultancy, and was commissioned by the UK's RAC Foundation to provide a review of evidence on UK consumer attitudes towards ultra-low carbon vehicles. A small section (just under two-and-a-half pages) of the 63-page report focused on the 'symbolic values' of the cars, an approach which was highlighted as being crucial in a field largely 'dominated by the framing of the consumer as a "rational actor"' (Lane, 2011, p. 26). Lane cited a number of publications, including two from a group of US papers looking at the symbolic meanings of HEVs (Heffner, Turrentine, & Kurani, 2006; Heffner, Kurani, & Turrentine, 2007a – these are discussed in subsection 3.3.2.2 of this chapter), and such literature was felt to provide evidence that there were multiple symbolic meanings of EVs, containing both positive aspects (e.g., preserving the environment and offering liberation from petrol) and negative aspects (curtailing freedom in terms of limited driving range). Lane concluded that it remained to be seen 'which

symbolic values will be attached to ULCVs as the market evolves’, but that these could be ‘important factors which ultimately determine their success’ (p. 28).

3.2.1.3. Morton, Anable, and Brand (2014)

The third publication was a working paper by Morton and colleagues (2014), commissioned by the UK Energy Research Centre to assess the prevalence and implications of uncertainty in the emerging UK market for EVs. This paper differed from the above two in that it followed the broad format of an academic paper and presented the findings of a new study conducted by the authors. The study took a qualitative approach and applied thematic analysis to semi-structured interviews with 13 stakeholders in the EV field (EV adopters, academics, consultants, non-governmental organisations, and market implementers). Six thematic categories related to uncertainties emerged. The first five were orientated around functional factors, but the sixth addressed the topic of ‘social uncertainty’, and opened with the statement that consumers generally ‘evaluate the functional capabilities which [a new car] offers alongside the image which it represents’ (Morton et al., 2014, p. 17). In this category, interviewees discussed the ambiguity surrounding EVs in terms of public opinion and social norms; while EV drivers may have been seen on one hand as ‘taking things forward’, they might also have been regarded as ‘odd and geeky’ and ‘a little bit off beat’ on the other (Morton et al., 2014, p. 18). There was no further analysis or discussion of these findings, so they remained at a descriptive rather than an interpretative level.

3.2.1.4. Summary

Overall, this substantial body of reports and working papers exposed a large gap in the literature. The majority of the publications overlooked issues of image and identity completely, and the ones which did take them into account offered little insight into the actual *content* of the images of EVs, and the implications that these could have had for the drivers. This was a surprising omission, given that marketing (orientated explicitly around the promotion of images) plays a huge role in the ICE car industry; the top 100 UK advertisers in 2013 included 12 major vehicle manufacturers, each of which spent up to

£46.5 million on advertising (over £333 million in total) (Bold, 2014). The reports by Anable and colleagues (2006) and Lane (2011) referred clearly to this gap, and highlighted the potential opportunities that it could offer for future EV research, while the paper by Morton and colleagues (2014) touched on the complexity of the EV image with the theme of 'uncertainty'. It was apparent from this body of literature that the image of EVs was ambiguous, undeveloped, and unstable, comprising a variety of conflicting aspects. Part of the problem appeared to be the lack of 'evidence' (Anable et al., 2006, p. 102) regarding image and identity issues in the EV field, as the majority of reports and working papers relied on existing research to support their arguments. Those that did conduct new studies were not subjected to the rigorous peer-review process of academic literature, and thus varied in quality and reliability. This suggests that the real gap in the literature currently lies in the academic field, which is discussed in the following section.

3.3. Academic publications

This cluster of 236 publications was sourced largely from peer-reviewed academic journals. In addition, 10 papers were retrieved from the online, peer-reviewed research repository of the Institute of Transportation Studies, University of California, Davis (ITS, UCD), and nine from the online published proceedings of conferences or meetings. A further 12 publications were retrieved from online repositories for doctoral and Master's theses and dissertations. Most of the academic journals fell into the fields of transportation, energy, or business research, plus a smaller number from fields such as ecology and environmental research. The publications were written by collaborating authors from institutions across a total of 27 countries around the globe.

Unlike the reports and working papers discussed in the previous section, the academic publications generally focused more narrowly on specific research questions, and the majority (166/236, 70%) conducted new analyses of data. The journal papers adhered to relatively standard lengths and formats, and adopted analytical rather than descriptive approaches. Many publications applied or developed theories and/or models to provide frameworks for their findings, but their suggestions for real-world applications were typically

broader and less targeted, remaining at the theoretical and speculative rather than the policy-driven implementation level. The underlying aim of these publications was nevertheless similar to that of the reports and working papers: to investigate and assess the current EV situation, and suggest possible ways of promoting EV uptake.

Many of the publications analysed consumer attitudes and behaviour to varying degrees, but this was largely in relation to the functional side of EV adoption and driver adaptation (e.g., how drivers perceived and adapted to features such as limited driving range and the process of recharging). Some touched on issues of image and identity, but it was not their main focus; as with the reports and working papers, this was often just mentioned alongside other consumer-influencing factors, or in reviews of existing literature. Twenty-nine publications (29/236, 12%) drew on the concept of image and identity to a somewhat greater extent, but 15 of these were not considered to be sufficiently relevant and/or substantial to include them for discussion in this chapter. Where appropriate, references to these publications are made in the results chapters (Chapters 5 and 6) of this thesis. The 14 exceptions (14/236, 6%) are discussed below in the following two subsections, focusing on quantitative and then on qualitative research.

3.3.1. Quantitative studies addressing issues of image and identity

Out of the 166 academic publications which conducted new analyses, 132 (80%) adopted a purely or primarily quantitative approach. Despite this significant bias however, only four (4/132, 3%) of these publications investigated topics related to issues of image and identity to any relevant extent. These four are discussed below.

3.3.1.1. Skippon and Garwood (2011)

The first paper was by Skippon and Garwood (2011), who conducted a study to assess people's responses to BEVs following direct experience of driving the vehicles. Fifty-eight participants were recruited from two UK Eon workplaces (an engineering and technology company), and were given a BEV to drive in pairs on a predefined 10-mile route. In addition, 20 of the participants were

assigned overnight usage of the vehicles, which allowed them to try commuting to work and recharging at home. Participants subsequently completed a questionnaire about their attitudes to BEVs and related issues, plus a vignette exercise designed 'to evaluate their attributions of symbolic meaning' of the cars by attributing personality traits to an imagined BEV driver through a series of questions on likely behaviours (Skippon & Garwood, 2011, p. 525). The authors highlighted the importance of 'symbolism' in their paper title ('Responses to battery electric vehicles: UK consumer attitudes and attributions of symbolic meaning following direct experience to reduce psychological distance'), and emphasised at the start that consumers could be motivated by 'affective or symbolic' factors as well as 'functional' ones (Skippon & Garwood, 2011, p. 525).

The findings focused largely on the functional features, however. The results of the vignette exercise were summarised in three short sentences: participants imagined a BEV driver to be 'someone who is open to new ideas (high Openness), likes to plan ahead (high Conscientiousness), and cares about others (high Agreeableness)' (Skippon & Garwood, 2011, p. 530). The discussion stated that such signalled 'symbolic meanings' may have added 'further complexity to the prediction of uptake' as they might have held a positive value for some consumers but a negative value for others (Skippon & Garwood, 2011, p. 530). This was a very loose interpretation of the term 'symbolic meanings', and the three personality traits mentioned were so broad that it was difficult to draw any specific conclusions. It would have been logical to assume, for example, that 'conscientiousness' would be linked to environmental concern, but the paper associated it only with people who liked to plan ahead and were 'more comfortable planning their journeys to take recharging opportunities into account' (Skippon & Garwood, 2011, p. 530). By the end of the paper, it became apparent that the 'symbolic' side of the study was very inconclusive.

3.3.1.2. Egbue and Long (2012)

The second paper was by Egbue and Long (2012), which stated that its aim was to identify potential socio-technical barriers to consumer adoption of EVs, and to determine whether sustainability issues influenced consumer purchase decisions. The authors observed at the start of the paper that much existing

research on EV uptake barriers had focused predominantly on the practical obstacles; they argued that this view did not ‘reveal key areas of consumer resistance to EVs’, and that ““social” barriers may pose as much of a problem as the “technical” [ones] in the development of EVs for the mainstream consumer market’ (Egbue & Long, 2012, p. 718).

The data were collected from an online survey completed by 481 students and staff at a technological university in the US (exact location unspecified, but from the authors’ affiliations it can be assumed to be Missouri). Despite the stated intentions to consider the ‘symbolic attributes’ of EVs alongside the functional ones, however, almost all of the 33 survey questions asked about participants’ perceptions of functional features of the vehicles, plus their personal demographic data. The exceptions were two open-ended questions: ‘Please describe in a few words what comes to your mind when you think about electric vehicles’, and, ‘What, if anything, could be done to make you want to purchase an EV?’ (Egbue & Long, 2012, pp. 725, 728). The orientation of the survey appeared to have primed participants to answer in functional terms, as the example responses given for the latter question referred only to factors such as cost, range, reliability, and recharging time.

The results section summed up in two sentences what could loosely be considered the ‘symbolic’ attributes of EVs: ‘Respondents referred to EVs as the future of transportation; “the way of the future” and “future of travel”’. Environmental benefits were also associated with EVs; “green”, “zero emissions” and “environmentally friendly”’ (Egbue & Long, 2012, pp. 720-721). The second point was undermined later, as it emerged that the majority of participants were in fact uncertain about the environmental credentials of EVs, and some expressed very sceptical attitudes. Overall, this paper did not advance understanding of consumer perceptions of the image of EVs, or the impact that it could have on driver identity.

3.3.1.3. Axsen and Kurani (2013)

The third paper was by Axsen and Kurani (2013) of the ITS, UCD, and it used data collected in 2011 to compare mainstream consumers’ stated interests in ICE vehicles, HEVs, PHEVs, and BEVs in San Diego County, California. The

authors acknowledged in the introductory section that ‘consumers are not just motivated by functional considerations – they may also consider symbolic and societal dimensions’, and that the traditional ‘rational actor’ models of purchase decisions neglected many intangible factors such as ‘the desire to represent and communicate aspects of the driver’s self-identity, e.g., intelligence or pro-environmental values’ (Axsen & Kurani, 2013, p. 533).

The data were collected from 508 households that had recently bought a new car. The main focus of the multi-part study was a web-based design game in which participants had to construct what they considered to be a desirable car through manipulation of various factors. Participants subsequently answered a series of online questions addressing the ‘functional’ and ‘symbolic’ motivations behind their choice of design. The questions addressing ‘symbolic’ motivations were phrased as, ‘Other people will think this vehicle looks...’, and participants could choose from a closed list of 10 different types of ‘images’ (Axsen & Kurani, 2013, p. 540).

Statistical analyses revealed that the more ‘electrified’ the designed vehicle (from HEV to PHEV to BEV), the more likely respondents were to associate it with images of ‘intelligence’, ‘responsibility’, ‘environmental support’ and ‘national (U.S.) support’. There were no significant associations between selected vehicle types and perceived images of ‘power’, ‘attractiveness’, ‘masculinity’, ‘femininity’, ‘success’, or ‘sportiness’. From the graph presented, it appeared that the ‘responsible’ image was the one most frequently attached to BEVs, followed by ‘supportive of environment’, then ‘intelligent’, and ‘supportive of the U.S.’ (Axsen & Kurani, 2013, p. 540).

In the concluding section, the authors stated that consumer perceptions of a vehicle’s image could play a ‘strong role’ in purchase behaviour, and that the ‘symbolic’ benefits of EVs might ‘motivate consumers to overcome or adapt to what may be initially perceived as functional limitations, e.g. limited range’ (Axsen & Kurani, 2013, p. 541). They recommended that policymakers should not focus exclusively on the functional attributes of vehicles, and suggested a number of possible strategies to foster and spread positive images. These included social marketing campaigns; effective ‘green’ vehicle labelling to reinforce the environmental image; efforts to use ‘green’ energy resources; and

the use of marketing and advertising efforts to research and develop appropriate symbolic values for the cars. The paper concluded that 'Further research should explore how policy can further stimulate such symbolic motives for [PHEV/BEV] adoption' (Axsen & Kurani, 2013, p. 542). Although these suggestions were useful, however, the findings were not particularly supportive as the list of 10 images was so small, and participants were probably primed to an extent to select the images they did as the most logical choices for electric cars.

3.3.1.4. Schuitema, Anable, Skippon, and Kinnear (2013)

The fourth paper, by Schuitema and colleagues (2013), stated that its aim was to investigate perceptions of the 'instrumental, hedonic, and symbolic attributes' of PHEVs and BEVs, plus 'the role of self-identity, which may influence the attributes on which people focus' (p. 39). The authors acknowledged that although much empirical evidence had identified the instrumental (i.e., functional) attributes of EVs which may influence uptake, 'very few studies to date have investigated whether the likelihood of adoption of EVs are influenced by perceptions of hedonic and symbolic attributes' (Schuitema et al., 2013, p. 40). The paper drew on Sirgy's image congruity theory to suggest that people who had a 'car-authority identity' (perceiving themselves as opinion leaders and endorsers of new car technology) or a 'pro-environmental identity' (perceiving themselves as environmentally friendly and endorsers of the green image) should perceive all three EV attributes more positively (Schuitema et al., 2013, p. 41). In addition, it proposed that people who regarded themselves as holding both forms of identity might find EVs a particularly attractive transport option.

Data were collected from a 2-wave online survey completed by 2,728 UK participants in 2010. The main part of the survey asked participants to rate sets of statements regarding PHEVs and BEVs. Complex statistical analyses revealed that perceived 'hedonic' and 'symbolic' attributes of the vehicles appeared to mediate the relationship between perceived 'instrumental' attributes and intention to adopt. The authors interpreted this as indicating that the direct influence of instrumental factors was not very strong; they drew the unusual conclusion that features such as driving range were important to consumers

only because of their influence on perceptions of the hedonic and symbolic attributes of the cars (e.g., joy of driving and social identity).

The analyses also revealed that participants who identified themselves as pro-environmental held more positive evaluations of EVs, but that there was only a weak correlation between the car-authority identity and evaluations of EVs. There was no interaction effect between pro-environmental identity and car-authority identity on the perception of car attributes. These findings led the authors to conclude that 'a strong pro-environmental identity alone is enough to generate positive perceptions of EVs' (Schuitema et al., 2013, p. 48). This was a contestable conclusion, and no mention was made of other potential contributing variables that could have influenced drivers' attitudes. In addition, the statements presented to participants for the hedonic and symbolic categories appeared on close examination to be a relatively weak measure of consumer perceptions of EV attributes, as there were only three per category and some did not appear to fit (e.g., one of the three statements in the symbolic category was, 'Compared to a normal car, [PHEV/BEV] cars [are] not suitable for my lifestyle', and one in the hedonic category was, 'I would prefer to drive a normal car than a [PHEV/BEV] car' (Schuitema et al., 2013, p. 43)). This rendered interpretation of the different 'meanings' problematic.

3.3.1.5. Summary

Overall, these four papers offered some limited insight into consumer perceptions of image and identity issues surrounding EVs. Each paper acknowledged the importance of looking beyond practical barriers and the 'rational actor' model, and drew attention to the gap in the existing literature. Despite the complexity of some of the statistical analyses presented, however, the findings were ultimately simple and reductive, and some were potentially misleading. Three of the papers (Axsen & Kurani, 2013; Egbue & Long, 2012; Schuitema et al., 2013) mentioned the 'green' image as something positive, for example, but other (qualitative) studies revealed this to be very complex and ambiguous (Burgess et al., 2013; Graham-Rowe et al., 2012; Heffner, 2007). The quantitative approach appeared to be the underlying cause of these limitations, because although the chosen methods allowed analysis of large datasets, they did not open opportunities for deeper explanations, and could not capture the

complexities which emerged from the qualitative studies. Participants' perceptions were judged on the basis of very brief responses (Skippon & Garwood, 2011; Egbue & Long, 2012), the selection of a few pre-determined images (Axsen & Kurani, 2013), or the rating of a small set of statements (Schuitema et al., 2013). The limitations of these studies are highlighted more clearly in the following section, which examines qualitative research.

3.3.2. Qualitative studies addressing issues of image and identity

Out of the 166 academic publications which conducted new analyses, only 27 (16%) adopted a purely or primarily qualitative approach. An additional seven (4%) adopted a mixed methods approach. These studies covered a range of issues and methods, and focused on in-depth analysis of datasets collected from smaller numbers of participants. Ten of the publications (10/34, 29%), including a cluster of five drawing on the same dataset, addressed issues of image and identity in sufficient depth to include them for discussion below.

3.3.2.1. Gjølén and Hård (2002)

The first was a paper by Gjølén and Hård (2002), which argued that traditional political processes neglected to take consumer attitudes and experiences into account when promoting new technology. Material from 'long interviews' conducted with 'a handful' of individual EV owners in Norway between 1993 and 1995 (Gjølén & Hård, 2002, p. 265) was used to construct a narrative based on a fictional driver named 'Sylvia' who lived in Oslo and drove a small and unusual BEV. The story gave a detailed description of her imaginary commute in the car, which was interspersed with analytical interpretation. Sylvia's narrative offered a lot of information about both the functional and image-related features of the vehicle. She called it her 'Barbie car' because it had a unique design, and regarded it as fun, special, toy-like, and feminine; this was highlighted as illustrating the way in which consumers were able to 'develop new symbols and new user scripts that in the future might challenge politicians' scenarios and engineering scripts' (Gjølén & Hård, 2002, p. 269). For Sylvia, the adoption of a BEV appeared to provide a way of challenging conventional cultural and symbolic meanings of cars as masculine and aggressively powerful.

Sylvia received a number of curious and positive reactions from members of the public, and this gave her a sense of importance and distinction. She also received some expressions of concern about the range, performance, and safety of BEVs, but these did not affect her sense of identity as she was confident, independent, and willing to adapt her driving style. She fell into the consumer category of a 'yuppie', a group of well-off, middle class people who could 'combine professional lives and "high tech" profiles with alternative lifestyles an alert environmental consciousness' (Gjøen & Hård, 2002, p. 267). This category was acknowledged to be a good potential market for EVs. The paper ended with another piece of narrative set in the not-too-distant future, in which a new character called 'Tom' cursed the 'damned electric people' but realised that he belonged to a 'fading, politically weak minority of IC[E] car lovers, most of them well-to-do, middle-aged men with a love for "speed and freedom"' (Gjøen & Hård, 2002, p. 278).

Overall, the paper emphasised the need to recognise the role that consumers played in constructing new and positive meanings for BEVs. It was interesting in that it covered the issues of image and identity in some depth, and drew attention to the importance of acknowledging both of these factors. It also carried several limitations, however, the first of which was the obvious fact that the data were collected in the early 1990s when BEVs were still in the embryonic stages of development, being much smaller and offering significantly lower standards of performance, reliability, and safety than ICE cars. The lack of information given about the interviews (e.g., exact number, length, and type) and participants (e.g., demographic details) made it difficult to draw supported or generalisable conclusions, and the narrative approach blurred the boundaries between fact and fiction; it was unclear which parts reflected BEV drivers' actual reported experiences and which were the result of the authors' interpretations and imaginative additions.

The main point of the paper was that BEVs opened up opportunities for drivers to assign their own idiosyncratic meanings to their cars and to challenge the existing culture of automobility as a whole. This was a somewhat radical perspective, given the deeply entrenched nature of the global car culture that has evolved over the last century. 'Sylvia' did not appear to encounter any particularly negative responses, but it is highly questionable how many people

(male or female) would want to assign the image of a 'Barbie car' to their vehicle, or have the confidence and creativity to develop and promote new images that could evoke very different reactions from the general public. Sylvia also appeared to possess a relatively high social status, even for a 'yuppie' (she was a top manager at work and was wealthy enough to possess a sports car as well as her BEV), so she fell into a social category which was quite atypical and unrepresentative of the majority of the mainstream market. Her level of social power and influence was unclear, however, and the future scenario involving the ICE driver 'Tom' required a large imaginative leap; an alternative future situation could equally well be one in which BEV drivers still formed the minority, embracing a disparate spectrum of personal images that failed to appeal to mainstream consumers and ultimately functioned to stimulate a certain degree of contention and ridicule.

3.3.2.2. Heffner (2007) and associated Institute of Transportation Studies, University of California, Davis (ITS, UCD) publications

The next cluster of five publications came from the ITS, UCD, and the most substantial was Heffner's (2007) doctoral thesis, a 335-page online publication which set out to examine 'the relationship between image and car purchases' and to advance the existing body of research exploring issues of 'what image is' and 'why it is important to consumers' (p. iii). Heffner focused on HEV drivers in the US, and analysed data from in-depth, ethnographic interviews conducted between 2004 and 2005 with 45 HEV-owning households in Northern California. The interviews took 1.5-3 hours and involved 'multiple household decision-makers' (Heffner, 2007, p. 110); they were designed to elicit narrative discussion of a number of pre-set topics, and included an exercise in which participants talked about two or more photographic items that represented the 'meanings' that the HEVs held for them. The researchers (two per interview) also took field notes, and participants completed a brief questionnaire. An additional 23 interviews were subsequently conducted with owners of PHEVs, but these data formed a separate chapter focusing mainly on functional features of the cars and so are not discussed here.

Heffner's (2007) thesis highlighted the novelty of applying a qualitative approach in a field dominated by researchers who tended to 'treat consumers

as rational actors who focus primarily on the functional and financial attributes of vehicles' (p. 7). A substantial section of the thesis (62 pages) was devoted to outlining and discussing various theories which had explored the relationship between product image and consumer identity. Heffner divided these into two categories: 'products as self-expression' and 'products as self-creation'.

Theoretical approaches in the first category (Bourdieu, 1984; Sirgy, 1982a; Solomon, 1983; Veblen, 1899) assumed that 'people exist within fairly defined systems of meaning' over which they had little or no power to change. Those in the second category (Csikszentmihalyi & Rochberg-Halton, 1981; Giddens, 1991; McCracken, 1988) proposed that people had 'much greater freedom to manipulate their own identities and the meanings of products', using their consumption choices to 'invent and re-invent themselves' in ongoing, creative projects (Heffner, 2007, p. 32). Heffner endorsed the latter perspective, and used Saussure's (1965) concept of 'semiotics' (the study of symbols) as an overarching analytical framework to interpret the data.

In Chapter 4 of Heffner's (2007) thesis, the findings were initially presented from four of the 45 households in the form of 'stories' (descriptive narratives of each household and their HEV) and 'semiotic maps' (complex diagrams showing the interrelationships between the various meanings attached to the HEVs by household members). These meanings were divided into two types:

'denotations' (socially-shared meanings) and 'connotations' (personal, idiosyncratic meanings). The findings for all 45 households were summarised in a table showing the five most influential denotations that emerged:

(1) 'Preserve the environment'; (2) 'Oppose war'; (3) 'Manage personal finances'; (4) 'Reduce support to oil producers'; and (5) 'Embrace new technology' (Heffner, 2007, p. 154). Each of these was linked to between one and four connotations. In the next chapter (Chapter 5), stories and semiotic maps were presented for two additional households, and extensive discussion of these participants' 'self-narratives' was used to explore how they used their HEVs as 'products as self-creation'. Finally, in Chapter 6, increasingly complex stories and semiotic maps were presented for another four households, and the discussion drew on deeper dissections of semiotic theory.

The content of Heffner's (2007) thesis formed the basis of four papers. The first (Heffner, Kurani, & Turrentine, 2005) examined the preliminary results

collected from 10 HEV-owning households, and gave a broad overview of the multiple meanings that arose from the data. No theoretical perspective was applied, but the paper focused primarily on the images of environmental protection and money-saving. The second paper (Heffner et al., 2006) provided an introduction to semiotics and was very similar to Chapter 2 of Heffner's thesis. The third (Heffner et al., 2007a) presented the findings from 25 households, and was drawn from Chapters 4 and 6 of Heffner's thesis. The fourth (Heffner et al., 2007b) used the same data to make recommendations for stakeholders involved with the promotion of fuel-cell vehicles.

Together, these publications formed a landmark body of research in the EV field. They applied thorough and systematic qualitative analysis to a very rich dataset, and revealed an extensive number of insights into image and identity issues that would have been impossible to capture using a quantitative approach. The analyses looked at 'the how and the why' of consumer behaviour, and unpicked purchase decisions in a way that offered 'deep understanding' on a level that no other work on EVs had attempted to address (Heffner, 2007, pp. 91, 94). Despite these advantages, however, the studies still carried a number of limitations. In contrast to the overly broad and shallow findings of the quantitative papers, the results presented by this cluster of ITS, UCD research could be said to pose the opposite kind of challenge; many of the multiple emergent meanings were so idiosyncratic, detailed, and diverse that it was unclear to what extent the selected stories and semiotic maps represented the experiences of the participant sample as a whole, and whether the participant sample could be said to be representative of a larger body of consumers. Although qualitative research steers clear of trying to generalise findings, and the authors acknowledged that the meanings could not be considered 'universal' (Heffner et al., 2007a, p. 399), there were some social, cultural, and location-related variables in the dataset that could have been outlined more clearly. The state of California, for example, is a very high profile, trend-setting region of the US, home to Hollywood and large areas of renowned natural beauty, which could well have contributed to participants' strong pro-environmental and pro-innovation attitudes.

When thinking about potential applicability to the UK BEV market, it is also important to note that the perceptions of Heffner's (2007) participants related

clearly to *HEVs* as opposed to EVs more generally. HEVs do not have limited range or require recharging, and the models owned by the Californian participants were of similar size and performance to mainstream ICE vehicles. Twenty out of the 45 households in Heffner's thesis actually owned high performance or large sports utility vehicle (SUV) hybrids. In addition, it is necessary to take into account the fact that the households interviewed had already made the significant commitment of buying their HEVs, so it was perhaps unsurprising that their personal views of the cars were largely very positive.

As with Gjøen and Hård's (2002) paper, Heffner and colleagues (Heffner, 2007; Heffner et al., 2005, 2007a, 2007b) focused primarily on how EV drivers created and manipulated new images for their cars and for themselves, a process that the authors considered to be very appealing. On close reading of the 'stories', however, it became apparent that alongside their personal views, many households did express concern about other people viewing the HEVs in ambivalent or negative ways, drawing on pre-existing social stereotypes operating in the public sphere. Drivers felt that they might be seen as a 'tree-hugger' (Heffner, 2007, pp. 136, 144, 162, 181, 202), a 'radical environmentalist' (p. 139), an 'environmental zealot' (p. 182), a 'liberal' (pp. 136, 144), a 'socially-challenged geek' (p. 164), or simply as someone who was 'smug' (p. 165), 'self-righteous', or 'self-absorbed' (p. 162). In his thesis, Heffner (2007) discussed this phenomenon briefly, but paid comparatively little attention to it and went on to state that, 'Since many buyers decided to purchase HEVs in spite of negative meanings, it is likely that these negative meanings were seen as less important than the positive ones' (p. 165). In the papers, the negative meanings were almost completely ignored by the first three (Heffner et al., 2005, 2006, 2007a) and only touched on very briefly in the fourth (Heffner et al., 2007b). This suggests that there may have been another, under-explored side to the situation which the data collection and/or data analysis methods failed to fully capture. Even if the negative meanings were not seen as particularly important for the selected sample of early adopters, they could be much more off-putting to mainstream consumers.

Finally, the choice of semiotics as an overarching analytical framework carried its own set of limitations for research looking at consumer behaviour.

Saussure's (1965) theory evolved in the field of linguistics and is a highly rational and technical approach designed to examine the structure of language. On a basic level, it proposes that a symbol (the 'signifier') is a word that stands in for the real object or concept (the 'signified'), and that such symbolic structures underlie human cognitive processes. The theory has since been applied in many other fields, and Heffner (2007) wrote extensively about how HEV signifiers could be parsed into multiple components such as 'syntagms' (symbols comprising combinations of other signifiers) and 'paradigms' (signifiers that combine to form the syntagms). This did not offer much explanation of the *content* of the emergent symbolic meanings, however, and Heffner's discussion of the findings remained largely descriptive in many places, suggesting that a specific psychological theory could have supported more insightful explanations of the data. The social identity perspective would perhaps have been an ideal approach to examine the ways in which many participants appeared to maintain a strong sense of self-esteem through establishing positive 'ingroup' distinctiveness and comparing HEV drivers favourably to the 'outgroup' of ICE car drivers (they repeatedly derogated ICE SUV drivers in particular). Heffner attempted to explain the perceived division between HEVs and ICE cars using the syntagm/paradigm model, but semiotic theory did not account for the emotional and social factors involved, and ultimately led to a detached and objective overview of the complex, competing, and highly personalised meanings articulated by the drivers.

Overall, this body of ITS, UCD research generated a lot of valuable data and clearly established some of the benefits of applying a qualitative approach in the transportation field. The main findings were novel, and included highlighting how the symbolic meanings of HEVs were very important to consumers; how these could override practical barriers to HEV uptake; how they may have had an impact on drivers' sense of identity; and how drivers used them to communicate messages to other people. The limitations discussed above must nevertheless be taken into account when considering the implications for EV uptake on a wider scale. This current thesis takes the limitations of the above work as a set of guidelines for developing an approach more suited to producing findings that are more relevant and more accessible for UK stakeholders.

3.3.2.3. Caperello and Kurani (2012)

One separate ITS, UCD study was a paper by Caperello and Kurani (2012), which stated that its aim was to gain insight into ‘why people respond to PHEVs the way they do’ (p. 495) and analysed data collected from 36 households participating in 4- to 6-week PHEV driving trials in Northern California from 2008 onwards. The authors constructed household ‘narratives’ based on multiple semi-structured interviews, questionnaire responses, and measures of driving and recharging behaviour drawn from on-board data loggers. Although the non-interview data was acknowledged to be quantitative, the overall approach was primarily qualitative and inductive. In the introductory section, the authors stated their intentions to explore participants’ perceptions of the ‘practical, emotional, and symbolic aspects of their evaluations of PHEVs’, and they emphasised the importance of qualitative research in ‘understanding people’s meanings behind their actions’ (Caperello & Kurani, 2012, pp. 495-496).

The chosen method was thematic analysis, and this revealed a total of seven themes. All focused almost exclusively on practical points, however, although some issues tentatively related to vehicle image did emerge from the overall findings. One main recurring issue was uncertainty and confusion (echoing the findings of Morton et al., 2014), as many households remained ‘unfamiliar and uncomfortable’ with PHEV technology even after a month of usage, and held the image of PHEVs being ‘a car of the future, not a car of today’ (Caperello & Kurani, 2012, pp. 499, 503). Another highlighted issue was the fact that the environmental credentials of the PHEVs were not mentioned by any of the households. This surprised the authors, who stated that this finding did not ‘exclude the possibility that a cadre of climate-aware consumers will initiate a market for electric-drive vehicles’, but they assumed that it emphasised the importance of promoting the environmental benefits of BEVs (i.e., the green image) (Caperello & Kurani, 2012, p. 506). Overall, the findings were relatively superficial, and the paper did not attempt to analyse the ‘symbolic aspects’ of participants’ evaluations that were mentioned at the beginning.

3.3.2.4. Graham-Rowe, Gardner, Abraham, Skippon, Dittmar, Hutchins, et al. (2012)

A more in-depth study was conducted by Graham-Rowe and colleagues (2012) in the UK. This paper analysed interview data from 40 non-commercial drivers (20 male and 20 female) who participated in 7-day field trials in three locations in the south of England (exact dates unspecified). Half of the drivers were given a BEV and the other half a PHEV. Semi-structured interviews were conducted at the end of each trial, and a form of grounded theory analysis revealed six core response categories: (1) 'cost minimisation'; (2) 'vehicle confidence'; (3) 'vehicle adaptation demands'; (4) 'environmental beliefs'; (5) 'impression management'; and (6) the underpinning theme that EVs were perceived as a 'work in progress' (Graham-Rowe et al., 2012, p. 144). Image and identity related issues emerged predominantly from categories 4 and 5.

In the brief 'environmental beliefs' category, it was reported that some participants gained a 'feel-good' factor from the environmental credentials of the cars, or stated that it helped to alleviate 'driving guilt' (Graham-Rowe et al., 2012, p. 147). Being an early adopter of 'green' technology conveyed a 'desirable social identity' for a few drivers, but others were sceptical about the actual green credentials of EVs (Graham-Rowe et al., 2012, p. 147). In the 'impression management' category, a variety of points emerged. Some drivers expressed concern about how they would be viewed by other people in terms of the 'perceived identities connected with this car choice' (Graham-Rowe et al., 2012, p. 148), and several felt embarrassed or ashamed to be seen driving a BEV/PHEV. This appeared to be due to the cars' lack of visual appeal, poor performance, comparison with glamorous ICE cars, or negative reactions from other people. Exploration of drivers' feelings about other people's perceptions revealed three broad construals of typical EV users. The first was 'people with limited mobility needs'; this was typically seen as negative as it was linked to consumer groups who valued only the functional aspects of their cars and just needed to 'tootle around' (Graham-Rowe et al., 2012, p. 148). The second construal was 'those who valued identity and affective benefits' such as environmental concerns; this was also seen as negative by many drivers, as it evoked stereotypes of eccentric environmentalists. The third construal was 'PHEV drivers who derive social identity gains' from their cars; this was seen as

positive, as it was felt to confer 'kudos' and conveyed the image of modern and forward-thinking early adopters embracing viable new technology (Graham-Rowe et al., 2012, pp. 148-149). The authors noted that these construals were based on drivers' own judgements of public perceptions, and that the actual responses encountered from other people were mostly just expressions of curiosity.

In the discussion section, the authors summarised these image-related points in two brief paragraphs, and concluded that negative views could potentially be countered by 'positive and aspirational imagery' which 'may create social approval and acceptance' (Graham-Rowe et al., 2012, p. 150). They observed that while the environmental image was perceived as communicating a positive identity for some drivers, it was felt to communicate a negative identity for others, and this led them to propose that 'emphasizing environmental benefits of BEVs may have unintended negative effects on some consumers' (Graham-Rowe et al., 2012, p. 151). They suggested that uptake of EVs was likely to require 'broad and positive images of EVs and their users', perhaps as 'caring', 'connected', 'innovative', 'future orientated', and 'technologically informed' (Graham-Rowe et al., 2012, p. 151).

Overall, this study provided the first real insight into UK BEV drivers' perceptions of image and identity-related issues. Unlike the preceding qualitative studies reviewed in this subsection, it focused on consumers who were more representative of the mainstream market and had not yet committed themselves to purchasing an EV. This could help to explain why they appeared more willing to express ambivalent or negative thoughts and feelings towards the cars, in addition to the positive ones. The paper revealed some interesting complexities and contradictions in the interview data, and highlighted the importance of looking beyond a 'rational actor' consumer model.

In terms of limitations, however, the image and identity issues raised were given comparatively little attention compared to the practical factors, which implied that the former should be considered subsidiary to the latter. The presentation of the results was somewhat ambiguous as no clear indication of numbers was provided (the phrases 'many drivers', 'some drivers', and 'other

drivers' overlapped and became confusing in places). It was not apparent whether all participants were asked the same questions, or what topics the questions covered; the interviews were initially described as 'semi-structured', but the methods section stated that 'Participants were encouraged to speak spontaneously' and interview questions 'were used where necessary to evoke further discussion of topic areas salient to participants' (Graham-Rowe et al., 2012, p. 144). No theory was used so the discussion was primarily descriptive, and a deeper exploration of the emergent psychological issues (e.g., the apparent disparity between drivers' own perceptions of the cars' images and their assumptions about other people's perceptions of these images) would have been beneficial.

3.3.2.5. Burgess, King, Harris, and Lewis (2013)

The next study was a paper that I co-authored with my PhD supervisors and a former colleague prior to starting this PhD project (Burgess et al., 2013). Expanding on a topic of interest which was first identified by the fourth author (my predecessor in the initial research post on the TSB ULCVD programme), I conducted a review and critical analysis of the existing literature, and went on to select a participant sample and undertake the initial, detailed analysis of the TSB data. In conjunction with the first author, I subsequently developed the themes and drafted much of the paper, the process of which was discussed with and independently audited by the third author. The study used a qualitative approach to examine interview data collected between 2009 and 2012 from 55 private BEV drivers in the TSB trial (41 male and 14 female; there is an overlap of 29 drivers with the sample of 53 selected for this thesis). The aim of the study was to identify the images of BEVs that existed in the UK public imagination by analysing drivers' reports of interactions and communication with a wide range of non-BEV driving people, including strangers, acquaintances, colleagues, friends, and family members. The findings suggested that BEVs were particularly susceptible to stereotyping, but that this stereotyping was in a state of flux. The chosen method was thematic analysis, and it revealed three main themes: (1) 'Traditional' meanings; (2) 'Ambivalent' meanings; and (3) 'Positive' meanings.

In the 'Traditional' meanings category, 69% of drivers reported encountering people who appeared to hold negative stereotypes of BEVs. These people imagined the cars to be underpowered or unviable technology that evoked a certain amount of disparagement, anxiety, or ridicule. This often reflected a mindset 'indicative of a more general preference for adhering to established ways of life and entrenched opinions' (Burgess et al., 2013, p. 41). Individuals holding these views usually lacked knowledge or experience of BEVs, but were resistant to receiving contrary or disconfirming information. Negative attitudes appeared to be a primarily affective response, often linked to a sense that BEVs posed a threat to existing lifestyles and identities reliant on ICE cars. Two conflicting images emerged from the 'Traditional' category, as some people imagined BEVs to be technologically crude and old-fashioned (associated with vehicles such as milk floats and golf buggies), while others envisaged them as being overly complex, high-tech, and 'geeky' (associated with odd-looking 'space agey' machines) (Burgess et al., 2013, p. 38). People with negative views often stereotyped BEVs strongly, regarding them as one inferior, homogenous category and exaggerating the differences between BEVs and ICE cars.

In the 'Ambivalent' category, 56% of drivers reported encountering people who were undecided or unsure about BEVs, or held elements of both positive and negative views. Many were sufficiently open-minded to express interest in the cars, but generally adopted a 'wait and see' approach, and displayed attitudes that were 'hesitant, cautious, sensible, and risk-averse' (Burgess et al., 2013, p. 42). They accepted the socially-sanctioned stereotype of BEVs as 'underdeveloped technology, futuristic but potentially unfeasible' (Burgess et al., 2013, p. 42), and their responses were primarily cognitive, relying on rational assessments of the advantages and disadvantages of BEVs on an abstract, non-participatory level. People in this category tended to align themselves with the mainstream market, viewing the BEV drivers as adventurous pioneers on one hand but as a risk-taking minority on the other. They perceived the environmental images to be ambiguous, carrying a mixture of desirable and undesirable meanings.

In the 'Positive' category, 36% of drivers reported encountering people who were enthusiastic about BEVs, often after first-hand exposure to the TSB trial vehicles. Direct experience helped to shatter misleading preconceptions and

immediately promoted the image of BEVs being a 'real', 'normal', and 'viable' means of transportation (Burgess et al., 2013, p. 42). A number of drivers explained how they took a proactive role in initiating conversations and offering rides, and many others received unsolicited approaches to their vehicles, even from complete strangers. This participatory interest helped to reduce the unfamiliarity and uncertainty that typified the 'Traditional' and 'Ambivalent' categories, and new images of BEVs were found to revolve around high-performing, exciting, practical, and future-facing technology. The formation of positive attitudes seemed to include a combination of behavioural, affective, and cognitive components, and to comprise systematic as well as heuristic processing. Other important facilitators which played a part in the process of stereotype change were the increased visibility of BEVs, a wider range of available models, and a higher, positive profile in some areas of the media.

In conclusion, the findings were summarised as showing how the UK public appeared to hold a broad spectrum of images for BEVs, ranging from the very negative at one end to the very positive at the other, with a middle ground that was 'vacillating and open to change' (Burgess et al., 2013, p. 43). The findings suggested that the next wave of BEV adopters is likely to come first from consumers holding a 'Positive' outlook, and that the conversion of people holding 'Ambivalent' or 'Traditional' views will potentially rely on promotion of a variety of desirable images in the public sphere, plus more opportunities for direct experience with BEVs, and the ambassadorial role of BEV drivers. Overall, the paper emphasised the importance of acknowledging the role that stereotypes can play for consumers, functioning not only to systematise and simplify new concepts but to preserve and bolster particular social values and social norms.

In undertaking the initial analysis for this study, many issues arose from the data that I realised could not be captured in a single paper. These included the complexity of some of the specific images identified (in particular the 'environmental' image and the 'technological' image); drivers' reactions to the responses of other people, especially negative responses; the impact of pre-existing stereotypes on drivers' behaviour and sense of identity; and the distinction between the drivers' actual reported interactions with other people

and their imaginative assumptions about how other people perceived the BEVs. For clarity, the paper focused on just three main categories of meaning drawn from the drivers' reports of interactions with other people, but it also opened up a number of avenues for future research, and provided a clear starting point for this thesis.

3.3.2.6. Garland, Huising, and Struben (2013)

The final study discussed here took a different approach to analysing EV images. Garland and colleagues (2013) examined marketing representations of the Toyota Prius HEV in Canadian publications from 2006-2011, conducting a qualitative analysis of text and visual images in 33 print advertisements and comparing them to a matched sample of advertisements for ICE vehicles. The stated aim of the study was to identify and examine the dominant themes which functioned as a means of invoking, guiding, and shaping viewers' imaginations, and had the potential to influence people's perception of climate change. The authors highlighted the importance of the symbolic and cultural meanings of cars, and how such non-instrumental factors could play a key role in encouraging people to adopt pro-environmental attitudes and behaviours.

The analysis revealed three main themes: (1) 'nature'; (2) 'harmony'; and (3) 'agency'. For the first theme, nature was found to be central to each Prius advertisement, but the representations were unrealistic and described by the authors as a 'hyperreal' improvement on reality, linked to a fantastical future in which the Prius had the power to 'repair and reorder' a form of nature which was pliable and benign (Garland et al., 2013, pp. 687, 691). This contrasted with the ICE car advertisements, in which nature was often construed as something rugged and ominous over which the vehicles exerted domination and control. The second theme ('harmony') focused on how the Prius was presented as having a harmonious relationship with nature, integrated into artificial, airbrushed landscapes where the technology appeared 'as natural as the trees among which it sits' (Garland et al., 2013, p. 691). This was another direct contrast to ICE vehicle advertisements, which generally showed the cars as moving fast over smooth asphalt and signifying the traditional images of 'freedom, power and speed' (Garland et al., 2013, p. 692). The third theme ('agency') drew attention to how the Prius advertisements were largely devoid

of people and lifestyle indicators, and how the imagery was orientated spatially in ways which did not invite people to imagine themselves in the driver's seat. The driving experience (linked to environmental damage) was not featured or promoted, and viewers were simply transported to a new space of 'recreation and escape' where they could act as free agents to create and recreate their own sense of identity (Garland et al., 2013, pp. 692-693). This was again very different to the ICE vehicle advertisements, which generally used powerful visual imagery to encourage people to project themselves into the pre-set roles of adventurous drivers enjoying an exhilarating ride.

In an extensive discussion, Garland and colleagues (2013) explained the ways in which viewers were invited to 'actively make sense of the product' through 'participation and co-creation', and how the Toyota Prius marketing strategies depended on consumers' 'capacity to imagine' (p. 694). They argued that this approach allowed for 'a plurality of people to identify with the brand', and circumvented the problem of 'alienating or stigmatizing customer segments' who were not willing to identify with specific images (Garland et al., 2013, p. 696). Although the strategies were positive in one sense, however, they were acknowledged as being negative in another, as the represented utopian worlds may have encouraged viewers to 'withdraw from present and future difficulties related to climate change' and neutralised fears about the need for urgent action (Garland et al., 2013, pp. 696-697). The authors discussed the concept of 'ambiguity' in depth, and suggested that ambiguous cues in the advertisements allowed Toyota to avoid the risks associated with explicit 'green' marketing, such as implying that their other ICE vehicle lines were somehow inferior and less desirable than the HEVs.

In terms of limitations, Garland and colleagues (2013) acknowledged that the study focused primarily on the images attached to one HEV brand in one country, and that they did not investigate Toyota's original intentions or test the actual effect on consumers. One other gap in the paper (not acknowledged by the authors) was the fact that it largely ignored the importance of social context in some ways, carrying the implicit assumption that consumers would view the advertisements with open minds and act as free agents to imagine and create new selves in relation to the Prius. As discussed above, however, the concept of the creative consumer may be problematic; advertisements do not

operate in a vacuum, and viewers will almost certainly interpret the images and text through the various lenses of social and cultural experience, including representations of HEVs in other forms of media, and the attitudes held by family, friends, colleagues, and the public. The authors did not address this issue, or mention whether any differences were found in advertisements sourced from different publications, or across the 5-year data collection period (the second half of the decade following the global launch of the Prius in 2001, which saw a dramatic increase in uptake). By dissociating the advertisements from social and cultural contexts in this sense, the analysis became somewhat abstract, and the attempt at the end of the paper to link the findings back to 'the urgent need for behavioural change to limit the impact [of global warming]' (Garland et al., 2013, p. 700) was relatively vague.

3.3.2.7. Summary

Altogether, this small body of qualitative publications presented a diverse body of research. The studies used a wide variety of datasets, participant samples, methods, approaches, and theories. The majority (6 out of 10) were conducted in Northern California, plus two in the UK, one in Norway, and one in Canada. Only three (Burgess et al., 2013; Gjølén and Hård, 2002; Graham-Rowe et al., 2012) looked at BEVs; the rest focused on HEVs, and in one case on HEVs and FCVs (Heffner et al., 2007b). Out of the 10 publications, only two (Burgess et al., 2013; Graham-Rowe et al., 2012) looked at BEVs in the UK. The latter study did not make issues of image and identity its main concern, and did not distinguish between the BEV and PHEV drivers in reporting its findings. The paper that I co-authored (Burgess et al., 2013) was the only publication to adopt a primarily psychological perspective. This highlighted (again) a very large gap in the literature.

The studies outlined in this subsection revealed the qualitative approach to have many advantages over the quantitative approach for addressing issues of image and identity in relation to EVs. It permitted in-depth exploration of rich datasets, and could reveal the complexities, subtleties, and ambiguities underlying participants' attitudes and behaviour. Data collection methods allowed participants to voice their own subjective experiences, and the analysis of textual and visual data enabled new and unanticipated findings to emerge.

Researchers' interpretations did not attempt to reduce the data into rigid, pre-existing frameworks, which made the findings more reflective of reality. The above discussion also highlighted a number of limitations in the existing qualitative research, however. The emergent idiosyncratic findings from the publications covered a broad spectrum of meanings, and it was unclear to a large extent what the exact relevance was for stakeholders in the EV market. Although the studies showed that issues of image and identity were very important, and that they could influence consumer attitudes and behaviour, there were very few targeted suggestions as to how stakeholders could apply the findings to increase EV uptake. The existing images were identified as being ambiguous and unstable, but the majority of the studies (Gjøen & Hård, 2002; Heffner, 2007; Heffner et al., 2005; 2007a; 2007b; Garland et al., 2013) emphasised the role of the consumer in creating and transforming new, desirable meanings for the cars. This raised some additional, unanswered questions, such as: to what extent do negative EV images exist, and what is their impact on consumers? Do different people hold different images of EVs and their drivers? Do EV early adopters differ from the mainstream market? The final section of this chapter outlines briefly how this thesis takes into account the limitations of the existing literature in developing its methodological approach and main areas of focus.

3.4. Conclusion

In conclusion, this chapter has made clear that more research is required on issues of image and identity for EV drivers. It has identified a number of specific gaps and weaknesses in the existing literature, as summarised at the end of each subsection above. Drawing these findings together, it becomes evident that this thesis needs to address the methodological challenge of *striking a balance* across all sorts of extremes. The 17 studies examined form a highly polarised picture, ranging from the very simple to the very complex; the atheoretical to the overly theoretical; and the very broad to the very focused. There are no particularly consistent findings, and some findings appear to contradict each other. Bearing this in mind, this thesis does not attempt to build on the existing literature by developing and testing specific hypotheses; instead, as explained in Chapter 1, it adopts an exploratory, inductive approach

and investigates the TSB data in an open-minded, data-driven way. It intends to produce findings of interest and of use to readers both inside and outside of the academic field, and the following chapter provides full details on the methodological approach selected to achieve this aim.

Chapter 4

Method

This chapter outlines the methods used for selecting and analysing the data in this thesis. It is divided into seven sections. Section 4.1 presents a description of the Technology Strategy Board (TSB) Ultra Low Carbon Vehicle Demonstrator (ULCVD) programme. Section 4.2 provides details of the participant sample selected for analysis. Section 4.3 then provides details of the BEV models driven by the participants. Section 4.4 (divided into a further two subsections) explains the procedure by which the data were collected, in terms of the interviews (subsection 4.4.1) and the questionnaires (subsection 4.4.2). Section 4.5 (divided into a further two subsections) explains how the data were analysed, in terms of the mixed methods approach (subsection 4.5.1) and the thematic analysis method (subsection 4.5.2). Section 4.6 discusses the concepts of validity and reliability in relation to research with a qualitative orientation. Lastly, section 4.7 presents an overall summary of the methodological approach, and describes how the findings from the data are presented in the following two chapters.

4.1. Outline of the TSB ULCVD programme

As explained in Chapter 1, the data analysed in this thesis were collected from BEV drivers participating in the TSB ULCVD programme. This pioneering project was launched in 2008 by the TSB, the UK's innovation agency (now renamed Innovate UK). The project concluded in 2012 after its 349 ultra low emission vehicles had been driven for a total of over 1.5 million miles (Carroll et al., 2013). Over 90% of the vehicles were pure BEVs, while the remainder were plug-in hybrid or hydrogen fuel-cell vehicles. The programme involved eight consortia positioned around England and Scotland, comprising a number of vehicle manufacturers, equipment manufacturers, energy suppliers, university partners, and local authorities. The programme was designed to 'support the development of technologies and markets for ultra low carbon vehicles' by enabling the cars to be tested in real-world contexts on the UK roads (Carroll et

al., 2013, p. 5). Throughout the trial, data collection took place from both the vehicles (through on-board data loggers) and the drivers (through interviews and questionnaires). A detailed overview of the TSB ULCVD programme and its main findings can be found in its Final Report (Carroll et al., 2013).

Participants for the programme were recruited by the individual TSB consortia, and comprised a mixture of both corporate (70%) and private (30%) drivers (Carroll et al., 2013, p. 9). This thesis focuses exclusively on the private drivers, who applied to take part in the trial of their own volition and used the BEVs for everyday purposes. These drivers were assumed to have more personal interest in the BEVs than those who had simply been assigned one by their place of work. The TSB consortia also handled the distribution of the BEVs, and provided appropriate training and support. They selected drivers for the purpose of their individual projects, and the participant sample was not intended to be representative of the average UK population in terms of demographics or vehicle usage. The private drivers were generally thought to represent an 'early adopter' group, however, which is known to play an important role in encouraging the mainstream market to accept new products (Rogers, 1962, 2003). The interview schedules and questionnaires used for the data analysed in this thesis were designed by a research team in the Department of Psychology at Oxford Brookes University, who subsequently collected the data between December 2009 and March 2012 (Carroll et al., 2013). I worked full-time on this team for 1 year prior to starting this PhD, and my responsibilities included collecting, collating, and analysing large amounts of data; producing a number of reports for stakeholders; and contributing to various co-authored presentations and publications.

4.2. Participant sample selected

I selected a participant sample of 53 TSB drivers for this thesis. This was felt to be of sufficient size to gain both breadth and depth of understanding across a fairly diverse sample range. All drivers had been assigned to one of four types of fully-electric BEVs: the Mercedes-Benz smart fortwo electric drive, the Mitsubishi i-MiEV, the Tata Indica Vista EV, and the BMW MINI E. Details of these BEVs are provided in section 4.3. The Mercedes-Benz smart BEVs were divided between two consortia: one group, along with the i-MiEV and the

Indica Vista EV, came from the Coventry and Birmingham Low Emission Demonstrators (CABLED) consortium group, which operated in the West Midlands, while the other came from the London South East consortium group, which operated in London and the South East. The MINI E came from the MINI E consortium group, which operated in a triangular area between Oxford, Andover, and West London. The BMW trials were part of a larger, international MINI E field trial project, but only the UK trials were included in the TSB ULCVD programme. Further details of these three consortia are presented below in Table 1.

Table 1

Details of the Selected TSB ULCVD Programme Consortium Groups [Main source: SMMT, 2009]

Consortium group	CABLED	MINI E Research Project	London South East Consortium
Location	West Midlands	Midlands/South East	London/South East
BEVs included in thesis	• Mercedes-Benz smart fortwo electric drive • Mitsubishi i-MiEV • Tata Indica Vista EV	• BMW MINI E	• Mercedes-Benz smart fortwo electric drive
Consortium group members	• Arup • Jaguar Land Rover • Mitsubishi/Colt • Mercedes-Benz/smart • Tata Motors • LTI Vehicles • Microcab Industry • E.ON Energy • HaloIPT • Advantage West Midlands • Birmingham & Coventry City Councils • Aston, Birmingham, & Coventry Universities	• BMW Group • Scottish and Southern Energy • South East England Development Agency • Oxford City Council • Oxfordshire County Council • Oxford Brookes University's Sustainable Vehicle Engineering Centre	• smart • EDF Energy • Elektromotive • Nudge Advisory • Greater London Authority • Westminster City Council

The TSB trials were advertised to the UK public through newspapers, flyers, and websites, and people applied by post or online. The majority of selected drivers paid a monthly lease fee for their BEV. Various motivations inspired drivers to

apply for the trials, including being a car enthusiast generally; being interested in assessing the practicality of BEVs; having a desire to advance new driving technology; wanting to protect the environment; and wanting to save money on fuel costs (Carroll et al., 2013). Drivers were usually given the BEVs for periods of 6-12 months. This trial length enabled the cars to be tested in a genuine real-world context and become integrated into the drivers' ongoing, routine lifestyles.

The 53 drivers were selected for this thesis using appropriate inclusion and exclusion criteria. These criteria initially focused on vehicle type. Drivers using the above four types of BEV were selected for inclusion because the cars were relatively similar in terms of size and performance. Vehicles from other consortia were excluded because they were too different (e.g., vans or high performance sports cars), and so differed in both image and practical features. The criteria then focused on the data collected. Drivers were included if they had completed at least two interviews (including the pre-trial interview), plus at least one questionnaire (the post-trial questionnaire). The interview data needed to be sufficiently robust, so drivers who had given only brief responses to relevant questions were excluded. For the questionnaires, drivers had to have answered the questions identified as being most relevant.

This process narrowed down the potential dataset to 84 drivers, but two types of BEVs significantly outweighed the others. These groups of drivers were reduced by a process of random selection, designed to ensure that an appropriate number of female drivers was included for the sample to be regarded as representative of the TSB private driver group as a whole in terms of gender. The drivers of the Mercedes-Benz smart cars were considered to form two discrete groups, as the Midlands/London locations rendered their experiences somewhat different. The final sample comprised five groups of 8-12 drivers (Mean = 10.6). Information about vehicle type is not included in the results sections of this thesis as the manufacturers in the TSB trial have allowed data to be disseminated to a wider audience provided that the specific BEVs are not identified. Combination of findings from drivers of different types of EVs reflects other studies (e.g., Burgess et al., 2013; Graham-Rowe et al., 2012; Heffner, 2007; Heffner et al., 2007a, 2007b), but for this thesis the data were initially analysed by vehicle group to ensure that no distinct patterns

emerged between the groups in terms of the image and identity-related issues reported in the following chapters. BEV type was only one variable among many in the project (e.g., driver age, gender, occupation, income, location of residence, and daily driving pattern), and this thesis focuses on findings that are relevant to the wider BEV market rather than unique to specific models or brands.

Thirty-nine of the selected 53 drivers were male (74%) and 14 female (26%), with an age range of 23-71 years (Mean = 46.91, SD = 12.00). Additional demographic details were provided by 24 of the 53 drivers (45%). These are presented below in Table 2. Overall, the demographics are similar to those of the whole TSB dataset, in which drivers were predominantly male (76%), in their mid-40s (mean age 46 years), white (91%), living with a spouse or partner (85%), and had a university degree (for private drivers, 67%) (for full details, see Carroll et al., 2013, p. 11).

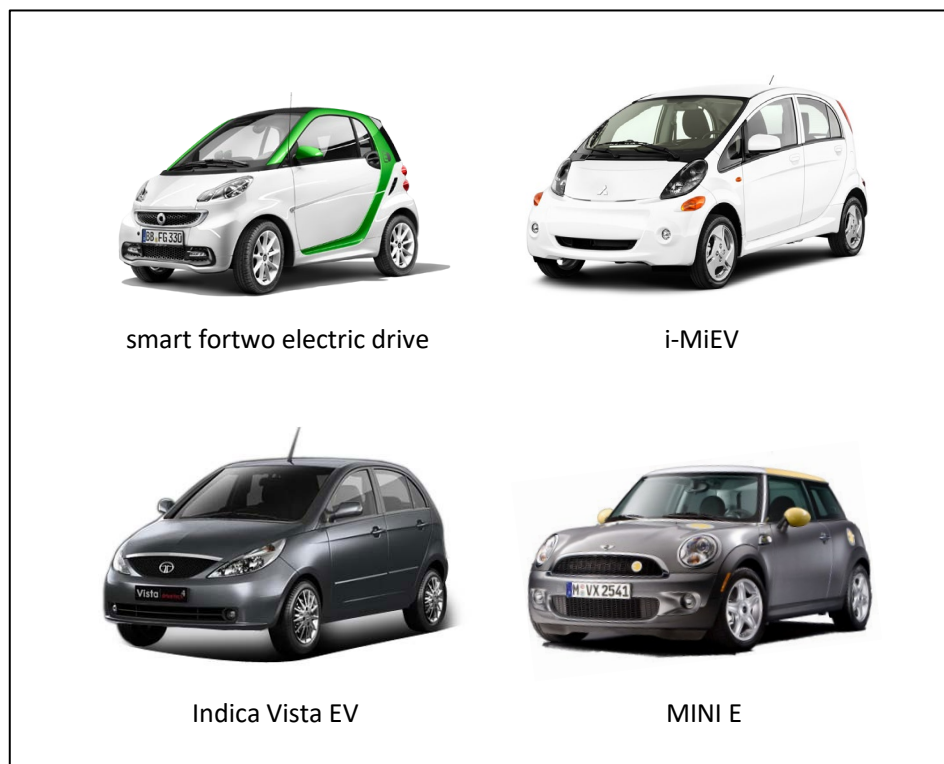
Table 2
Participant Demographics

Category		Response			
Ethnic background N=23	White		Mixed		
	96%		4%		
Marital status N=24	Single	Married	Living with partner	Divorced/separated	Widowed
	4%	67%	13%	12%	4%
Education level N=24	GCSE/equivalent	A-level/equivalent	Graduate	Post-graduate	Other
	4%	29%	25%	33%	8%
On average, how often do you drive? N=24	Every day		4-6 days per week		
	83%		17%		
How many hours per week do you spend driving? N=23	Range		Mean		SD
	2-100 h		12.87 h		19.39 h

4.3. Details of the BEVs

The Mercedes-Benz smart fortwo electric drive was a conversion of the ICE smart fortwo city car. It had two seats and was the smallest of the TSB trial

BEVs. Its top speed was an electronically limited 62 miles per hour (mph) and its maximum range was about 84 miles. The Mitsubishi i-MiEV was a newly-designed, sub-compact, 4-seater hatchback. Its top speed was about 81 mph and its maximum range was about 93 miles. The Tata Indica Vista EV was a conversion of the ICE Indica Vista 4-seater hatchback. Its top speed was an electronically limited 65 mph and its maximum range was about 100 miles. The BMW MINI E was a conversion of the ICE MINI Cooper model, with two seats instead of four as the battery occupied the rear space of the vehicle. Its top speed was about 95 mph and its maximum range on a fully-charged battery was about 100 miles. 'Maximum range' refers here to the driving range under optimal conditions and with optimal driving style, with no usage of energy-consuming devices such as heaters or radios. Example illustrations of each of the four BEV types are presented in Figure 2.



Note: Scaling is not exact. Colour and design of paintwork varied between vehicles.

Figure 2. Examples of each of the four types of BEVs.

4.4. Procedure of data collection

4.4.1. Interviews

During the TSB trials, the majority of drivers were interviewed at the following stages: pre-trial, one week into the trial, and three months into the trial. One group of drivers was also interviewed at two additional time points, but these interviews are not analysed in this thesis. Another group was interviewed only at the 3-month time point, but their interviews used a 'combined' schedule which included all questions from the pre-trial as well as the 3-month interview. Questions from the pre-trial interview were put into the past tense, and included phrases such as, 'Prior to your participation in the trial...' and, 'Before you received the electric car...' to remind drivers to reflect back on their pre-trial thoughts and feelings.

The interviews were one-on-one and conducted over the telephone at times convenient to each driver. The majority of interviews lasted between 30-90 minutes. The interview schedules were designed to cover all major aspects of the drivers' expectations and experiences, ranging from the purely practical aspects of using the BEVs to deeper, psychological engagements with their cars (see Appendix B for copies of all three schedules). This thesis focuses on drivers' perceptions of issues related to image and identity. A small number of interview questions were designed to address this topic directly (e.g., 'Is there any difference in the image of the [electric] vehicle?' and, 'Do you think that electric vehicles are a status symbol in any way?'). Other, broader questions also prompted the drivers to reflect on image and identity related issues (e.g., 'What needs to be overcome for the successful widespread adoption of electric vehicles?' and 'For you personally, what are the most important reasons for taking part in the trial?'). All relevant information provided by drivers was analysed, regardless of the specific questions used to elicit it.

The interviewers prompted the drivers to give specific examples in response to the questions, and encouraged them to elaborate on their initial answers with follow-up, narrative-inducing probes in line with Wengraf's (2001) suggestions for optimal narrative-based interviewing. These probes were grounded in statements which the driver had made and the interviewer perceived as interesting and wanted to learn more about (e.g., 'You said that "electric cars

are seen as odd". Can you tell me more about that?'). This technique offers a way to establish rapport between interviewer and respondent, and can lead to additional, richer data as it allows the interviewer to enter the psychological world in which the respondent is the 'experiential expert', capable of steering the interview in unanticipated directions and branching into novel areas through accounts of their personal and social experiences (Smith & Osborn, 2008, p. 59). The interviews were transcribed verbatim and checked carefully to ensure accuracy.

4.4.2. Questionnaires

The questionnaires were distributed to drivers in paper format prior to the start of each trial (pre-experience questionnaire) and at the 3-month stage of the trial (post-experience questionnaire). This thesis draws only on the latter due to greater relevance of the post-trial questions, and some missing pre-trial data. The post-experience questionnaire was designed to cover all major aspects of drivers' experiences with their BEVs (see Appendix C for a partial copy). Most of the questions asked drivers to rate statements on a 5-point scale (1 = *Strongly disagree* to 5 = *Strongly agree*). Drivers returned completed questionnaires in the pre-paid envelopes provided. Eleven questions relevant to this thesis were identified, although the questionnaires given to one consortium group differed slightly to those given to the other groups, and included only 7 of the 11 questions. The number of responses for each question is clearly indicated in the results sections of Chapters 5 and 6.

4.5. Analytical approach

4.5.1. Mixed methods approach

This thesis used a mixed methods approach, drawing on both interview and questionnaire data. It focused primarily on qualitative analysis of the interview data, supported by descriptive analysis of the relevant questionnaire items. This qualitative orientation enabled in-depth exploration of the complex issues surrounding image and identity for BEV drivers. As explained in Chapter 3, much of the existing research on EVs has relied on quantitative approaches which can carry numerous limitations. The current project drew out the

subtleties and contradictions lying beneath the surface of the drivers' thoughts and feelings regarding their BEVs. This kind of research can help to deepen knowledge by offering insights with a high degree of applicability to social reality (Creswell, 2009).

The interview data collected for the TSB ULCVD programme was well suited for a predominantly qualitative approach. The semi-structured interviews were designed to encourage participants to explain and discuss their expectations and experiences on both personal and social levels, while the use of specific questions ensured that their responses were not too divergent. This kind of rich interview data allowed responses to be interpreted initially from the participant's point of view, using 'empathetic hermeneutics' to gain a holistic understanding of the narratives (Smith & Eatough, 2007). The application of 'critical hermeneutics' then assisted the researcher to delve below the surface level of the accounts, interpreting the participants' interpretations and making connections of which the participant may have been unaware (Smith & Osborn, 2008). This second stage was particularly important for this thesis, because although the BEV drivers were evidently conscious of and articulate about issues of image and identity, they did not have the psychological expertise or access to other drivers' interviews which were essential to make sense of the dataset as a whole. It has also been acknowledged that drivers 'might not be willing to admit that using a car fulfils many symbolic and affective functions' (Steg, 2005, p. 148), so it could not be assumed that they always expressed their thoughts and feelings in the most clear or candid way.

No research approach or methodology can be regarded as perfect, and some authors maintain that the findings of qualitative research may lack validity and transferability (Black, 1999). A mixed methods approach which combines but does not merge qualitative and quantitative approaches can be seen as a form of interplay between the two (Flick, 2006; Strauss & Corbin, 1998). The questionnaire data were used in this thesis to help ensure that the qualitative interpretations were sufficiently representative of the entire dataset, and not biased towards a minority of drivers' views. They were included in specific subthemes which clarified the drivers' perceptions of the more surface-level aspects of image and identity (i.e., the extent to which the images and image-related identities were felt to reflect reality). These findings provided a

foundational base for the increasingly interpretative qualitative analysis to build on.

4.5.2. *Thematic analysis method*

The interview transcripts were analysed for the following chapters in accordance with the thematic analysis (TA) guidelines provided by Braun and Clarke (2006, 2012). TA was chosen as an analytical method because its flexibility made it ideal for applying to a relatively large qualitative dataset, allowing the key themes to be identified and summarised across a range of participants. Other methods, such as interpretative phenomenological analysis (IPA) or grounded theory (GT), would have been less suited to the task as they were designed to focus on the unique, subjective experiences of just a few participants, and would have drawn attention away from the social and cultural contexts in which BEV usage is embedded.

TA is a foundational method not bound to a particular theoretical framework, so was appropriate for a project taking an inductive (bottom-up) approach with the aim of exploring an under-researched topic and investigating novel areas. It allowed the application of theory, however, so supported the use of the chosen theoretical approach to help to explain and anchor the findings. A good TA approach strikes a balance between description of the surface-level ‘semantic’ data patterns and interpretation of the underlying, ‘latent’ content (Braun & Clarke, 2006; Patton, 1990), enabling clear presentation of the more obvious, explicit results alongside insightful explanations of the deeper, implicit ones. The research is thus generally accessible to the educated public as well as academic specialists, and can produce analyses suited to informing policy development (Braun & Clarke, 2006). This attribute was a crucial requirement for this thesis, as it aimed to answer the research question in a way that would enable the conclusions to provide useful information and suggested strategies for improving BEV uptake, which could be easily communicated to a range of stakeholders outside the field of psychology.

As outlined by Braun and Clarke (2006, 2012), the TA process involves six ‘phases’: (1) ‘familiarizing yourself with your data’; (2) ‘generating initial codes’; (3) ‘searching for themes’; (4) ‘reviewing themes’; (5) ‘defining and naming

themes'; and (6) 'producing the report' (see Braun & Clarke, 2006, p. 87, for an overview table). In Phase 1, early readings of the TSB transcripts focused on pinpointing meaningful features of the data which were firmly grounded in the drivers' statements, as this helped to ensure that the eventual themes did not just evolve out of established theoretical frameworks or extraneous preconceptions. In Phase 2, the annotations on the transcripts were coded and collated across the entire dataset, resulting in a long list of codes which formed the 'building blocks of analysis' (Braun & Clarke, 2012, p. 61). In Phase 3, these codes were sorted and collated into potential themes and subthemes, using visual representations in the form of diagrams and tables. This process involved 'thinking about the relationship between codes, between themes, and between different levels of themes' (Braun & Clarke, 2006, p. 89), and required extensive sorting and clustering of codes to 'reflect and describe a coherent and meaningful pattern in the data' (Braun & Clarke, 2012, p. 63). In Phase 4, the potential themes and subthemes were reviewed and revised until they were felt to meet Patton's (1990) dual criteria of 'internal homogeneity' (meaningful coherence of data within a theme) and 'external heterogeneity' (clear distinctions between each theme). This phase involved repeated cycles of reviewing and re-reviewing, and much combining and dividing of codes, themes, and subthemes. In Phase 5, the selected themes were named and refined further, in order to ensure that they captured the 'essence' both of the data and of the overall narrative (Braun & Clarke, 2006, p. 92). This phase drew on 'deep analytic work', and related the data back to the existing literature and the theoretical approach (Braun & Clarke, 2012, p. 67). Lastly, Phase 6 involved writing up the findings in a clear and coherent way.

4.6. Validity and reliability

The conceptualisation of 'validity' and 'reliability' differs considerably between quantitative and qualitative research paradigms (Golafshani, 2003; Shenton, 2004; Smith, 2008, 2011). In the former, 'validity' is usually defined in terms of empirical evidence, objectivity, and accuracy of measurement, while 'reliability' is generally assumed to mean replicability or repeatability (Golafshani, 2003). In the latter, however, the two concepts are often merged together and replaced with encompassing terminology such as 'credibility', 'transferability', and

‘trustworthiness’ (Golafshani, 2003, p. 600). As opposed to focusing on factors such as sample size, participant selection criteria, and measuring instruments, qualitative methods focus instead on issues such as internal coherence of the narrative and quality of evidence provided by examples (Elliott, Fischer, & Rennie, 1999; Golafshani, 2003).

This thesis attempted to make the best possible case for its findings by taking into account the ‘strategies for ensuring trustworthiness in qualitative research projects’ presented by Shenton (2004, see p. 73 for a tabulated overview) and the ‘criteria for good thematic analysis’ presented by Braun and Clarke (2006, see p. 96 for a tabulated checklist). In terms of the data collection methods, for example, the TSB data were collected consistently using ‘well recognised research methods’, and the interviewers (including myself) applied appropriate tactics to ‘help ensure honesty in informants’, such as making clear at the start of the interviews that there were no right or wrong answers to the questions (Shenton, 2004, p. 73). In terms of the analysis, I conducted all phases of TA in a rigorous and systematic manner, and took care avoid ‘potential pitfalls’ such as placing too much weight on idiosyncratic and anecdotal quotes (Braun & Clarke, 2006, p. 94). With regard to the presentation of the findings, clear numbers and percentages are provided for all themes and subthemes in the following two chapters. This clarifies the distribution of participant quotes, in contrast to the more ambiguous phrases such as ‘many’ participants and ‘some’ participants used in other studies (e.g., Graham-Rowe et al., 2012, as discussed in Chapter 3).

4.7. Conclusion

In conclusion, this chapter has explained and justified the methods used for collecting and analysing its dataset. Although no approach can be deemed perfect, the carefully evaluated choices of participant sample, methodological approach, and analytical method were intended to produce high quality findings which advance the existing body of research on issues of image and identity related to BEVs. The methodological limitations of the existing research (as discussed in Chapter 3) were taken into account when considering the most appropriate approach for this thesis. The following two chapters present the findings, divided into two overarching categories: the first looks at the

environmental image of the BEVs, and the implications for BEV drivers (Chapter 5), and the second looks at the *technological* image of the BEVs, and the implications for BEV drivers (Chapter 6). These two categories were felt to have sufficient breadth (as relevant data were found across all 53 drivers' interviews) and sufficient depth (as they each contained multiple themes and subthemes, and a number of complex phenomena). Earlier stages of the thematic analysis process brought up a number of different patterns which were considered in turn, but eventually judged to be flawed on various grounds. The *environmental/technological* divide was ultimately felt to offer the most balanced and cohesive structure, in which the themes and subthemes related to each other both within and between each of the two chapters, and offered insight into why a number of complex and apparently competing perceptions of image and identity issues emerged.

Chapter 5

The environmental image of BEVs, and the implications for BEV drivers

5.1. Introduction

The environmental credentials of EVs are the main reason why governments across the globe are so keen to promote a switchover to the new technology. By introducing the 2008 Climate Change Act, the UK became the first country to establish a law requiring the reduction of greenhouse gas (GHG) emissions. Overall, Europe now has some of the most demanding vehicle regulations, with vehicle manufacturers facing fines if they fail to meet the strict average CO₂ emission targets for the total number of cars or vans they sell (OLEV, 2013). This is by far the most dominant GHG, and ICE road transport accounts for 24% of the UK's total CO₂ output (National Atmospheric Emissions Inventory, 2014).

GHGs lead to global warming by trapping solar radiation inside the Earth's atmosphere. Naturally occurring GHGs keep the planet at life-sustaining temperatures, but human population growth and large-scale industrialisation have resulted in rising levels since the mid-eighteenth century. A significant increase has occurred since the 1950s, and changes in many extreme weather and climate events have been observed over the last 60 years. The most recent worldwide assessment report from the Intergovernmental Panel on Climate Change (IPCC) stated that human influence on the climate system is clear, and that continued emission of GHGs will 'cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems' (IPCC, 2014, p. 7). Such impacts will almost certainly include rising sea levels, ocean acidification, melting glaciers, heat waves, droughts, floods, storm surges, cyclones, and wildfires. Outcomes are very likely to lead to biodiversity reduction, a risk of extinction for marine and terrestrial species, and a threat to human systems such as agriculture and food production (IPCC, 2014).

Various strategies have been proposed to reduce CO₂ emissions in the transportation sector. Many revolve around *reducing car use* by promoting other forms of mobility (e.g., walking, cycling, and taking public transport), and/or by discouraging unnecessary car journeys through measures such as congestion charges and increased fuel prices (see Anable et al., 2006, for a review). While these efforts may have some impact, however, they will not come anywhere near meeting the governmental targets for countering climate change. The car plays a central role in modern society, as it has radically redefined lifestyles and travel patterns over the last century by creating cultures in which home, work, retail, and leisure spaces require flexible commuting between multiple localities (Urry, 2004, 2006). Cars offer convenience, comfort, and personal safety, and have come to sustain major discourses of 'what constitutes the good life' and 'what is necessary for an appropriate citizenship of mobility' (Urry, 2006, p. 18). The number of cars on the roads is rapidly increasing, especially in developing countries, and it is estimated that there will be a total of 3 billion in use by 2050 (International Monetary Fund, 2008).

EVs offer a potential solution to the challenge of cutting back CO₂ emissions. Pure BEVs produce no CO₂ at a tailpipe level, and although they currently rely predominantly in the UK on electricity generated by fuel-burning power plants, the introduction of newer, cleaner plants and renewable energy resources will enable them to facilitate a dramatic shift away from GHGs. In addition, BEVs do not emit from their tailpipes any of the exhaust fumes produced by ICE vehicles. These include particulate matter (PM), oxides of nitrogen (NO_x), and oxides of sulphur (SO_x), all of which contribute to poor local air quality and are linked to respiratory and cardiovascular illnesses plus increased mortality in humans (OLEV, 2013). Diesel engine emissions have been classified as carcinogenic (OLEV, 2013). Exhaust fumes also cause damage to natural ecosystems and urban environments, resulting in cities around the world having to grapple with serious inner-city air pollution problems. The World Health Organization (WHO, 2014) reported that data collected between 2008 and 2013 revealed how people in 88% of 1,600 surveyed cities from 91 countries breathed air that fails to meet levels deemed safe, and that many urban centres 'are so enveloped in dirty air that their skylines are invisible' (para. 7). Global urbanisation is rising,

and it is predicted that by 2020, around 60% of the world's population will be living in cities (OLEV, 2013).

The exact environmental impact of BEVs is difficult to define at present due to the newness of the technology and its ongoing, rapid development. Factors such as vehicle lifespan and battery production and disposal must be taken into account, but complex models have been constructed (e.g., Arup & CENEX, 2008), and OLEV (2013) stated that 'there is consistent evidence that the efficiency benefits of electric propulsion outweigh the potential negative impacts of the technologies in the manufacture and disposal phases', allowing EVs to 'provide a significant environmental advantage over internal combustion engines' (p. 74). This was supported by another, independent report commissioned by the UK Petroleum Industry Association and RAC Foundation, which stated that despite emissions caused by vehicle manufacturing and disposal, and the production of the electricity, 'HEVs, PHEVs and BEVs are calculated to have significantly lower overall life cycle GHG emissions than a conventional petrol vehicle' (Kay et al., 2013, p. 39). These 'well-to-wheel' emissions could decrease substantially by 2050, and the European Commission has funded research to stringently assess the environmental impact of each life cycle phase of EVs (Kay et al., 2013).

On a purely functional level, it is logical to assume that consumers should perceive the environmental credentials of BEVs as something very positive. The existing literature often highlights the need for promoting these benefits clearly, and removing the misconceptions currently held by the general public (e.g., Accenture, 2011a, 2011b; HM Treasury, 2008; Lane, 2010; OLEV, 2013). It has been inferred that for some drivers, the low emissions could be felt to outweigh barriers such as high purchase price and limited driving range. This has led researchers to draw conclusions such as, 'Consumers who are more concerned about the environment are more interested in electric cars. [. . .] For the future of electric cars, *green awareness is key*' (smart, 2010, p. 5). With regard to issues of image and identity, three of the quantitative academic papers outlined in Chapter 3 of this thesis (Axsen & Kurani, 2013; Egbue & Long, 2012; Schuitema et al., 2013) emphasised the importance of promoting a 'green image', making statements such as, 'People who believe that a "green" image fits with their self-image are more likely to have positive perceptions of

EVs. [. . .] The “green” image of EVs is essential for the positive perception and early adoption’ (Schuitema et al., 2013, p. 48).

In the qualitative publications discussed in Chapter 3, however, some ambiguities surrounding the identities associated with the ‘green’ image emerged. Heffner and colleagues (2007b) briefly acknowledged that although two individuals might agree that HEVs symbolised environmental concern, ‘one may view HEV owners as ethical, caring people, while another labels HEV owners as radical or self-righteous’ (p. 398). The paper presented quotes from two interview participants: ‘Tony’ cared for the environment but was concerned that his HEV ‘could portray him as a radical environmentalist rather than the sensible, environmentally aware Republican he perceived himself to be’, while ‘Richard’ embraced a green lifestyle but was worried that ‘he might be seen as a “tree-hugger” driving an econo-box’ (Heffner et al., 2007b, pp. 404, 407). This ambiguity emerged again in Graham-Rowe and colleagues’ (2012) paper, as some interview participants felt that they gained a ‘desirable social identity’ from driving a PHEV/BEV, but others regarded it as more negative, and one driver imagined the typical BEV user to be ‘a spinster lady currently working in a library, hugging trees and going to public meetings about saving the planet’ (Graham-Rowe et al., 2012, pp. 147-148). The authors went on to observe that ‘BEV drivers motivated by environmental concern were viewed disparagingly, because they were seen to compromise their personal mobility’ (Graham-Rowe et al., 2012, p. 151). A similar theme was touched on in the paper that I co-authored (Burgess et al., 2013), in which some of the TSB trial interview participants expressed their sense of ambivalence in statements such as, ‘In terms of what other people think, it’s that eco-friendly, little bit geeky, eco warrior [image]’ (p. 39).

The negativity in these examples appeared to stem not from the participants’ *personal* perceptions of the ‘green’ image of EVs, but from their inferences about how other people would perceive the ‘green’ image and go on to draw assumptions about the driver’s identity. These assumptions tended to operate on a broad and stereotypical level, positioning the EV driver in a social category detached from conventional norms, values, and behaviours. This ‘abnormal’ form of pro-environmental identity was briefly acknowledged by Anable and colleagues (2006), who referred to a report which argued that

‘environmentalism has become entwined with images of denial such as not driving a car and using less water, and that this is out of line with what society considers to be *normal*’ (Bedford, Jones, & Walker, as cited by Anable et al., 2006, p. 107). The authors also observed that those who ‘willingly undertake environmental actions are perceived as “pious, hair-shirted, sandal-wearing hippies”’ (Bedford et al., as cited by Anable et al., 2006, p. 107). Anable and colleagues stated that ‘these negative connotations ensure that people continue to distance themselves from “abnormal” environmental stereotypes’ (p. 107).

Terms such as ‘tree hugger’ and ‘eco-warrior’ also proliferate in public discourse. To give an example from the UK, *The Sunday Times* (Britain’s oldest and best-selling broadsheet newspaper) devoted one issue of *The Sunday Times Magazine* (a publication renowned for its high-quality journalism) to the topic of climate change in November 2009, just prior to the seminal 2009 United Nations Climate Change Conference in Copenhagen. Despite the fact that the magazine as a whole clearly emphasised the need to acknowledge and address the problems of pollution and global warming, multiple references were made in various articles to ‘tree-hugging, soft-headed warmists’; ‘dinner-party eco-warriors’; ‘green believers [wearing] Tibetan hats that only look good on Tibetans’ (Appleyard, 2009, pp. 12, 11, 10); the ‘eco-nutter’; the ‘shouty mob of eco-protesters’; the ‘green fringe’ (Hattersley, 2009, pp. 29, 31); the ‘starry-eyed eco-dreamer’ (Arlidge, 2009, p. 25); and the ‘eco-hypocrites’ who go around ‘spouting green virtue but spewing out hundreds of tons of carbon from their private jets or multiple holiday homes around the globe’ (Foreman, 2009, pp. 52, 54). Although it appeared that the authors were generally trying to *disprove* these negative stereotypes, advising readers to ‘forget dreadlocks, lentils and sandals’ because ‘the new breed of eco-warriors is sassy and sharp-suited’ (Hattersley, 2009, p. 29), the use of such descriptions nevertheless functioned to invoke and reinforce the impression that people with pro-environmental attitudes occupied a unique social group that attracted and deserved a certain amount of ridicule.

With regard to EVs, caricatures of pro-environmental drivers are sometimes drawn on in the media, especially by television programmes such as *Top Gear* in the UK (prior to the dismissal of presenter Clarkson by the BBC in 2015). One

brief article published on a website created for EV enthusiasts and adopters highlighted this as a problematic issue, asking, 'Are electric vehicle owners being stereotyped?' and, 'If you drive an electric car, are you a swivel-eyed, sandal-wearing, hemp-chewing leftie loon?' (Conway, 2011, para. 2). The author subsequently observed that although the EV market was expanding and diversifying away from consumers motivated primarily by 'an activist environmental agenda', even popular HEV models such as the Toyota Prius were 'still seen by many on the right [i.e., with right-wing, conservative UK political affiliation] as an overtly political, environmentally concerned statement' (Conway, 2011, paras. 7, 8). Surprisingly, however, this social categorisation has been almost completely ignored in the extensive body of existing academic literature looking at the EV market. This thesis chapter addresses the gap by examining TSB drivers' perceptions of the 'green' image and the associated identities that they believed it to hold.

5.2. Results and discussion

Thematic analysis of the interview data revealed two main overarching themes for this chapter: *the 'green' image of BEVs* (5.2.1) and *the 'green' identity of BEV drivers* (5.2.2). It should be noted that the term 'green' was used by drivers of their own accord; it was not included in the phrasing of the interview schedules or questionnaires. The subthemes attached to each theme are outlined in Figure 3. Summary tables are provided at the start of each subtheme in order to give a clear overview of the proportion of drivers falling into each main category of response. The results are then presented with supportive illustrative quotes, and discussed in sufficient depth to allow the subtleties and complexities to be exposed and investigated.

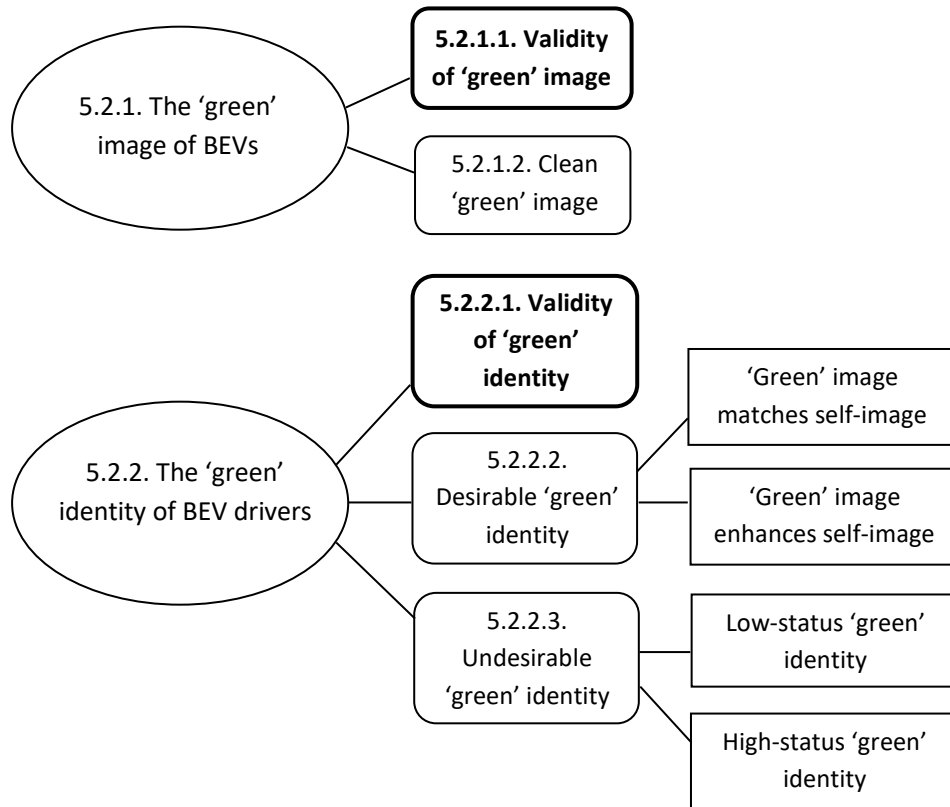


Figure 3. Thematic map showing Chapter 5 themes and subthemes.

Each of the two main themes is linked to a subtheme centred around issues of ‘validity’ (highlighted in bold on Figure 3). These subthemes differ slightly from the rest of the subthemes in the way that they are presented. Braun and Clarke (2012) used the metaphor of the TA researcher as a sculptor ‘making choices about how to shape and craft their piece of stone (the “raw data”) into a work of art (the analysis)’ (p. 63), an extension of their original emphasis on the need for the researcher to actively ‘construct’ rather than passively ‘discover’ themes and subthemes within the data (Braun & Clarke, 2006, p. 96). The sculpting process in this chapter constructed the two ‘validity’ subthemes as a foundational base for the rest of the analytical structure, as the initial data-driven codes formed distinct clusters providing answers to two important underlying questions: *Do the drivers perceive the BEVs as possessing a valid ‘green’ image?* (focus of subtheme 5.2.1.1) and, *Do the drivers perceive themselves as possessing a valid ‘green’ identity?* (focus of subtheme 5.2.2.1). In order to address these questions in the most comprehensive way, additional

findings from the questionnaire data are drawn on and presented alongside the interview data in these two subthemes. Inclusion of relevant questionnaire data was felt to be appropriate because these subthemes take a largely semantic approach and look primarily at surface-level meanings. Although the content may appear less obviously linked to issues of image and identity, the findings help to interpret and explain the deeper-level, more latent meanings that emerge from the other subthemes.

In terms of the interview data, the ‘validity’ subthemes focus on all 53 drivers’ responses to a small number of specific questions asked in the pre-trial interviews. The others take a broader approach and include relevant data drawn from the entire body of interviews. Data collection time points are mentioned in the ‘validity’ subthemes, but this is largely for clarity purposes only (as outlined in Chapter 4, the analysis does not attempt to provide a detailed comparison between data collected at different stages of the trial).

5.2.1. The ‘green’ image of BEVs

5.2.1.1. Validity of ‘green’ image

For a product image to be considered valid, it must be felt to reflect the functional features of the product. The term ‘felt’ is used here because validity is a subjective perception; as explained in Chapter 2, the image is potentially dependent on consumer beliefs, opinions, and anticipations as opposed to objective and rational evaluations. This subtheme outlines the TSB drivers’ perceptions of the actual environmental credentials of the BEVs, and draws on data from all of the 53 drivers (or 43 drivers for some questionnaire items where data are missing, as explained in Chapter 4). Numbers and percentages for each of the main categories of response are presented in Tables 3 and 4.

Table 3

Validity of 'Green' Image: Summary Table for Pre-Trial Interview Data

Question: 'Do you feel that electric cars will be environmentally friendly?'	
Response	No. and % N=53
In the future	
BEVs have the potential to become increasingly environmentally friendly	45 (85%)
No reference to BEVs having the potential to become increasingly environmentally friendly	8 (15%)
At present	
BEVs can be considered environmentally friendly at present (confident response)	6 (11%)
BEVs may be considered environmentally friendly at present, in comparison to ICE cars (tentative response)	5 (9%)
BEVs offer limited environmental benefits at present, by reducing local air pollution	6 (11%)
It is unclear whether BEVs can be considered environmentally friendly at present	34 (64%)
BEVs cannot be considered environmentally friendly at present	2 (4%)

Table 4

Validity of 'Green' Image: Summary Table for 3-Month Questionnaire Data

Statement	Response					Mean	SD
	Strongly agree	Agree	Neither agree/disagree	Disagree	Strongly disagree		
Widespread use of EVs would result in lower carbon emissions in UK N=53	28 53%	20 38%	2 4%	3 6%	0	4.38	.81
By driving an EV I am doing something to protect the environment N=43	9 21%	22 51%	9 21%	1 2%	2 5%	3.81	.96
Renewable energy should be used to power EVs N=53	22 42%	22 42%	7 13%	1 2%	1 2%	4.19	.88
Renewable energy should be the only EV power source N=53	2 4%	13 25%	12 23%	16 30%	10 19%	2.64	1.16

In response to the pre-trial interview question, 'Do you feel that electric cars will be environmentally friendly?', the majority of drivers (45/53, 85%) indicated that they felt BEVs to have the potential to become increasingly environmentally friendly in the future. Six drivers (11%) were confident that BEVs could already be considered beneficial to the environment, and four of these six explained that they had based their judgements on careful research:

I've, because it's my work I already have the data. They are *already* better. Even our mix of energy production, electricity production, they are already better than a petrol car. [. . .] As we replace our electricity generators with new technology, then it'll get better and better. (P22)

I know enough about the way electric motors work and know that they are of course a lot more efficient than a combustion engine, so I have done a bit of research, and even if you charge them off the National Grid with coal-fired power stations, I still knew that they were more environmentally friendly than petrol engines. (P31)

It was not always the case that careful research led to positive perceptions, however. One driver reported encountering the opposite responses from colleagues:

I had some very strong reaction emails at work. [. . .] There are scientists and engineers coming out of the woodwork here, they're doing all their calculations, going, "No, no, it's not a positive benefit to the environment because of x, y, and z, and here's a spreadsheet with the maths on it!" (P46)

A further five drivers (9%) expressed more tentative positive opinions about BEVs' current credentials, agreeing with the above six drivers that BEVs could probably be considered environmentally friendly in comparison to ICE cars. An additional six (11%) felt that BEVs offered limited current environmental benefits by reducing air pollution at a local level. Interestingly, however, the majority of drivers (36/53, 68%) expressed uncertainty or scepticism about the current overall credentials of BEVs, raising a number of issues such as the production of the electricity used to power the motors, the manufacturing and disposal of the batteries, and the total lifespan of the vehicles:

I get slightly concerned, I'm not a technical expert, but I get slightly concerned when I look at constituents of batteries and the care that's needed, the amount of energy, and resources and everything else that's going into the manufacturing of them. (P01)

I do think there's a big question mark over the battery itself, on the

production of the battery. [. . .] The question is, how much resources do you require to produce the battery, and what do you need to mine in order to get all the components of the battery, to get the lithium? (P37)

The potential green factor [. . .] I think the jury's still out on that one. [. . .] I think to really call it a green car, you need to be getting your energy from a greener source. (P41)

Two of these drivers (4%) expressed stronger sceptical opinions about BEVs' current environmental credentials:

I don't think they're at all environmentally friendly. (P24)

In the UK, most of our electricity is generated by fuel, so we're not really doing much at all, we're just moving the pollution source from one area to another. So it's a bit of a con. [. . .] I think it would be ridiculous to assume that this is in any way reducing carbon dioxide as an output, I can't believe it does at all. (P21)

Many of the sceptical drivers regarded BEVs as being part of a much broader and more complex social system than the motor vehicle market, and believed that large-scale changes to energy production networks (plus extensive uptake of BEVs) would be needed to achieve significant effects. Although BEVs were generally seen as 'a step in the right direction' (P02, P29), these drivers felt that development still had a long way to go before the cars could be considered 'truly green' (P16, P35).

In the 3-month questionnaires, 48 out of the 53 drivers (91%) gave a positive response to the statement, 'Widespread use of electric cars would result in lower carbon emissions in the UK' (53% chose *Strongly agree*, and 38% chose *Agree*). This largely supports the above findings that the majority of drivers believed BEVs to have the potential to make an environmental impact in the future. For the statement, 'By driving an electric vehicle I am doing something to protect the environment', 31 out of 43 drivers (72%) gave a positive response (21% chose *Strongly agree*, and 51% chose *Agree*). This suggests that despite the level of uncertainty and scepticism raised in the interviews, the majority of drivers did believe their BEVs to be making some form of environmental contribution, if possibly only a small one. Alternatively, it could be interpreted as indicating that the drivers thought that they were helping to start a shift towards widespread BEV adoption. It is important to note, however,

that over one quarter of drivers (12/43, 28%) did *not* indicate that they thought their BEVs to be helping to protect the environment.

Drivers were also presented with two statements about the power source for BEVs. The first was, 'Renewable energy should be used to power electric vehicles'. Forty-four out of 53 drivers (83%) gave a positive response (42% chose *Strongly agree*, and 42% chose *Agree*). This reflects the way in which many of the uncertain or sceptical drivers referred in the interviews to the problematic fuel-burning generation of the electricity currently used to power the BEVs. The second was, 'Renewable energy should be the only power source for electric vehicles'. Fifteen out of 53 drivers (28%) gave a positive response (4% chose *Strongly agree*, and 25% chose *Agree*). This could be interpreted in different ways, but suggests that the majority of drivers (38/53, 72%) did not consider powering BEVs with purely renewable energy to be a feasible option. One driver made this clear in an interview:

I'm not one of these people that thinks the only electric car worth driving is one that is powered by 100% renewable energy from day one, I think that's unrealistic. (P31)

This subtheme shows that although the large majority of drivers believed the BEVs to offer possibilities for reducing environmental damage (especially in the future), the cars could by no means be regarded as being unambiguously environmentally friendly. This renders the 'green' image questionable; as stated by one driver, 'the image is obviously more green, rightly or wrongly' (P50). One of the most articulate and reflexive drivers in the participant sample argued that although BEVs could be considered 'greener' than conventional vehicles, they were still cars, and could never be as ecological a mode of transport as walking or cycling. Despite his concern for the environment (and great enthusiasm for BEVs), he felt that the terms 'eco' and 'green' were detrimental and misleading:

I think the words 'eco' and 'green', all car manufacturers should shy away from that in a blind panic because they're not eco or green – they're cars. A pair of hand-made sandals that you walk in are eco, but a car is a bloody great lump of technology, not eco, and I think that's a curse for them, they shouldn't ever use eco. 'Green car', I think the term 'green car' now is only ever used by the *Daily Mail*! (P40)

He went on to explain that the 'green' image of BEVs was seen as equally unappealing by friends who rejected environmentally friendly lifestyles, and by those who embraced them:

I have some friends who are seriously committed petrol-heads and I have friends that won't go in cars because they're so ecologically out of order that they'll only ride bicycles or catch a train, that whole variety. So essentially those two extremes, neither of them are impressed! (P40)

These findings highlight a discrepancy between image and actuality, implying that the 'green' image was felt by many TSB drivers to be linked only loosely to reality. Similar opinions emerged in the findings of Graham-Rowe and colleagues' (2012) study, in which many UK BEV/PHEV trial drivers questioned 'the "green" nature of the electricity they use and the overall carbon footprint created by EV manufacture' (p. 147). Such consumer ambivalence has also been acknowledged by many reports, but these publications generally attribute it to people's lack of knowledge (due to lack of relevant information). Accenture (2011b), for example, revealed that almost half of its survey respondents (over 7,000 people in 13 countries) indicated that 'not only do they want to know how the vehicle charging electricity is generated, but that it would impact their decision to buy a [BEV/PHEV]' (p. 16); the UK's Institute for Public Policy Research (IPPR) stated that 'it is essential that consumers have confidence that their purchase contributes to a national effort to meet the UK's [greenhouse gas reduction] 2050 targets' (Rowney & Straw, 2013, p. 43); and OLEV (2013) highlighted the need to 'provide the public with consistent, well-evidenced information' on topics including EVs' environmental credentials (p. 91).

While increasing information availability appears to be a logical approach for stakeholders, however, this may not be the ultimate ideal solution. The TSB driver quote 'I'm not a technical expert' summed up the attitudes of many of the drivers towards the BEVs' environmental credentials, implying that the problem lay not just in a lack of information, but in the drivers' perceived inability to understand or weigh up the available information. Four of the six drivers who thought BEVs to be 'greener' than ICE vehicles at the time of the trial based their judgements on careful research and background knowledge, which the majority of participants appeared not to possess. One driver observed, however, that careful calculations led to very different reactions

from colleagues. Dubious or sceptical drivers also referred to the public 'debate' surrounding BEVs' credentials, and raised issues related to the reliability of information sources. This implies that people's perceptions relied largely on interpretation rather than simple acceptance of facts and figures. Consumer resistance to understanding or believing available information may prove a significant barrier for the mainstream market.

Overall, this subtheme suggests that in contrast to the assumptions made in a number of existing papers (Axsen & Kurani, 2013; Egbue & Long, 2012; Schuitema et al., 2013), the 'green' image is not the best one to attach to EVs. Unlike other organic or biodegradable 'green' items, BEVs will never be able to reach the highest end of the 'green' product spectrum. Some TSB drivers felt that the 'green' image could be seen as misleading or even as a 'curse' or 'a bit of a con'. This perceived lack of validity points to the well-known phenomenon of 'greenwashing', a situation where consumers think that they are 'being misled by a company regarding its environmental practices or the environmental benefits of a product or service' (King, Dyball, Webster, Sharpe, Worley, DeWitt, et al., 2009, p. 69). This was sharply reinforced by the 2015 Volkswagen scandal, when it was revealed that around 11 million VW diesel vehicles worldwide were producing significantly higher emissions than the company claimed (Hotten, 2015). The following subtheme examines the environmental image in greater depth, analysing which aspects made it appeal to drivers on certain levels.

5.2.1.2. Clean 'green' image

The word 'green' evolved from the Old English 'grēne', which shares the same Germanic root as the words 'grass' and 'grow'. It is widely associated with nature due to the colour of plants, and from the 1970s onwards, the term has become associated across the world with the idea of protecting the natural environment. It is frequently used in both formal and informal discourse, and most drivers in the TSB participant sample used the word 'green' at some point in the interviews. Only one (P32) associated the BEVs with anything natural and literally green in colour, however (joking that it would be a good idea to power the cars with grass cuttings in the future). This subtheme explores the drivers' alternative conceptualisations of the environmental image of the BEVs.

Numbers and percentages for each of the main categories of response are presented in Table 5.

Table 5

Clean 'Green' Image: Summary Table for Interview Data

Topic: Conceptualisations of the environmental image of BEVs	
Relevant statements	No. and % N=53
Reference to environmental image of BEVs being desirable	18 (34%)
Reference to desirable environmental image in general terms	8 (15%)
Reference to BEVs being linked to something organic and green in colour	1 (2%)
Reference to BEVs being conceptualised as clean	9 (17%)
Reference to ICE cars being conceptualised as dirty	6 (11%)
No reference to environmental image of BEVs being desirable	35 (66%)

Eighteen of the 53 drivers (34%) regarded the environmental image as being desirable in some way. Out of these 18, eight (15%) spoke of it in general terms, using vocabulary such as 'environmentally friendly' or 'eco-friendly'. A further nine drivers (17%) were more specific, conceptualising it in the sense of being 'clean':

The image of the car itself... There are the environmental benefits I assume, which make it cleaner. It's saying that, that it's cleaner. (P33)

I think the image is a cleaner image, it's better and healthier and cleaner. (P09)

I think from the point of view of cleanliness, emissions, it's wonderful, you know, no exhaust and green energy. (P38)

In comparison, six of these drivers (11%) also described how they had come to perceive ICE cars as being polluting or 'dirty'. Two drivers used vivid, affect-laden descriptions to emphasise this point:

[BEVs] are massively cleaner than the most economic, super-eco, modern petrol or diesel car – the difference is mind-boggling. Without question, they are much, much cleaner. [. . .] When an electric car is brand new, it's exactly the same as a petrol car in terms of the environmental impact in

reducing carbon, but from that moment on they get cleaner. So from that moment on a petrol car only gets dirtier. (P40)

Hopefully it's going to significantly reduce the carbon footprint and also [. . .] localised emissions, no stinky old cars about the place. [. . .] If you ever go into Euston and you go downstairs and pick up a taxi and there's like 25 taxis in a queue, the atmosphere is awful. It's disgusting, everybody in there is just inhaling these fumes. [. . .] I mean, you walk up Euston Road and you feel like you've got your face up somebody's exhaust pipe. (P26)

For the four other drivers, the image of cleanliness was linked to the process of recharging BEVs at home, compared to refuelling ICE cars at the 'dreaded petrol stations' (P53) where you 'get your hands dirty' (P06):

The hassle factor of driving a petrol car has really come home to me, you know, the more sort of lower service intervals, the filling up with petrol... all those dirty things that you have to do, you just don't get with an electric car. It literally takes me about 10 seconds to plug in when you get home, and then you can just forget about it, so it's much more convenient and cleaner. (P31)

I think the benefits [of BEVs] are that you can rely very much on your own resources, you're not relying on the petrol station being open around the corner, you know that nobody's dug a hole into the middle of the earth and pulled out a whole load of black stuff, and generally you just know that the source is yours, regardless. [. . .] That is my source, I'm using my washing machine, I'm plugging in my car. That's how I want my life to be. (P13)

These drivers shifted the emphasis away from the relatively abstract reduction of CO₂ to the more tangible, local benefits offered by the BEVs. On a surface level, some of the quotes in this category appear to refer simply to the functional features of BEVs, but on closer reading, they also carry connotations of moral as well as physical cleanliness. A few drivers implied that the clean image was associated with a sense of increased independence, freedom, convenience, and control: the traditional meanings attached to ICE cars (Redshaw, 2007; Stokes & Hallett, 1992). The reference to a 'washing machine' in the second quote adds another interesting implication that the BEV helped to make things cleaner in the household.

This preference for the term 'clean' over 'green' contrasts with many academic papers and institutional reports, which often apply phrases such as 'green cars' and 'green consumers' to describe EVs and their users. It also differs from the theory that pro-environmental attitudes correlate with 'emotional affinity toward nature', and that emotional bonds with the outside world (such as love

of nature, or feelings of being free and safe in natural environments) function to motivate people to behave in environmentally friendly ways (Kals, Schumacher, & Montada, 1999). This theory has been used to suggest that marketing 'green' products can be improved through nature-related advertising (Hartmann, Apaolaza-Ibáñez, and Forcada Sainz, 2005; Hartmann & Apaolaza-Ibáñez, 2010); supportive evidence provided by Hartmann and Apaolaza-Ibáñez (2010) included a large experimental study which revealed that consumers responded more favourably to 'green energy' advertisements showing natural scenery, especially lush green vegetation and clear water, over urban and barren desert landscapes.

The lack of reference to organic forms of nature in the TSB interviews may have been partly due to the fact that it is difficult to integrate the image of cars (man-made, fast-moving, and powerful technology) with the image of green plants or creatures (alive, but generally immobile or slow-moving). This incompatibility was addressed by Garland and colleagues (2013); as discussed in Chapter 3 of this thesis, their study found that a number of Toyota Prius advertisements had attempted to assimilate the concepts of nature and technology through idealistic pictures of hyperreal harmony. The incompatibility has also emerged clearly in cartoons of electric cars (see *Cartoonstock* and *Google Images* for online examples), which have taken the opposite approach and enjoyed depicting BEVs in a variety of impossibly surreal states such as covered in grass, sporting vegetable gardens on the roof racks, designed to look like giant ladybirds, or powered by compost heaps in the boot. In a paper on transportation cartoons, Salomon and Singer (2011) identified 'incongruity theory' as a way of evoking humour through absurdity, and such images have the potential to render BEVs ridiculous in the eyes of the public. They can in addition exaggerate the stereotypes of poor functionality often associated with BEVs (e.g., slow speed, limited range, and unreliable power).

On a deeper level, nature may also be associated with a loss of individuality and sense of self; the idea of being subsumed in a vast, anonymous, organic system could conflict with the well-established link between cars and individuality, selfhood, and free agency (Stokes & Hallett, 1992). In addition, nature has traditionally been associated with femininity and motherhood (Dobscha & Ozanne, 2001; Roach, 1991), a direct contrast to the traditional association of

cars with masculinity (Redshaw, 2006, 2007). It may conjure images of the past, such as the pre-industrial age and the 'back to nature' hippy movements of the 1960s and 1970s, neither of which are complementary to the image of future-facing technology.

The 'clean' image, however, can be integrated more easily with the image of a car, and the idea of a 'clean machine' requires less cognitive effort to visualise than a 'green machine'. It allows the tangible, local benefits to be emphasised more strongly, especially in urban areas and domestic garages which lack green scenery but where BEVs are most likely to play an important role. Given the scepticism of many drivers towards the BEVs' overall environmental credentials, focusing on benefits such as lack of tailpipe emissions could be regarded as a more credible and appealing image. In addition, highlighting the negative affective experiences related to 'dirty', 'disgusting', and 'stinky' ICE vehicles provides a clear point of comparison for the benefits of BEVs, and the *clean/dirty* divide offers a simpler mental model than the *green/non-green* one. While the image of being 'green' can imply the need for some form of sacrifice, such as increased behavioural effort or compromise on product quality (Pettit & Sheppard, 1992), it is difficult to see the 'clean' image in anything but a positive light. For some drivers, the term 'clean' carried connotations of independence, control, and freedom from dirt, pollution, petrol stations, and the general 'hassle factor' of using ICE cars. This highlights the way in which BEVs offer a number of personal benefits, allowing the drivers to save time and effort as well as contributing to 'saving the planet'. The 'clean' image is thus broader and more inclusive than the purely 'green' image, encompassing a range of positive meanings that help to appropriate and transform some of the traditional meanings of ICE cars.

5.2.2. The 'green' identity of BEV drivers

The findings in this theme reveal two different ways in which the drivers viewed their identities in relation to the 'green' image of the BEVs. The first is *how drivers perceived their own self-images*. This is a relatively straightforward perspective, and forms the basis of subthemes 5.2.2.1 (*Validity of 'green' identity*) and 5.2.2.2 (*Desirable 'green' identity*). It is examined using Sirgy's image congruity theory (e.g., Sirgy, 1980, 1981, 1982a, 1982b). The second is

how drivers thought that other people perceived their self-images. This is a more complex perspective, and forms the basis of subtheme 5.2.2.3 (*Undesirable 'green' identity*). Images in this latter category do not necessarily reflect reality, as they emerged predominantly from drivers' expectations, inferences, and interpretations of how others might view them, as opposed to actual reported communications or encounters (the focus of our previous paper, Burgess et al., 2013). Cooley (1902) named this phenomenon the 'looking-glass self', and a significant body of research over the last century has supported the concept. It is an interesting phenomenon in its own right because it operates on a psychological level, and lends itself to psychological investigation.

Drivers' perceptions in the *undesirable 'green' identity* subtheme could be said to broadly meet the criteria of Sirgy's 'social self-image', a concept that he acknowledges to be the same as the 'looking-glass self' (Sirgy, 1982a, p. 288). The drivers' quotes do not appear to refer to appraisals of individual personality characteristics, however; they align more closely with the process of intergroup stereotyping as outlined by the social identity perspective. The findings in this subtheme are therefore analysed through the lens of the social identity perspective, drawing on the specific micro-theory of 'stereotype threat' (Steele, Spencer, & Aronson, 2002), which looks at how people are affected by the possibility of being negatively stereotyped by others on a social group level.

5.2.2.1. Validity of 'green' identity

The validity of an identity is difficult to define. On one hand, an extensive body of research has attempted to measure specific consumer characteristics such as 'greenness' in highly rational ways. Numerous studies have endeavoured to define and categorise 'green' consumers in terms of socio-demographic, behavioural, and/or personality profiles, and various categorisation models have been established. The King Review Part II, for example, drew on a framework which divided the market into seven clusters based on levels of consumer ability and willingness to act in environmentally friendly ways: 'Positive greens' (highest scorers on both scales), 'Concerned consumers', 'Sideline supporters', 'Waste watchers', 'Cautious participants', 'Honestly disengaged', and 'Stalled starters' (lowest scorers on both scales) (DEFRA, as

cited by HM Treasury, 2008, p. 61). Other studies have applied simpler models, such as Gupta and Ogden's (2009) paper on environmental consumerism, which used survey data to identify the major differences between 'Green buyers' and 'Non-green buyers'. The extent to which pro-environmental behaviour can be measured reliably is questionable, however. Combinations of all sorts of consumer activities can increase or mitigate global warming to varying degrees (Truelove & Parks, 2012), and the local activities of a household which makes considerable efforts to be 'green' can unfortunately be 'vastly eclipsed' by a small number of other activities such as long-haul flights, rendering its actual 'carbon footprint' much higher than the national average (Flintoff, 2009, p. 18).

On the other hand, the concept of 'existential authenticity' has stimulated extensive philosophical discussion on 'what it means to be human, what it means to be happy, and what it means to be oneself' (Steiner & Reisinger, 2006, p. 300). Interest in the concept has increased since the emergence of post-industrial, postmodern societies in which the dominance of marketing and consumerism has thrown the whole nature of identity into question (Erickson, 1995; Steiner & Reisinger, 2006). As discussed in Chapter 2 of this thesis, postmodern researchers have suggested that consumers now live in a world where they are obliged to create and communicate their identities through a multitude of changing, inconsistent, and conflicting images drawn largely from advertising and the media (Baudrillard, 1981, 1983, 1988; Firat et al., 1995). Although a captivating topic in itself, however, this standpoint is hard to apply in a meaningful and strategic way to specific real-world situations. This subtheme therefore aims to strike a balance between the two validity-assessing approaches; it does not attempt to measure the 'greenness' of the TSB drivers in an objective, quantifiable way or to discuss the authenticity of 'green' identity on an existential level, but focuses instead on one clear question: *do the drivers perceive themselves as possessing a valid 'green' identity?* Numbers and percentages for each of the main categories of response are presented in Tables 6, 7, and 8.

Table 6

Validity of 'Green' Identity in Terms of Attitude: Summary Table for Pre-Trial Interview Data

Question: 'Do you feel that powering cars in a way that limits environmental damage is important?'	
Response	No. and % N=53
Yes	51 (96%)
Yes (emphatic response)	23 (43%)
Yes (moderate response)	16 (30%)
Yes, but BEVs' environmental credentials are currently questionable	12 (23%)
No, not for me personally	2 (4%)

Table 7

Validity of 'Green' Identity in Terms of Behavioural Motivation: Summary Table for Pre-Trial Interview Data

Questions: 'For you personally, what are the most important reasons for taking part in the trial?' 'What do you expect to get from your participation?'	
Response	No. and % N=53
Reference to protecting the environment	22 (42%)
Environment as primary motivating factor	12 (23%)
Professional as well as personal interest in environment	6 (11%)
Environment as subsidiary motivating factor	10 (19%)
No reference to protecting the environment	31 (58%)

Table 8

Validity of 'Green' Identity: Summary Table for 3-Month Questionnaire Data

Statement	Response					Mean	SD
	Strongly agree	Agree	Neither agree/disagree	Disagree	Strongly disagree		
I would be willing to pay more for a vehicle that I knew was less harmful to the environment N=53	8 15%	20 38%	9 17%	11 21%	5 9%	3.28	1.23
I would be happy to have a non-premium EV if it meant that I was helping to reduce carbon emissions N=43	8 19%	18 42%	9 21%	7 16%	1 2%	3.58	1.05

The first interview question was very specific, and asked about drivers' attitudes towards protecting the environment: 'Do you feel that powering cars in a way that limits environmental damage is important?' Almost all of the drivers (51/53, 96%) agreed, and many (23/53, 43%) emphasised the importance with phrases such as '100%, yes' (P17), 'Oh absolutely' (P25), 'Very much so' (P45), and 'For me, vital, yeah' (P01). Other drivers (16/53, 30%) gave more moderate positive responses, such as 'Yes, it is' (P12) or 'Uh, yes, yep' (P03). A smaller number of drivers (12/53, 23%) agreed, but their positive responses were tempered by their ambivalent or sceptical attitudes towards the BEVs' credentials, as outlined in the previous subtheme. Out of these 12 drivers, one was also sceptical about the cause of climate change:

Possibly, yeah, I mean I don't really... I'm extremely sceptical about all the climate change after all the revelations from the CRU [Climate Research Unit], so it's not proven to me that it's manmade so much really. (P34)

Two drivers (4%) admitted that the environmental credentials were not important to them personally:

I can see why some people might find it important but it's not that important to me as a person. (P52)

If I'm honest, no! (P04)

The next two interview questions were more open, asking drivers about their general motivations for adopting a BEV: 'For you personally, what are the most important reasons for taking part in the trial?' and 'What do you expect to get from your participation?' In response to these questions, under half of the drivers (22/53, 42%) mentioned the environment. Of those that did, 12 (23%) considered protecting the environment to be a primary motivating factor, while 10 (19%) considered it to be a subsidiary factor, and sometimes described it merely as an additional bonus:

Obviously that's a benefit, but it's not sort of my main... my main interest is kind of the technology. I don't specifically look for [. . .] green things everyday but if that is a side effect or a benefit then that's good. (P41)

For me it's not top of my personal priority list, though I realise it's a good thing. (P28)

Out of the 12 drivers who considered the environmental credentials of the BEVs to be the main important factor for taking part in the trial, six (11%) indicated that this was partly due to the fact that they worked for a company or institution which focused on or strongly supported pro-environmental behaviour. They implied that although they had chosen to trial the BEVs on their own behalf, their interest in the environment operated on a professional as well as a personal level:

My job is also sustainability policies for my company. [. . .] It would be something good for the business to be seen to be involved with it. (P10)

Well, we're very keen on sustainability at the [Name of Corporation]. We're about to... well, for example, we've just put a central heating system in this office that puts electricity back into the grid, so we're keen on that. [. . .] We're really committed to a green agenda. (P06)

In these instances, the drivers appeared to have partially identified with an extrinsic motivating factor as opposed to being inspired by a purely intrinsic one. No drivers considered the environmental credentials of BEVs to be their *only* motivating factor for taking part in the trial, as they all mentioned other appealing aspects such as experiencing innovative technology (overall, mentioned by 31/53 drivers, 58%); taking part in and contributing to a worthwhile research project (16/53, 30%); saving money on fuel (14/53, 26%); feeling like a pioneer (7/53, 13%); having an interest in cars (9/53, 17%);

learning something new (3/53, 6%); and feeling that a BEV would be ideally suited to their lifestyles (3/53, 6%).

In the 3-month questionnaires, drivers were asked to rate two statements evaluating the degree of personal sacrifice that they would be prepared to make in buying an environmentally friendly car. The first was, 'I would be willing to pay more for a vehicle that I knew was less harmful to the environment'. Twenty-eight out of 53 drivers (53%) gave a positive response (15% chose *Strongly agree*, and 38% chose *Agree*). The second was, 'I would be happy to have a non-premium electric car if it meant that I was helping to reduce carbon emissions'. Twenty-six out of 43 drivers (60%) gave a positive response (19% chose *Strongly agree*, and 42% chose *Agree*). These findings show that over half of the drivers appeared willing to prioritise environmental benefits over financial and functional personal benefits in selecting a car, a behaviour known to be typical of 'green' consumers (Davis, Le, & Coy, 2011; McDonald, Oates, Young, & Hwang, 2006; Pettit & Sheppard, 1992). The extent to which the TSB questionnaire data reflect reality is difficult to determine, however, because surface-level data collection methods can lead to a priming effect; as observed by Anable and colleagues (2006), it is 'generally assumed that surveys overstate respondent concern', and that some topics (especially environmental ones) often 'generate "socially desirable" responses' (p. 12). It is also important to note that a significant proportion of drivers (47% for the first statement, and 40% for the second) did *not* indicate willingness to prioritise environmental benefits over personal ones.

Overall, this subtheme reveals a number of complexities. Despite the fact that 51 drivers initially expressed concern for the environment, only 12 considered the BEVs' environmental benefits to be a primary personal motivating factor for taking part in the TSB trial, and six of these 12 mentioned sustainability goals promoted by their workplaces. Deci and Ryan's (1985) self-determination theory would describe these six drivers as having identified with an extrinsic motivating factor (e.g., wanting to fit in with corporate norms and project a good image for their company, which could lead to approval from colleagues and managers) as opposed to being motivated on a purely intrinsic level (i.e., doing something for its own sake because it is felt to be inherently satisfying). The variety of motivations mentioned is representative of the TSB participant

sample as a whole, which reveals the traditional view of BEVs as being 'strictly the domain of those who are solely environmentally motivated' to be outdated (Carroll et al., 2013, p. 13).

The disparity between drivers' attitudes (enthusiastic endorsement of the need to limit the environmental damage caused by cars) and motivations (transforming these expressed views into action) could be partly explained by the widely established concept of the 'attitude-behaviour gap', which implies that pro-environmental attitudes do not necessarily lead to pro-environmental behaviour (see Anable et al., 2006, pp. 61-81, for a review of literature on the attitude-behaviour gap in relation to climate change and transportation use). In addition, the uncertainty and scepticism surrounding the current environmental credentials of BEVs could have contributed to reducing the role of environmental motivation. It may also be the case that drivers' pro-environmental attitudes were simply outweighed by other motivating factors that they felt to be more important. Together, the findings suggest that although the majority of drivers liked to perceive themselves as being environmentally friendly *to some extent*, this 'green' part of their identity did not colour all of their behaviours or have a substantial impact on their choice to adopt a BEV. This undermines assumptions drawn from quantitative survey studies which argue that BEVs are more likely to be purchased by consumers who rate highly on pro-environmental scales (Carley, Krause, Lane, & Graham, 2013; Hackbarth & Madlener, 2013; Plötz, Schneider, Globisch, & Dütschke, 2014), and that 'marketing campaigns aimed at a more left-leaning populace and touting the environmental benefits of [EVs] may be more effective than those aimed a more general audience' (Krupa, Rizzo, Eppstein, Lanute, Gaalema, Lakkaraju, et al., 2014, p. 26). On the whole, it appeared that the TSB drivers could not be categorised as highly 'green' consumers.

5.2.2.2. Desirable 'green' identity

Moving towards a deeper psychological examination of identity, just over a quarter of the drivers (14/53, 26%) indicated that they saw the environmental image of the BEVs as interacting with their own identities in a positive way, either by matching their existing self-images or by enhancing their existing self-images. Using Sirgy's image congruency theory (e.g., Sirgy, 1980, 1981, 1982a,

1982b), this could be described as positive congruency between product-image and actual self-image in the first instance, and between product-image and ideal self-image in the second. This would suggest that these drivers did see themselves as being 'green' when using a BEV. However, it must be noted that almost three-quarters of the drivers (39/53, 74%) did not mention any clear perceived congruency or enhancement of their self-images in environmental terms. Numbers and percentages for each of the main categories of response for this subtheme are presented in Table 9.

Table 9

Desirable 'Green' Identity: Summary Table for Interview Data

Topic: Environmental image of BEVs linked to identity in desirable way	
Relevant statements	No. and % N=53
Reference to 'green' image interacting with identity in positive way	14 (26%)
'Green' image matches self-image	8 (15%)
Stated explicitly	4 (8%)
Stated implicitly	4 (8%)
'Green' image enhances self-image	6 (11%)
Enhances in proactive way	2 (4%)
Enhances in more passive way	4 (8%)
Reference to 'green' image interacting with identity in ambiguous way	7 (13%)
No reference to 'green' image interacting with identity in positive or ambiguous way	32 (60%)

'Green' image matches self-image

Eight of the 53 drivers (15%) indicated how the BEVs functioned to reinforce and/or communicate their existing 'green' identities by matching their own self-images. Four of these drivers (8%) stated clearly that their self-images included a variety of established pro-environmental behaviours, lifestyles, values, and commitments:

I'm fairly green at home, it kind of goes with my green values. [The BEV says] I'm interested in the planet, I'm engaged, I want to do my bit to help. (P46)

I like to think of myself as somebody that does care about [the environment]. I took up free compost boxes – I have very little waste at home, so I think it is very important. (P35)

I just love learning about the environment. Until I came back to work full-time I'd been doing studies with, in the Open University to do an environmental science degree. [. . .] Really, [driving a BEV is] a commitment to the environment. (P30)

We quite like to be green. [. . .] We have the Prius, we have Photovoltech panels for electricity, hot water from the sun, so it's all part of that way of thinking. (P26)

The other four drivers (8%) were less explicit, and indicated on a more pragmatic level that they engaged in significant pro-environmental behaviours. From their quotes, it can be inferred that driving a BEV matched their existing self-images:

We have two kids so we recycle sort of everything we possibly can. We look at sort of energy efficiency ratings on, you know, all of the products we buy for our home. (P36)

I'm surrounded by people who are very interested in Photovoltech, drilling for their own water. [. . .] I'm looking at solar panels to heat the house, so I'm involved, there are a lot of discussions going on about general green energy. (P01)

Three (6%) of the eight drivers implied that they perceived themselves to be part of a 'green' family or social group rather than merely a 'green' individual. This sense of social support was undermined for one participant, however, as he went on to say that even his highly pro-environmental friends viewed adoption of a BEV as being a step too far:

The general feeling on electric cars, in the circle that I'm in, is that they're not viable yet [. . .] not something a sensible person would do! [. . .] They think that I shall be totally mad! (P01)

The conflict between drivers' personal opinions and their perceptions of other people's opinions emerges again in the next category, and is addressed fully as the main focus of subtheme 5.2.2.3 (*Undesirable 'green' identity*).

Together, these eight drivers suggested that using a BEV fitted well with their existing mentalities and lifestyles, viewing it as being 'all part of that way of thinking'. There appeared to be differences between the drivers' reported behaviours, however, as these ranged from taking up free compost boxes (a common, low-effort, low-cost action) to investing in solar panels and HEVs (a more uncommon, high-effort, high-cost action). This makes it hard to distinguish how 'green' a consumer would need to be in order to see the 'green' image of BEVs as appealing; while some people might perceive driving a BEV to be similar to using a new compost box, others might regard it as more drastic than making significant household transformations.

On the whole, the eight drivers' attitudes in this subtheme were relatively moderate, and phrases such as 'I'm fairly green' or 'We quite like to be green' differed from the confident and passionate assertions made by many of the US HEV drivers in the studies conducted by Heffner and colleagues (Heffner, 2007; Heffner et al., 2005, 2007a, 2007b), who liked to wholeheartedly 'embrace the image of environmental stewardship' (Heffner et al., 2005, p. 5). In addition, only two of the eight TSB drivers (4%) in this subtheme mentioned communicating a positive 'green' image to other members of the public. This again differs to the above US studies, in which the attitudes of numerous HEV drivers were summed up by one interviewee who 'likened his HEV to a billboard that displayed symbolic meanings to everyone on the road' (Heffner et al., 2007a, p. 29).

The importance of shared beliefs and 'green' group action was highlighted by Anable and colleagues (2006) and by Steg and Vlek (2009), who observed that social support and social norms can influence pro-environmental behaviours. Noblet, Teisl, and Rubin (2006) also raised this point in relation to the purchase of low-emission vehicles, stating that a consumer 'who believes that she is the only one selecting environmentally friendly vehicles may refrain from making the eco-friendly choice because she fears her effort will be wasted', whereas a consumer who perceives that other consumers are purchasing environmentally friendly products 'may be more likely to purchase an eco-labeled vehicle as she feels her proenvironmental choice may be part of a larger effort' (p. 427). This suggests that promoting a 'green' group image could potentially be beneficial for attracting people to buy a BEV. Conversely, though, the existing images of

'green' groups were perceived negatively by many TSB drivers, as presented in subtheme 5.2.2.3 (*Undesirable 'green' identity*).

'Green' image enhances self-image

In addition to the eight drivers who felt the 'green' image to match their self-images, a further six drivers (11%) felt that driving a BEV enhanced their existing self-images by increasing their sense of helping the environment. Two of these drivers (4%) explained how the BEVs opened new possibilities for engaging in proactive behaviours, which were linked to feelings of responsibility and altruism:

It makes you feel sort of, more responsible, environmentally responsible, socially responsible. [. . .] I think it will be a way to protest, being proactive in the change, making the change. (P12)

It's got that green image, doing good kind of thing. [. . .] I prefer the image that a green car will project. [. . .] Good for the environment, and I think also at this stage of it all, I'm prepared to dip my toe in the water and take a new path. (P18)

These drivers saw themselves as making a difference by taking things forward and leading the way to wider-scale societal change. They also implied that their new identity would be projected to other people, communicating positive messages about their innovative choice of vehicle.

The remaining four drivers (8%) referred to a less specific 'good feeling' derived from the environmental credentials of their BEVs:

It's also a good feeling of reducing our carbon footprint. (P45)

It makes you feel good just driving around in a zero-emissions car. (P05)

I can say I feel better about driving an electric car because it's lower emissions and lower cost, and makes me feel better about the whole package. (P50)

This affective sensation appeared to be a more passive and personal benefit derived from simply 'driving around' in a BEV; a phenomenon which has been identified as a distinct psychological benefit of purchasing 'green' products, a 'warm glow' deriving from the 'moral satisfaction of contributing to the common good environment' (Hartmann & Apaolaza-Ibañez, 2012, p. 1; see also Ritov & Kahnemann, 1997). The quotes from the TSB drivers echo in addition

the reports of an environmental 'feel-good factor' experienced by some BEV/PHEV drivers in Graham-Rowe and colleagues' (2012) study (pp. 147, 148).

This 'feel-good factor' may not necessarily reflect genuine environmental contributions, however; Hartmann and Apaolaza-Ibáñez's (2005) conference paper (as cited by Hartmann & Apaolaza-Ibáñez, 2006) revealed that the 'warm glow' effect was felt mainly by consumers who rated *low* on environmental consciousness measures. This kind of inconsistency was observed by one of the TSB drivers, who made clear that the feeling was not necessarily linked to the BEVs' actual impact on the environment, but to the drivers' beliefs that they were behaving in a sustainable way:

I think it's saying we care about the environment. [. . .] If it makes no difference... depends on what you're doing, if you're making yourself feel better you can say, "Well at least I'm making a contribution", even if it makes no difference, rather than not doing so and feeling bad about it. (P26)

Pettit and Sheppard (1992) also drew attention to inconsistencies between the real and imagined impact of 'green consumerism', arguing that pro-environmental behaviour was driven not by selfless altruism but by perceived personal gains:

The consumer will not purchase a more costly 'ozone-friendly' product because it makes a tangible contribution to saving the ozone layer; rather, consumers will buy it (if at all) because it makes them feel better, or makes them feel like they are contributing and thus doing something for the environment. (p. 336)

Bearing this in mind, while the 'feel-good factor' may on one hand encourage people to drive a BEV rather than an ICE vehicle, it may on the other hand encourage them to drive more often, or to use a BEV instead of a bicycle or public transport. The latter change in behaviour would obviously have a negative effect on the environment, so the potential consequences of promoting the 'warm glow' reward are questionable.

It is also interesting to note that despite their positive personal views, only three of the drivers (6%) in the *desirable 'green' identity* subtheme made clear reference to positive perceptions of the environmental credentials of BEVs held by the wider market:

I think most people have a sufficient awareness for them to think that this is a good, positive move with respect to the environment. (P45)

It's quite fashionable to be green, and [BEVs] are greener, and people recognise them as being greener and better for the environment. I think that's the general opinion of most of the general public. (P05)

Across the board, there's changing acceptance in terms of the environmental impact and the environmental issues that we have. [. . .]
I think it's certainly changing in terms of the type of personalities who would be open to [using an electric car]. (P20)

The lack of reference to positive public perceptions suggests that the desirable images projected to other people were not necessarily reflected back to the drivers.

In comparison to the drivers who reported a desirable sense of identity, another seven drivers (13%) made ambivalent statements which swung between approval of pro-environmental behaviours and rejection of the 'environmentalist' label. These drivers made clear that their views were modest and sensible, defining their 'green' identities in terms of what they were *not* and downplaying their environmental concerns in order to resist social categorisation. Although they described their identities from their personal points of view, it appeared that they had internalised negative environmentalist stereotypes from the public sphere:

I am quite concerned about the environment [. . .] but that is not my main reason for doing [the BEV trial]. I'm not over the moon about the environment. (P38)

I'm not a massively green person [. . .] [although] I think it's important that we don't unnecessarily waste energy and waste resources. (P39)

I'm not an environmentalist [. . .] but [. . .] if you were an environmentalist you'd think you could sleep at night knowing that you're not polluting from carbon emissions. (P24)

I'm not a, you know, big sort of green environmentalist. [. . .] I don't wear that big badge, but I do my bit, you know, recycle [. . .] and pick up tins, paper, cardboard, glass as well as greenery. [. . .] So yeah, I'm probably a mediocre greenie rather than a, oh you know, "I'm out to save the planet". (P32)

I liked the idea, I asked for [the BEV] because I thought it was a great concept. [. . .] I'd like it to work, not because I'm an environmental egg-head, just that I think it's a good solution. (P16)

The stereotypes become more apparent in each successive quote, culminating in the explicitly negative 'environmental egg-head' phrase in the final statement. Two (4%) of the seven drivers emphasised that using a BEV was not a fixed or permanent commitment, but an identity that could be shrugged off if necessary:

I'm not doing it, it's not a religion, it's because I think it's the right thing to do, but if it turns out to be the wrong thing to do then I'll stop doing it. (P26)

If the car is just a toy for an environmentalist to do their little one mile journey in every day then fine, that's where it'll be, and I can go and buy my high performance sports car. (P43)

The reference to 'a religion' in the first quote implies an all-consuming environmental faith that defies rationality, while the second quote draws on the established stereotype of socially diminished environmentalists who make very limited journeys. Only one driver out of the whole dataset reported actually encountering any such negative environmentalist stereotypes from other people, however:

[Friends and family think] Oh [him] and his bloody electric cars, stuff like that! [Laughter] You and your holier-than-thou go-kart, you're one of those eco people! That sort of thing. So I've had a bit of that. (P40)

This suggests that the stereotypes operated to a large extent in the drivers' imaginations, influencing the ways in which they perceived, constructed, and attempted to project their own identities.

Overall, the *desirable 'green' identity* subtheme supports the idea that an environmental image for BEVs will appeal to some drivers on a personal level, but it also undermines the traditional view that promotion of a strong 'green' image will be necessary to increase uptake of BEVs, and that 'green' consumers should be targeted as the ideal early adopters. The interview data show that only a minority of drivers (14/53, 26%) believed it to interact with their self-images in a wholly positive way. In a paper addressing the challenges of 'green marketing', Rex and Baumann (2007) observed that the concept of the 'green consumer' had recently been contested, as studies showed that 'the same consumer may well make green purchase decisions in one situation but not in another', and that being 'green' was not a fixed personality characteristic or

predictor of purchase choice (p. 571). They emphasised the importance of social context in influencing pro-environmental behaviour, and proposed that it could be time for green marketing to shift away from ‘targeting green consumers with green products’ to ‘broadening the targeted consumer group and including green properties as one of the appeals among others, of a product’ (Rex & Baumann, 2007, p. 574). This fits well with the findings discussed above, and the importance of social context for BEV drivers is addressed more fully in the next subtheme.

5.2.2.3. *Undesirable ‘green’ identity*

In direct contrast to the desirable identities mentioned by 14 drivers (26%) in the above subtheme, almost half of the drivers (27/53, 51%) referred directly to some form of undesirable pro-environmental identity attached to the BEVs. These identities emerged from how the drivers thought that other people would perceive BEV adopters. Six drivers (11%) fell into both the ‘desirable’ and ‘undesirable’ identity categories, as they felt that BEV drivers possessed a positive pro-environmental identity from their own point of view and a negative pro-environmental identity for other people. Two opposing categories emerge in this subtheme: the *low-status ‘green’ identity* and the *high-status ‘green’ identity*. Three drivers (6%) made reference to both a low-status identity and a high-status identity, implying that different members of the public saw BEV drivers in different undesirable ways. Numbers and percentages for each of the main categories of response for this subtheme are presented in Table 10.

Table 10

Undesirable 'Green' Identity: Summary Table for Interview Data

Topic: Environmental image of BEVs linked to identity in undesirable way	
Relevant statements	No. and % N=53
Reference to 'green' image interacting with identity in negative way	27 (51%)
Reference to low-status identity but not high-status identity	17 (32%)
Reference to high-status identity but not low-status identity	7 (13%)
Reference to both low-status and high-status identities	3 (6%)
No reference to 'green' image interacting with identity in negative way	26 (49%)

Low-status 'green' identity

Twenty of the 53 drivers (38%) referred at some point to a pro-environmental identity that communicated the impression of low social status. Two of these drivers (4%) indicated that 'some people' might see the 'green' identity as negative because it carried the image of frugality or loss of masculinity:

The image is [. . .] more cost conscious, more environmentally conscious. [. . .] They're not a status symbol in the sense of what one would normally construe as a status symbol, conveying some sort of greater status. I think some people may see it the other way. (P50)

Put it this way, you're not going to want to pull in an electric car, ok, it's just not going to happen, you're not going to drive to a bar and [the women are] all going to go, "Yes! I want to be like that!" [Laughter] So really the image is, it's a sensible choice I think, it's an interesting environmental choice, it's not going to give you immediate kudos. (P43)

Other drivers drew on more general stereotypes of eccentric environmentalists, and a recurring concern across the interviews was that BEV adopters could be categorised as deviant 'tree huggers' (P17, P22) or 'eco-warriors' (P46, P15), defying established social norms and embracing alternative 'hippy and green' ones (P43). Some drivers made humorous references to BEV drivers being seen as 'eco-freaks' (P11) or 'weird, freaky nutters' (P40), but others expressed stronger feelings that the impression of BEV driver identities should be normalised for the mainstream market:

The image needs changing, because I think historically the image has been [. . .] reflective of high opinion, because frankly if you drove one of the previous electric cars, you'd have to be very opinionated. [. . .] Now I think it's different, I think it's now more of an environmental option that we can actually choose. (P20)

As outlined in the introduction to this chapter, such stereotypes proliferate in the public sphere, and have been addressed in a small number of academic publications looking at BEVs and HEVs (Burgess et al., 2013; Graham-Rowe et al., 2012; Heffner et al., 2007b). They have also been analysed in depth by a number of academic papers and book chapters outside of the transportation field (DeLoach, Bruner, & Gossett, 2002; Hutchings, 2005; Jorgensen, 2011; Killingsworth & Palmer, 1996); these researchers acknowledged that 'environmentalists have long been perceived as radical idealists who are out of touch with the needs of average citizens', and that 'popular images [of environmentalists] are reductive, with the result that groups and individuals who may have common ground are unnecessarily divided' (Jorgensen, 2011, p. 1). Despite the lack of reported encounters with negative stereotypes, many drivers seemed to assume that the public would automatically perceive BEV drivers as belonging to this low-status social group.

These perceptions could be described broadly as the 'social self-image', a concept which Sirgy (1982a) acknowledged to be the same as the 'looking-glass self'. The quotes from drivers in this category do not appear to refer to appraisals of individual personality characteristics, however; they align more closely with the process of stereotyping as described by the social identity perspective. Tajfel (1969) originally proposed that stereotyping helps not only to simplify perceptions by transforming 'fuzzy differences' between groups of stimuli or people into 'clear ones' (p. 82), but to create 'biases in judgements of individuals belonging to various human groups' (p. 85). This form of categorisation relies on the process of *accentuation*: an exaggeration of intragroup similarities (i.e., individuals in the same group are seen as more homogenous), and intergroup differences (i.e., individuals in different groups are seen as more heterogeneous). Subsequent research has highlighted how social stereotyping extends far beyond a purely cognitive process, as shared stereotypes function to provide group members with favourable intergroup comparisons by allowing their ingroup to be seen as superior to the outgroup

on selected dimensions. Such stereotypes can help to explain and justify intergroup relations and behaviour (see Tajfel, 1981, for a detailed theoretical discussion of the effects of stereotype formation and maintenance).

Much literature using the social identity perspective has examined how groups use stereotypes to enhance their social identity by homogenising and depersonalising the outgroup(s), sometimes leading to discrimination and prejudice. A smaller body of literature has focused on the concept of 'stereotype threat', looking at responses to being seen as a member of a group that is stereotyped negatively on a dimension that is personally relevant (e.g., Steele, 1997; Steele & Aronson, 1995; see Steele et al., 2002, for a detailed review of existing research). Steele and colleagues (2002) made clear that although these stereotypes were often seen to affect their targets through actual 'discriminatory behavior and judgment', even the 'mere threat of discrimination and devaluation' could have a negative impact on people (p. 389). A small number of papers have applied the concept of 'stereotype threat' to consumer behaviour; studies by Hogg and Banister (2001), White and Argo (2009), and White and Dahl (2006, 2007), for example, showed that consumers often avoided products associated with negatively viewed group identities.

Stereotype threat offers a plausible explanation for why many of the BEV drivers regarded the 'green' identity as undesirable. They referred to well-established images of a collective environmentalist identity, assuming that simply driving a BEV would lead people to view them as being different to the mainstream market and similar to the environmentalist 'prototype' (the most typical member of a group, real or imagined, in terms of beliefs, attitudes, and behaviours). The prototype in this instance was felt to be a strange and radical activist, summarised in phrases such as 'tree huggers', 'eco-freaks', and 'weird, freaky nutters'. In a paper analysing negative usage of the term 'tree hugger', Hutchings (2005) identified a number of widely-accepted connotations attached to the stereotype, including the eccentricity, extremism, self-sacrificing austerity, and loss of masculinity mentioned by the TSB drivers. Jorgensen (2011) and Hutchings (2005) also acknowledged that environmentalist stereotypes can be used in image politics to alienate and denigrate people who are felt to present a challenge to existing attitudes and

behaviours. The BEV drivers implied that they might be seen as holding drastic views for opposing ICE car usage, and the derogatory stereotypes could function to reduce public cognitive dissonance over environmental behaviour by making BEV adopters look foolish and out-of-touch.

In addition, the stereotype of a tree hugger in the context of the TSB trial may have appeared particularly absurd; like the incongruity between the image of nature and the image of cars, the idea of clinging to trees and embracing the outdated mindset of a 'hippy' or a Luddite contrasts vividly with the image of an early adopter of new vehicle technology. The terms 'green' and 'eco' call to mind the image of being immersed in immobile, organic environments, which conflicts with the image of driving a car at speed on manmade roads. This could help to explain why a number of drivers took pains to dissociate themselves from the 'big sort of green environmentalist' stereotype, downplaying their environmental attitudes or indicating that they could discard the whole BEV-driving part of their identity if necessary. In the stereotype threat literature, these psychological defence strategies are known as 'disengagement' (a short-term, reversible response) or 'disidentification' (a long-term, chronic response) (Stern et al., 2002, pp. 409-413).

High-status 'green' identity

On the other side of the status spectrum, 10 of the 53 drivers (19%) indicated that the 'green' image of BEVs communicated an undesirable high-status identity. This identity was often linked to the adoption of HEVs by film stars, but the association with Hollywood was felt to be 'uncomfortable' as it implied that the BEV drivers were simply trying to show off their altruism or copy US celebrities:

I think there's a kind of a, a bit of a slightly uncomfortable feeling of 'holier-than-thou'. [. . .] I think there's a bit of that, you know, like Hollywood stars driving [HEVs], you know, I think it's a little bit of, there is a little bit of wearing your environmental heart on your sleeve. (P53)

I mean you see the Hollywood types all have their Priuses don't they, so it's a bit of a posey thing. (P34)

There may be a bit of snobbery attached to it that says, "OK, I am, I am very environmental, very switched on", oh, a new term I've heard – "environmental bling". [Laughter] (P22)

Repeated references to being 'holier-than-thou' (P40, P53) imply that the high-status BEV/HEV drivers were seen as attempting to project an image of sanctimonious one-upmanship. Terms such as 'environmental bling' suggest that BEVs and HEVs may nevertheless be dismissed by the public as merely a fashion statement or a passing fad, rather than a viable and usable long-term transport option for mainstream consumers. Three drivers (6%) felt this kind of 'green' image to be misleading, communicating the impression of pretentiousness and hypocrisy:

I think judging by the use of hybrid vehicles by the Hollywood set, yes [EVs are a status symbol]! I think a lot of these actors and actresses like to improve their image by either pretending or actually doing good deeds. (P45)

I bet you those people that say, "Oh yes it shows that we're fantastically environmentally friendly", I bet you they take flights abroad frequently. (P43)

[EVs are a status symbol for] anybody who needs eco-credentials. I was talking to somebody the other day [. . .] he was talking about some big company where all the directors had Toyota Priuses, but they only came out one or two days a year – when they went off to the directors' meeting or board meetings they drove them, otherwise they drove their Jags. (P28)

These quotes imply that BEVs and HEVs were adopted by the wealthy primarily for overt display, providing a false image that could mask or help to offset their other, environmentally damaging behaviours. Another three drivers (6%) made clear that BEVs were only considered a high status symbol for people who identified with environmentalist social groups and had positive images reflected back to them by other group members. They implied that they did not regard themselves as belonging to these categories:

I suppose you could argue, yes, I'm an environmentalist, therefore I've got an electric car. So yes, I think for some people they can be a status symbol. [It says] we've suddenly become very, very green. (P47)

I think an electric car has a sort of, you know, a slightly... unusual image shall we say! [. . .] They're a status symbol amongst, I suppose, in some sort of... people who are interested in sort of environmental issues. (P03)

I think [BEVs] probably are [a status symbol] to some people actually. I think they are probably because they're quite expensive, got to be honest, you know £30,000 for a car is a lot of money to me. [. . .] That is a lot of money to park one on your driveway and say, "Look at me, I'm being really green". I suppose for eco-warriors with massive budgets they are a bit of a status symbol. (P46)

The last quote reinforces the idea that BEVs could function simply as fashion accessories, parked in highly visible places to radiate 'green' signals as opposed to being used as a practical means of transport.

The high-status image did not appear to be viewed as negatively as the stigmatised 'tree hugger' stereotype, and some drivers seemed amused at the thought of being associated with the rich and famous. They did report feeling somewhat uneasy with the idea that the public could regard them as environmentalist show-offs, however, flaunting their altruism or wealth, or simply trying to keep up with the latest celebrity trends. This contrasts with the way in which celebrity endorsement of a product is usually considered very positive; Hartmann and Apaolaza-Ibáñez (2006) observed, for example, that the commercial success of the Toyota Prius was partly due to the fact that 'followers of social fashion know that several movie stars own one' and could use it to 'demonstrate their environmental consciousness to others' (p. 677). The prototype member of the high-status 'green' group was seen by the TSB drivers to be a Hollywood fashion-follower, and the psychological distance was emphasised to an extent by the geographical and sociological distance between the UK and California, especially as the latter region has been established as a world leader for the acceptance of new HEV/BEV technology (California PEV Collaborative, 2010). In addition, California carries the impression of being a far-off fantasy land for many people, quite literally a world of images where film stars adopt numerous identities in multiple films.

In direct contrast to the frugality image attached to the low-status drivers, the high-status group's prestige factor was drawn largely from the impression of affluence. This was undermined, however, by drivers' implications that the money was being spent in a vain and frivolous way. Some literature has proposed that a display of self-sacrificing environmental altruism (being ethical and caring towards the environment) can lead to a status-enhancing social identity (Chua, Lee, & Sadeque, 2010; Griskevicius, Tybur, & Van den Burgh, 2010; Sexton & Sexton, 2014); Griskevicius and colleagues (2010) termed this phenomenon 'conspicuous conservation', and contrasted it with traditional approaches that 'associate status with preferences for luxury and self-indulgence' (p. 392). The jet-setting and Jaguar driving high-status environmentalists described by the BEV drivers appear to align more closely

with the traditional ‘conspicuous consumption’ theory, however, which proposes that consumers gain status by purchasing products that demonstrate wealth (Veblen, 1899). Three of the TSB drivers (6%) made clear that BEVs would only be considered a status symbol for other members of the ingroup (*intragroup* stability), but could be seen differently by the outgroup (*intergroup* instability). Tajfel (1978) would describe this situation as a ‘perceived illegitimacy of an existing relationship of status’ (p. 75), and the TSB drivers attempted to dissociate themselves from what could be considered an ‘illegitimately superior group’ on the environmental dimension (Caddick, 1982, p. 151).

At first glance, the two categories in the *undesirable ‘green’ identity* subtheme appear to be complete opposites, positioned at conflicting extremes of the social status spectrum. On closer analysis, however, the low-status and high-status identities do share several similar characteristics. Firstly, each of the two extremes *is* extreme in the sense that it is very different from social norms; drivers thought that other people would view them as being highly dissimilar to ‘normal’ consumers. Secondly, this subtheme revolves around stereotypes of social groups rather than perceived appraisals of individual personality characteristics, as both the low-status and high-status environmentalist groups were viewed by the drivers as minority social categories detached from the mainstream market. Thirdly, the low-status and high-status identities are both linked to an element of invalidity, as drivers thought that group members of each category would be perceived by the public as embracing an invalid ‘green’ self-image. This helps to explain why the high-status identity (usually regarded as very positive) was seen as negative by drivers in the TSB trial.

Overall, this subtheme reveals some novel findings and contradicts assumptions in the existing literature that a pro-environmental EV image and driver identity will automatically be seen as positive (e.g., Axsen & Kurani, 2013; Chua et al., 2010; Egbue & Long, 2012; Schuitema et al., 2013; smart, 2010). More than half of the TSB drivers referred to some form of negative ‘green’ BEV driver image that they imagined other people to hold, in line with the kinds of stereotypes and caricatures employed by *The Sunday Times Magazine* (2009) and other forms of media, as discussed in the introduction to this chapter. Analysis of the TSB interview data offered a deeper and more expansive insight

into the ambiguities raised by existing qualitative studies (Burgess et al., 2013; Graham-Rowe et al., 2012; Heffner et al., 2007b), exposing not one but two distinct negative stereotypes (low-status and high-status) associated with the 'green' image of BEV drivers. Although these two stereotypes initially appeared contradictory, the social identity perspective offered an explanation for how both operate in a similar way on a socio-psychological level, sharing the main characteristic of categorising the drivers as belonging to a minority social group that deviates from established social norms.

5.3. Conclusion

In conclusion, this chapter shows how the 'green' image of BEVs and 'green' identity for BEV drivers comprise a range of complex and potentially problematic meanings. These meanings have not been fully addressed in the background literature. One key finding from the above analysis is the clear divide between BEV drivers' own perceptions (largely positive and related to individual personality characteristics) and their expectations and inferences about other people's perceptions (largely negative and based around broad social stereotypes). Existing qualitative research addressing issues of image and identity for EVs and their drivers has tended to focus on the positive side, emphasising the opportunities for consumers to create new and personalised sets of desirable meanings (Garland et al., 2013; Gjøen & Hård, 2002; Heffner, 2007; Heffner et al., 2005; 2007a; 2007b). This chapter reveals, however, that drivers can be equally creative in imagining negative stereotypes that they believe the general public to hold. This echoes the findings of our original TSB study (Burgess et al., 2013), which observed how the lack of a widely-accepted and stable image for BEVs rendered the cars 'particularly susceptible to stereotyping' (p. 33). This chapter expands on the original study, looking specifically at the 'green' image and exposing how the stereotypes do not necessarily originate from actual encounters or communications with other people, but from the psychological phenomenon of 'stereotype threat' as experienced by the drivers.

These findings carry a number of implications for stakeholders attempting to advance EV uptake. Detailed suggestions for promoting the functional 'green' credentials of low-carbon cars can be found in reports such as the King Review

Part II, which outlined a number of strategies revolving around provision of 'clear and easy to understand information' (e.g., improved vehicle eco-labelling in showrooms, colour-coded tax/emission discs for all cars, and targeted information campaigns) (HM Treasury, 2008, p. 66). On an image-related level, however, such interventions could have little impact if consumers felt the negative connotations of the 'green' image to be off-putting. Many studies in the field of marketing research have contributed to a body of robust evidence for the 'negativity effect', a term used to describe how consumers 'place more weight on negative than positive information in forming overall evaluations' (Ahluwalia, Burnkrant, & Unnava, 2000, p. 204); in a qualitative study looking at focus group attitudes towards negative images in relation to clothing, for example, Hogg and Banister (2001) revealed that consumer aversion to projecting undesirable self-images was a strong influential factor for avoidance or rejection of retail outlets, brands, and products. The participants drew on product user stereotypes, and one key emergent theme was that 'in order to support a positive identity, it is essential to avoid those products [. . .] which represent an undesirable typical consumer' (Hogg & Banister, 2001, p. 96).

Bearing these findings in mind, one possible solution for stakeholders in the EV field would be to shift away from promoting an environmentally friendly image for EVs. This would enable them to steer clear of greenwashing accusations and to remove the 'green' stereotype threat for EV adopters. Given the fact that the environmental credentials of EVs are the main reason why governments and other invested bodies around the world want to promote the vehicles, however, this would not be an ideal approach. The findings of this chapter show that the environmentally friendly image did appeal to some drivers on a personal level, and that local, tangible benefits such as lack of exhaust fumes were often seen as positive. An alternate solution would therefore be to promote the environmental image in a new and original way, perhaps transforming it from a 'green' image to a 'clean' image in line with the conceptualisations evoked by a number of TSB drivers. This would allow the traditional 'tree hugger' stereotype to be avoided, and could potentially attract a broader and more diverse range of consumers.

Promoting a more normalised consumer group image could carry a range of benefits for the EV market. Both of the undesirable 'green' identities (low-

status and high-status) that emerged from the TSB data revolved around negative stereotypes of social groups, whereas the desirable 'green' identities were based largely around drivers' positive perceptions of themselves as individuals. Only three participants (6%) made reference to a positive pro-environmental ingroup. A central tenet of the social identity perspective is that people use group membership to develop and define their sense of self, and that belonging to a positively-evaluated ingroup (i.e., a group 'perceived as being superior to relevant outgroups on salient comparison dimensions') functions to 'enhance social identity and satisfy the need for self-esteem' (Brown & Capozza, 2006, p. 4). The lack of reference to a positive ingroup in this chapter reveals a large gap. It also raises an important question: did the drivers perceive themselves as belonging to desirable social group of BEV adopters in any way? This question is partially answered in the next chapter, which looks at the technological image of the cars and the associated identities that it holds for the drivers.

Chapter 6

The technological image of BEVs, and the implications for BEV drivers

6.1. Introduction

Electric vehicles are widely hailed as a new and innovative form of technology. Along with their environmental credentials, this is often seen by governments and other investors as a major selling point. Since the mid-1990s, rapid advances have been made in the development of EV batteries, motors, interior and exterior designs, and charging equipment. Ongoing current and potential future technological developments have been discussed in detail by numerous reports (e.g., Accenture, 2011a; Hjorthol, 2013; HM Treasury, 2007, 2008; Kay et al., 2013; Lane, 2011; OLEV, 2013; RAEng, 2010; Rowney & Straw, 2013; Tsang et al., 2012). These reports focus not only on the vehicles themselves but on broader shifts towards regenerative energy production, 'smart' energy grids, integrated payment systems, and reliable information networks which connect electricity suppliers and consumers. The ambitious technological nature of EV projects is often emphasised: the King Review Part II (HM Treasury, 2008), for example, referred to EVs and other low-carbon vehicles as 'radical new vehicle technologies' (p. 83); OLEV (2013) described the move towards alternatively-fuelled vehicles as a 'once in a lifetime technology change' (p. 6); and a report commissioned by the UK's IPPR (Rowney & Straw, 2013) announced the automobile industry to be facing a global 'innovation revolution' (p. 7).

From a technological point of view, BEVs are seen by stakeholders to offer numerous advantages. Many of the above reports explained how large-scale uptake could benefit both consumers and suppliers. Like other household appliance changes in the twentieth century, such as the shift from human-powered laundry tubs to electric washing machines, fuel-burning stoves to electric ovens, and gas lamps to electric lightbulbs (Cowan, 1976), they could be regarded as a constructive move towards a new era of increased convenience and control. In the long term, BEVs would help drivers to save money through

lower operating costs, and to save time and effort through not needing to visit petrol stations. In terms of performance, BEVs are quiet, easy, and smooth to drive, and offer excellent acceleration due to lack of gears. For energy suppliers, they could offer new opportunities to balance supply and demand on electricity grids, which would increase efficiency and reduce expenditures. For vehicle manufacturers, they would open avenues for research, development, and production, allowing the UK motoring industry to position itself 'in the vanguard of this new technology – delivering jobs and growth for decades to come' (OLEV, 2013, p. 14).

It has been acknowledged that despite these advantages, one barrier facing the EV market is the fact that consumers are often resistant to technological change (Sovacool & Hirsch, 2009). Much research has examined the individual technical features of BEVs that are felt to be problematic by consumers, such as the limited driving range, long recharging times, and lack of public charging infrastructure. Some publications have also observed that there can be a more general challenge in 'helping consumers understand how suitable new technology can be for them' (OLEV, 2013, p. 31), and overcoming 'concern over early adoption of new technology' (HM Treasury, 2008, p. 20). In a paper addressing the barriers to the acceptance of plug-in hybrid electric vehicles (PHEVs), Sovacool and Hirsch emphasised how most consumers tended to 'remain impatient and close-minded about new energy technologies', relying instead on 'notions of tradition and familiarity when they make consumer choices, especially when dealing with hardware that requires huge capital costs' (p. 1100). They observed that 'subtle impediments relating to social and cultural values', in addition to specific technical concerns, may present significant obstacles to acceptance of EVs and associated energy systems (Sovacool & Hirsch, 2009, p. 1095).

Background literature often assumes that EVs will appeal initially to a minority of consumers for whom new technology is attractive. Some research draws on Rogers' (1962, 2003) well-known 'diffusion of innovations' (DOI) theory, which looks at the process by which innovations are adopted (or rejected) by members of social systems. Rogers (2003) divides the market into five segments based on consumer willingness to adopt innovative technologies, practices, or ideas: 'innovators', 'early adopters', 'early majority', 'late majority',

and 'laggards' (pp. 283-284). For an innovation that achieves successful uptake, the distribution of adopters forms a bell curve when plotted over time on a frequency basis, and an S-shaped curve when plotted over time on a cumulative basis. In a report commissioned by the UK's RAC Foundation, Lane (2011) applied this theory to the EV field by stating that 'current BEV and HEV owners are broadly defined by the "innovator" and "early adopter" market segments' (p. 14). Lane went on to describe how members of the first category are 'generally more willing to take risks than the average consumer, are wealthy, young, have high social class, are well educated and are pro-technology', while the second 'have much in common with innovators, but tend to adopt new technologies for more pragmatic reasons' (p. 14). By initially targeting these two market groups, stakeholders could increase the likelihood of getting EVs out onto the roads and promoting diffusion in the typical pattern.

A conference paper by Morton, Anable, Schuitema, and Nelson (2012) focused specifically on applying the DoI theory to the uptake of low emission vehicles (LEVs) in the UK. This study investigated the hypothesis that 'individuals that exhibit a high degree of innovativeness will be more likely to consider a LEV' (p. 3), and presented the results of a questionnaire survey completed by 54 households in the city of Aberdeen. The questionnaires were designed to measure respondents' levels of 'innovativeness', a concept which was divided into 'innate innovativeness' (personality and communication characteristics) and 'adoptive innovativeness', divided again into 'global adoptive innovativeness' (purchasing behaviour for new technology in general) and EV-specific innovativeness (stated preferences for 'micro hybrid', 'full hybrid', 'plug-in hybrid', and 'pure electric' cars) (Morton et al., 2012, pp. 1, 10). Correlation analyses showed some interaction between 'innate innovativeness' (measured by asking respondents to rate statements such as 'I regularly seek information about the latest consumer technology' on a 7-point Likert scale), and 'global adoptive innovativeness' (measured by presenting respondents with a list of 17 technological products, such as smart phones and underfloor heating systems, and asking them to indicate which ones they owned, intended to own in the near future, or did not intend to own). There was little interaction between either of these two forms of innovativeness and the stated preferences for LEVs, however. This led the authors to conclude that

‘innovativeness in the LEV market appears to be a more challenging concept to understand’, and to propose that ‘innovativeness has yet to be switched on in the LEV market’ (Morton et al., 2012, p. 11). Morton and colleagues went on to suggest that ‘a more qualitative inquiry may prove more fruitful’ in investigating such an ambiguous area (p. 12).

One possible explanation for the ambiguous findings could be that the respondents (mainstream market consumers in a UK region where LEV uptake is low) perceived the LEVs as either too innovative (i.e., much more advanced than the other 17 technological products) or on the other hand as not very innovative (i.e., offering lower performance and convenience than ICE cars). The paper did not measure consumer perceptions of the degree of ‘innovativeness’ that the LEVs possessed; it was assumed that the vehicles were universally regarded as a form of new technology, with micro hybrids falling at the lower end of the ‘innovativeness’ scale and pure BEVs at the higher end. Conflicting consumer perceptions emerged, however, in other qualitative studies (discussed below). Another explanatory factor could be that issues of image and identity played a greater role in influencing respondents’ perceptions of LEVs than of the other products listed. The importance of image for buyers of cars compared to buyers of different forms of technology was highlighted in a report by the UK’s Royal Academy of Engineering:

Cars are iconic and aspirational in a way that most other energy-consuming goods are not and are central to much contemporary (and particularly youth) culture. In Britain, 6.4 million people do not tune in to TV programmes called *Top Domestic Appliances* or *Top Condensing Boilers* in the way they do for *Top Gear*. (RAEng, 2010, p. 13)

This quote makes clear that consumer perceptions do not rely simply on rational assessments of the technological functionality of EVs, as they might do if they were seeking to buy a more mundane household appliance.

The importance of the technological *image* of EVs emerged clearly in some of the publications discussed in Chapter 3. In Heffner’s (2007) doctoral thesis, the data collected from the Californian HEV drivers revealed a number of complex and conflicting consumer views, as the majority of participants did not consider themselves to be particularly ‘technology-savvy’ (i.e., knowledgeable about the technical aspects of their cars on a functional level) (pp. 140, 152), but they did

like to talk about the 'symbolic meanings of hybrid technology' and the desirable identities that these were felt to confer. One of the five main 'denotations' presented by Heffner was the fact that many participants appeared to 'embrace' the image of the HEVs as 'new, advanced technology vehicles' (p. 160). Positive symbolic meanings attached to the cars included 'high efficiency' (p. 67), 'futuristic technology' (pp. 122, 123), and 'leading-edge technology' (p. 142); these images allowed the drivers to communicate both to themselves and to other people identity characteristics such as 'technology proficiency' (p. 18), 'individuality' (p. 161), 'intelligence', 'distinctiveness' (p. 174), and 'smart' consumerism (pp. 174-175). Similar positive views were sometimes reported to be shared by wider social networks. One participant described how his colleagues perceived the HEV as something novel and fantastic:

Richard's colleagues [. . .] were the ones who recognized that his HEV was not just another compact car, but a futuristic "technological marvel" that was far better than a conventional BMW or Lexus. Within a specific lifestyle sector where innovativeness was strongly valued, Richard's HEV ownership established him as a technology pioneer and a leader who was ahead of his peers. (Heffner, 2007, p. 184)

Heffner's (2007) study also touched more tentatively on a number of ambivalent or negative meanings attached to the technological image of EVs, however. One participant explained that she chose to buy a high-performance HEV because she thought that other HEV models looked like a 'toy car' and were just 'small, strange-looking things for odd people' (Heffner, 2007, pp. 148, 165). Another participant liked HEVs but argued that BEVs were far too radical:

Ron noted that the BEV's limited range and recharging requirements made it an "impractical" vehicle. He also saw the BEV as symbolizing change that was too drastic for most car-buyers. "Radical revolutions fizzle out" Ron explained, "EVs were too extreme." (Heffner, 2007, p. 232)

On one hand, these quotes seem to suggest that a variety of meanings was already developing for different types, brands, and models of vehicles within the same overall superordinate category of EVs. On the other hand, however, they also show how even consumers who had committed themselves to buying a certain type of HEV could see other EVs as possessing stereotypically undesirable images. The second quote makes clear that the driver perceived pure BEVs as forming one single, stigmatised, and homogenised category of

‘drastic’, ‘radical’, and ‘extreme’ innovations that would meet an ignominious end. Both of the above quotes draw on images of EVs that deviate from established norms through being strange and inferior technology in the first instance, and overly advanced technology in the second.

Heffner (2007) also observed that technophile stereotypes existed in the public sphere and that ‘buyers who are interested in new technology can be seen as socially-challenged geeks’ (p. 164). He described how numerous households ‘connected the idea of being a geek with driving a hybrid’ (Heffner, 2007, p. 179), and how although some of the participants seemed to like and endorse the concept of ‘geekiness’, the term could carry neutral or negative meanings for other people (Heffner, 2007, p. 179). The term ‘geek’ is a form of slang and can be used in many ways, but its most common definitions are ‘an unfashionable or socially inept person’ or ‘a person with an eccentric devotion to a particular interest’ (Oxford English Dictionary, n.d.). It is frequently applied to technophiles with ‘excessive enthusiasm’ for a specialist subject, and while it may be ‘a term of pride as self-reference’, it is ‘often used disparagingly by others’ (Dictionary.reference, n.d.).

The ambivalence towards the technological image of EVs emerged again in the study by Graham-Rowe and colleagues (2012), in which UK participants engaging in a 7-day BEV/PHEV trial generally viewed the technology on a functional level as ‘underdeveloped’ and ‘a work in progress’ (p. 149). Participants discussed a range of images associated with the cars and drivers: some imagined the typical BEV/PHEV driver to be someone ‘sensible and boring’ who just needed to ‘tootle around’ (i.e., user of inferior technology), but others felt that they could derive ‘social identity gains’ or ‘kudos’ from projecting the image of ‘a forward-thinking person, modern, and perhaps on the pulse of technology’ (i.e., user of modern and viable technology) (Graham-Rowe et al., 2012, pp. 148-49). The authors suggested that emphasising ‘associations with progress and technological advancement’ could contribute to positive consumer evaluations of EVs, and that uptake was ‘likely to require broad and inclusive positive images of EVs and their users’, perhaps including “‘innovative”, “future orientated” and “technologically-informed”” (Graham-Rowe et al., 2012, pp. 150-151).

Our paper on BEV stereotypes (Burgess et al., 2013) revealed an equally complex range of images held by the UK public. The majority (69%) of the 55 TSB drivers interviewed mentioned encountering traditional views that were linked to images of underpowered milk floats, golf buggies, and ‘Noddy cars’ on one hand (i.e., outdated, inferior technology), and to strange science fiction machines on the other (i.e., overly futuristic technology). These impressions were detached from reality but have been perpetuated to some extent by the UK press, which has ‘enjoyed invoking a pageant of electronic bathtubs, motorized fridges, and vehicles made out of recycled cardboard’ (Burgess et al., 2013, p. 41). Some people seemed very resistant to the whole concept of BEVs, regarding them as an undesirable form of social transition. At the opposite end of the spectrum, 36% of drivers reported that negative stereotypes were beginning to change, as people had started to associate BEVs with images of positive, exciting, and desirable modern technology. Between these two extremes, 56% of drivers reported encountering ambivalent people with open-minded views, perceiving BEVs as ‘futuristic but potentially unfeasible’, and their drivers as ‘pioneers [. . .] but also a little crazy and out on a limb’ (Burgess et al., 2013, p. 42). This chapter expands on the findings of our original study, looking at the TSB drivers’ *own* perceptions of the technological image of the BEVs, and the associated identities that they believed it to hold.

6.2. Results and discussion

Thematic analysis of the interview data revealed two main overarching themes: *The ‘innovative technology’ image of BEVs* (6.2.1) and *The ‘innovative technology adopter’ identity of BEV drivers* (6.2.2). The subthemes attached to each theme are outlined below (see Figure 4). As with the ‘green’ results presented in Chapter 5, each of the two main themes is linked to a subtheme centred around issues of ‘validity’ (highlighted in bold on Figure 4). These two subthemes provide answers to two important underlying questions: *Do the drivers perceive the BEVs as possessing a valid ‘innovative technology’ image?* (focus of subtheme 6.2.1.1) and, *Do the drivers perceive themselves as possessing a valid ‘innovative technology adopter’ identity?* (focus of subtheme 6.2.2.1). As explained and justified at the start of the results section in

Chapter 5, additional findings from the questionnaire data are drawn on and presented alongside the interview data in the two ‘validity’ subthemes.

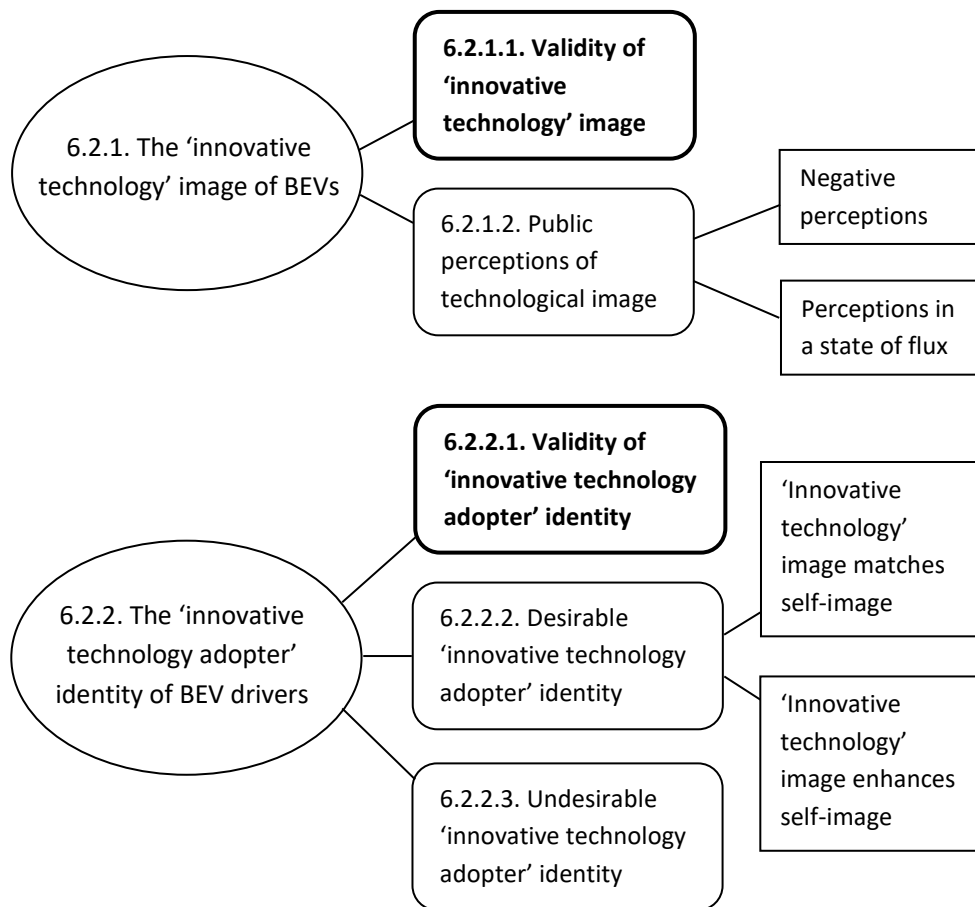


Figure 4. Thematic map showing Chapter 6 themes and subthemes.

6.2.1. The ‘innovative technology’ image of BEVs

6.2.1.1. Validity of ‘innovative technology’ image

For an ‘innovative technology’ image to be considered valid, it must be felt to reflect the functional features of the product. On a basic level, in order to be regarded as ‘innovative’, a technological item must be seen as advanced, inventive, original, and able to offer something different to existing technology. A product can be a ‘continuous innovation’, which expands on an established form of technology and does not require much adaptation, or a ‘discontinuous innovation’, which provides something completely new and requires substantial change on the behalf of the user (Garcia & Calantone, 2002; Lynn, Morone, &

Paulson, 1996; Ram & Sheth, 1989). To be regarded as desirable, the new technology should be perceived as superior in some way to existing technology and as having long-term potential for the future (Rogers, 2003). In the consumer field, it is generally assumed that innovative technological products must be practical, convenient, safe, and easy to use (Rogers, 2003).

This subtheme outlines the TSB drivers' perceptions of the functional technological credentials of the BEVs. It draws on data from all of the 53 drivers (or 43 drivers for some questionnaire items where data are missing, as explained in Chapter 4). It focuses on their overall perceptions of BEVs as a form of innovative technology, rather than on specific evaluations of individual technical features. A table showing the drivers' responses to additional questionnaire items focusing on individual technical features is presented in Appendix D. A comprehensive overview of all TSB drivers' assessments can be found in the Final Report for the ULCVD programme (Carroll et al., 2013); as explained in Chapter 4, the participant sample analysed in this thesis is in many respects similar to the TSB private driver group as a whole.

In the pre-trial interviews, drivers' opinions of the BEVs' overall technological credentials emerged frequently in response to the two motivation questions near the start of the schedule. An additional (subsequent) prompt question was: 'In effect, you'll be involved in testing innovative transport technology. To what extent does that interest you?' It is noted that this prompt may have had a priming effect on drivers. Responses to all three questions are analysed in more detail in subtheme 6.2.2.1 (*Validity of 'innovative technology adopter' identity*), so the findings presented here focus simply on the perceived images of the BEVs, as opposed to the implications that these carry for the identities of the drivers. Numbers and percentages for each of the main categories of response are presented in Tables 11 and 12.

Table 11

Validity of 'Innovative Technology' Image: Summary Table for Pre-Trial Interview Data

Questions: (a) 'For you personally, what are the most important reasons for taking part in the trial?' (b) 'What do you expect to get from your participation?' (c) 'In effect, you'll be involved in testing innovative transport technology. To what extent does that interest you?'	
Response	No. and % N=53
Reference to BEVs being a viable and desirable form of innovative technology	37 (70%)
Stated in response to questions (a) and/or (b)	30 (57%)
Confident response	21 (40%)
Tentative response	9 (17%)
Stated in response to question (c), but not (a) or (b)	7 (13%)
Reference to BEVs being an interesting but potentially unviable form of new technology	13 (25%)
Other reference to BEV technology	3 (6%)

Table 12

Validity of 'Innovative Technology' Image: Summary Table for 3-Month Questionnaire Data

Statement	Response					Mean	SD
	Strongly agree	Agree	Neither agree/disagree	Disagree	Strongly disagree		
I think EVs are the cars of the future N=43	15 35%	21 49%	7 16%	0	0	4.19	.70
EVs are practical N=43	10 23%	26 60%	7 16%	0	0	4.07	.63
The car I had in this trial satisfied my daily needs N=53	29 55%	20 38%	2 4%	2 4%	0	4.43	.75
I have felt as safe in the EV as I do in a normal combustion engine car N=53	24 45%	23 43%	4 8%	2 4%	0	4.30	.77
Learning how to use my EV was easy N=53	39 74%	14 26%	0	0	0	4.74	.45

In response to the first two interview questions, over one-third of the drivers (21/53, 40%) made confident reference to the BEVs being some form of desirable innovative technology. Phrases used included 'new technology' (P01, P14, P28, P33, P37, P39), 'new and novel technology' (P46), 'cutting-edge technology' (P20), and 'something new and innovative' (P42). Many drivers added statements about their beliefs regarding BEVs' role in the future:

It's new technology, it's the vision I share that electric vehicles are going to be very commonplace in large towns and cities. (P37)

The technology [. . .] I believe it will be what we'll all be driving in the future. (P09)

It's [. . .] evolving technology really, I mean, I think it's the way forward. (P47)

These 21 drivers indicated that they expected the BEVs to fit into their lifestyles and be a form of 'continuous innovation', not radically dissimilar to ICE cars but offering a new and enjoyable experience. An additional nine drivers (17%) implied through more tentative statements that they thought BEVs to be a form of desirable technology that would be enjoyable to drive and had potential for the future. Two of these drivers (4%) appeared to regard the BEVs as a form of 'discontinuous innovation', requiring substantial adaptation:

It's a completely new avenue for me because I've never driven these tech things before. [. . .] I'm going to be on a really steep learning curve, because this is awfully new and it's not like I can go to anybody and ask them their advice because nobody's had one before. (P30)

It's just going to be a totally different experience, isn't it? You know, the way you drive, the charger, I think the whole thing, you know, using the public charging points, I think the whole concept [. . .] it's just going to be so completely different in every way. [. . .] I think it'll take a while to get used to it. (P47)

These two drivers believed that they had the coping skills to manage the challenge, but implied that other people might lack the confidence to take such a leap. In response to the direct prompt question, a further seven drivers (13%) made positive statements. Overall, more than two-thirds of the drivers (37/53, 70%) appeared to consider BEVs to be a desirable form of innovative technology.

It should be noted that these 37 drivers did not assume that the BEVs would be faultless right from the start. They liked the idea of experiencing and testing

innovations that they felt to have a good chance of becoming superior to existing technology and improving 'quality of life' in the long run:

Improved transport technology [interests me] and therefore that comes from innovation. [. . .] You can make things better. When you can do the *Star Trek* and 'Beam me up Scotty' I'll be delighted with that as well. What you're trying to do is improve your quality of life. (P16)

They were aware, however, that BEVs were still in the early stages of development:

Obviously this is the first in a series of vehicles that they will release so effectively it's only a prototype [. . .] but obviously they'll improve as time goes on. (P17)

This did not detract from their optimism, and many drivers explained how they were keen to contribute to a project that enabled them to 'help sort out the pitfalls now' (P30), be 'part of developing the technology' (P04), and assist with 'ironing out some of the problems' (P29). They appeared to assume that the technological benefits of BEVs (e.g., instant acceleration, smooth handling, and low noise) would outweigh the technological barriers (e.g., limited range and long recharging times) at the time of the trial. Such proactive attitudes have also emerged in other research on innovative technology acceptance; as observed by Hoogma and Schot (2001), a number of studies have shown that in the early stages of introducing a new product to the market, producers can benefit greatly from the input of 'lead users' who 'are not passive recipients [...] they often develop new functions for technologies, solve unforeseen problems and propose or develop innovative solutions' (p. 216).

Of the remaining drivers, 13 (25%) regarded the BEV technology as new and interesting but were unsure as to whether it could be considered viable. These drivers were open-minded but made clear that they were withholding judgement until they had had the chance to use the cars:

I think it's to help to find out really how feasible [the BEV] is [. . .] for the future, whether it's something I can think about seriously in the future. (P12)

I guess this type of vehicle is something you're going to see more of in the future and it's inevitable that we have to change. [. . .] So it was the idea of actually you know, trying out something at the very early stages and getting an understanding of you know, what it can do, is it really, you know, is it really great or is it going to be a big let-down? (P36)

One of the 13 drivers admitted that he had absolutely no idea what to expect:

We're all interested in what the future's going to bring. [. . .] So I am interested in it. [. . .] It's not a Mickey Mouse outfit is it? [. . .] I really just have no idea [what it will be like to drive]. I presume it's going to be something like a dodgem car is it? I don't know. (P06)

Such reservations are interesting given that the drivers had signed up for a trial which demanded quite a commitment. These 13 drivers all appeared to view the BEVs as 'discontinuous innovations', which are harder for stakeholders to promote as they 'typically require a long, investment-intensive process, marked by pervasive uncertainty, unpleasant surprises, and no guarantee of success' (Lynn et al., 1996, p. 8). This problematic aspect of discontinuous technology has been highlighted by other researchers; Anderson and Ortinau (1988), for example, stated that 'it is not surprising to find the failure rate among this type of innovation excessive by most standards' (p. 283).

The remaining three drivers (6%) expressed slightly different opinions to the rest of the participant sample. One was very positive about her BEV but said that she had not thought about it as a form of technology. Her reply to the prompt question was, 'I hadn't even thought about that, sorry. [. . .] I think it's amazing, but I don't really understand [the technological side]' (P13). Another believed BEVs to be a form of new technology, but he did not see this as appealing:

It would be good if this wasn't new technology, so that people could trust it. [. . .] If it's new technology, normally there's a risk. [. . .] If it is proven then people tend to trust it much more. (P22)

The third described BEVs as 'a contentious, disruptive technology' (P40). He was very interested in the BEVs from a personal point of view, but also made reference to experiencing mixed views (including '*enormous* resistance') in the public sphere. These last two drivers evidently viewed BEVs as what can be termed a 'highly discontinuous' (Ram & Sheth, 1989, p. 7) or 'disruptive' (Christensen, 1997; Danneels, 2004; Markides, 2006) innovation, involving an element of risk and consumer resistance. Their quotes echo the statement: 'When an innovation requires a customer to deviate from established traditions, it is resisted. The greater the deviation, the greater the resistance' (Ram & Sheth, 1989, p. 9).

In the 3-month questionnaire, 36 out of 43 drivers (84%) gave a positive response to the statement, 'I think electric cars are the cars of the future' (35% chose *Strongly agree*, and 49% chose *Agree*). No drivers disagreed. Ten drivers (19%) were not presented with this questionnaire item, but expressed very enthusiastic views towards the BEV technology and its future potential in their 3-month interviews. This suggests that the drivers who entered the trial with positive views had their initial opinions confirmed or exceeded, and that many of the unsure drivers were converted to a positive viewpoint. Drivers were also presented with four more specific statements designed to assess their perceptions of whether BEVs were a viable form of technology during the trial period. The large majority of drivers agreed that BEVs were practical (36/43, 84%), satisfied their daily needs (49/53, 92%), felt safe to drive (47/53, 89%), and were easy to learn to use (53/53, 100%). Together, these findings show that experience led the large majority of drivers to think that BEVs were viable for everyday usage at the time of the trial. One notable exception was Participant 43 (discussed in more detail below), who was unsure about the viability of BEV technology at the beginning of the trial and became very disparaging in his 3-month interview.

Overall, this subtheme reveals that most of the drivers saw the BEVs as possessing a valid 'innovative technology' image, and viewed this as something desirable. It is important to take into account, however, the way in which they conceptualised the idea of 'innovative technology'. They did not on the whole regard BEVs as flawless and unquestionably superior to conventional ICE vehicles. Over the course of the interviews, drivers gave comprehensive feedback in response to targeted questions on which technical features worked well and which could be improved. The positive element of the BEV experience seemed to come not just from the technology itself but from the novel and unique aspect that it carried, which was often described as 'interesting' and 'exciting' because it opened new possibilities and raised new challenges. The drivers' relationship with the technology was not one of simple usage but of engagement, evaluation, and assessment that could lead to improvement.

Participant 43 was an outlier in the participant sample in that he became very negative towards his BEV over the course of the trial. He expressed clearly in his pre-trial interview that he expected to be able to use the BEV in exactly the

same way as an ICE car. In response to a question about whether he felt any differently about driving a BEV compared to his usual car, he replied:

I hope not! That's the whole plan. I was hoping I can use it just as well. I hope it doesn't affect... I'm not the kind of person to sit there and say, "Ooh, this is fantastic, this is electric!" [Laughter] At the same time I'm not going to sit there and go, "Uh oh, this is electric, what'll I do?" I'm not that affected, it's a case of if it's there I'm going to use it, as I would use anything. (P43)

He appeared very puzzled by two further questions asking whether he anticipated any changes in his life, and what new things he would have to get used to:

I'll just carry on with my normal life. [. . .] I am getting a car aren't I? I'm not getting some alien craft? What do you mean? (P43)

He was even more confused about a subsequent question asking about his confidence in the prospect of charging the BEV:

That is a remarkably psychologically strange question! [. . .] [Laughter] Perhaps if you tell me what you mean by that, because I've got no idea! Confident? Am I going to be quaking in my shoes? I don't know what you mean! (P43)

It emerged that he assumed that the charging plug for the BEV would be so similar to the kind of '3-point plug which I have used for the entirety of my life' (P43) that there could be no difference whatsoever between plugging in a BEV compared to any other kind of appliance. This initial mindset helps to explain why he did not perceive the BEV as fulfilling his expectations over the course of the trial; it did not turn out to provide exactly the same level of comfort, convenience, and performance as a conventional high-performance ICE car, and he was not prepared to make any changes in his outlook, lifestyle, or driving behaviour.

These findings highlight the need to define and contextualise the concept of 'innovative technology', and the factors that can make it acceptable or unacceptable to the people who will use or be exposed to it. An extensive amount of literature in the consumer field has addressed this topic, but a 'wide variety of definitions [. . .] has resulted in vagueness of terms and explanations' (Zapata & Nieuwenhuis, 2010, p. 14). Unlike much existing research, this thesis does not attempt to apply a particular innovation acceptance framework to the

TSB data, but it does take into account one fundamental feature acknowledged by Rogers' (2003) DOI theory and by the well-established Technology Acceptance Model (TAM) (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989; see also Bagozzi, 2007): the fact that product attributes are evaluated by consumers on a subjective level. As stated clearly by Rogers (2003), 'It does not matter so much whether an innovation has a great deal of "objective" advantage. What does matter is whether an individual perceives the innovation as advantageous' (p. 15). This chapter examines the 'validity' of the BEV image from the drivers' points of view, and in this way it differs from the large number of papers and reports which have attempted to measure and compare the individual technical features of EVs and ICE vehicles in a highly objective and pragmatic way (e.g., Kay et al., 2013; OLEV, 2013).

The TSB drivers' positive perceptions contrasted with general assumptions that in order for consumers to adopt a new technological product, they must perceive it as being faultless and superior in all ways to existing technology. This assumption was captured in a recent advertisement for the Jeep Grand Cherokee (an ICE sports utility vehicle), which promoted the car's latest design and 'innovative technologies' with the tagline, 'Could it be any more perfect?' (Jeep, 2015). The TSB drivers' distinct conceptualisation of the BEV technology appeared to be partly due to the fact that they were participating in a trial intended to test the vehicles, and had not committed themselves to purchase. Participants in other EV trials (as outlined in Chapter 3) nevertheless held more negative views. Caperello and Kurani's (2012) study analysed data from 36 Californian households which had been given a PHEV for a 4-6 week trial period, and the main theme that emerged was 'confusion about PHEVs'; many households were 'unfamiliar and uncomfortable with the PHEV technology', and most were unsure about the state of charge and worried about getting stranded (p. 499). In the UK, Graham-Rowe and colleagues' (2012) study found that many of the 40 PHEV/BEV drivers lacked confidence and were still concerned about the technical features of their PHEVs/BEVs by the end of the 1-week trial. They rated performance as substandard in comparison to ICE vehicles and felt the required adaptations (especially recharging procedures and new driving styles) to be difficult and effortful. Although most appeared to think that the 'present perceived inadequacies of EVs would be rectified by

technological improvements', their assessments on the whole were relatively dubious and sceptical (Graham-Rowe et al., 2012, p. 149).

These two studies, along with the negative attitude of TSB Participant 43, provide additional evidence that the validity of an 'innovative technology' image is largely dependent on personal interpretation rather than quantifiable assessment of technical features. One influential factor for the substantial differences between the findings of the three studies appeared to be the drivers' expectations and motivations for adopting the EVs. The TSB drivers actively volunteered to take part in the trial, aware that there was a competitive selection procedure, and engaged with the BEVs in a variety of affective, cognitive, and behavioural ways. The participants in the other two studies did not volunteer but were simply recruited by the researchers, and appeared to engage with the cars on a much more passive, behavioural level. Deci and Ryan (2000) observed that an intrinsically motivated person who is 'moved to act for the fun or challenge entailed rather than because of external prods, pressures, or rewards' will experience a greater sense of enjoyment, autonomy, competence, and control (p. 56); on the other hand, someone with an external goal imposed upon them can show increased anxiety and poorer coping skills. The TSB drivers were aware at the pre-trial interview stage that the BEV technology would not be perfect in all respects, but the majority saw this as a fun kind of challenge and were confident in their coping capabilities. This reflected back on their assessments of the BEVs and on their own identities.

Overall, this subtheme shows that the 'innovative technology' image of BEVs can be seen as valid by some consumers. It would not be ideal to promote BEVs at present with an idealised image of highly superior technology, however. The TSB drivers talked about certain technological benefits that they considered better than those of ICE vehicles (e.g., the excellent acceleration, smooth handling, and low noise), but a significant appeal for many drivers was initially the novelty and uniqueness of the BEVs, which led to a sense of anticipation and excitement, and a desire to learn more about the cars. This suggests that the *innovative* element of 'innovative technology' should be promoted clearly, although not to the extent that BEVs are seen as a radical or highly 'discontinuous' invention requiring significant adaptation. Many of the drivers did like the idea of encountering some degree of surmountable challenge,

which differs slightly from the assumptions of the Dol and TAM theories. It does, however, support the findings of an EV questionnaire study conducted in Germany by Peters and Dütschke (2014), which found that, contrary to expectations, respondents 'would be more likely to purchase and use an EV if they perceived the use of EVs as more complex, i.e. less easy' than an ICE car (p. 12). The authors attempted to explain this finding by stating that 'in samples with a high level of education and affinity towards new technology, a certain technological complexity could also represent a positive characteristic if it is still manageable for the individual consumer' (Peters & Dütschke, 2014, p. 12).

These findings obviously carry relevance for other imminent innovations in the transportation field, such as the 'driverless vehicles' which have gained widespread international interest and are currently the focus of a £19 million trial project launched by the UK Government in 2014 (DfT, 2015). These are usually regarded as a 'disruptive' form of innovation; as stated by Bertolini and Palmerini (2014) in a report commissioned by the European Parliament, 'Driverless vehicles may radically transform our transportation system, and force a change in many habits and preferences we today give *[sic]* for granted' (p. 96). The TSB drivers' experiences offered insight into how conceptualisations of such resistance-evoking technologies could be overcome. Rather than feeling that a drastic change was being 'forced' upon them, the large majority of drivers engaged with the BEV technology in a way that they felt to be rewarding and empowering. Their proactive learning experience enabled them to gain a sense of mastery, as opposed to the experiencing the 'anxiety and stress [...] commonly mentioned as psychological reactions to technology' (Mick & Fournier, 1998, p. 125). Some drivers used phrases such as 'evolving technology' (P47), implying that the potential societal shift towards EVs was an ongoing, natural process rather than a threatening and imposed upheaval. This suggests that new transport technology should ideally be promoted as a form of 'continuous innovation', adding an interesting new element to consumers' lives rather than evoking the 'darker side' of technology ownership by arousing sensations of 'dependence', 'enslavement', and 'ineptitude' (Mick & Fournier, 1998, pp. 129, 126).

6.2.1.2. Public perceptions of technological image

In contrast to the largely positive perceptions of the TSB drivers, a much broader spectrum of images emerged from their reports of how they thought other people to perceive the BEV technology. All drivers made some form of reference to public opinion in the interviews, as they were asked a number of questions such as, 'Are electric vehicles a topic of conversation among your friends and family?', and, 'What have other people's reactions been to you driving your electric car, and to the car itself?' Reported public perceptions ranged from the very negative to the very positive, with various mixed or ambiguous images in between. No drivers referred only to positive or negative perceptions of the BEV technology; they either described how they thought different people (or groups of people) to hold different opinions, or how people's initial scepticism was altered after encountering a real-world BEV.

Not all of the drivers' quotes made clear reference to concrete interactions and communications with other people, so it was not assumed that their statements formed a transparent reflection of reality, providing an accurate snapshot of UK public attitudes. Rather than attempting to present an objective comparison between drivers' views and mainstream consumer views of BEV technology images, this subtheme aims primarily to establish the social context encountered by the drivers on a subjective and psychological level. Their beliefs about other people's perceptions formed part of their own self-images, as explored fully in section 6.2.2. Numbers and percentages for each of the main categories of response for this subtheme are presented in Table 13.

Table 13

Public Perceptions of Technological Image: Summary Table for Interview Data

Topic: How drivers thought that other people viewed BEV technology	
Relevant statements	No. and % N=53
Reference to other people's negative perceptions	40 (75%)
BEVs seen as unviable and undesirable technology (general statements)	17 (32%)
BEVs seen as outdated technology (specific statements)	18 (34%)
BEVs also seen as overly futuristic technology (specific statements)	2 (4%)
BEVs seen as a form of 'gimmick' (specific statements)	5 (9%)
Reference to other people's mixed or ambiguous perceptions	38 (72%)
Reference to other people's positive perceptions	23 (43%)

Negative perceptions

Three-quarters of the drivers (40/53, 75%) made reference in the interviews to some form of public scepticism. Twenty of these drivers (20/53, 38%) reported encountering actual negative responses from family, friends, colleagues, or strangers, while the remaining 20 drew on broader evaluations of public views, sometimes influenced by the media. The scepticism ranged from mild cynicism at one end to extreme resistance at the other. Seventeen drivers (32%) mentioned public negativity in general terms, observing how people saw BEVs as a problematic, unviable, and undesirable form of technology. The remaining 18 drivers (34%) made more specific reference to images of outdated and underpowered vehicles, frequently using comparisons with milk floats, golf buggies, lawnmowers, dodgem cars, and 'Noddy cars':

The vast majority of the public at the moment [think that BEVs are] like a lawnmower or a milk float. (P30)

I think the perception is that they're slow and they haven't got a very good range. [. . .] Certainly people sort of associate them with the old milk floats I think. (P04)

I know a lot of people that I spoke to about being part of the trial have all been, and still to some degree, are all quite, they just had a good laugh

about having an electric car, “Oh it’s going to be like a milk float or a dodgems car”, you know, “You’re be there in 3 hours rather than half an hour”, and you know, sort of quite detrimental really. (P07)

Two of these drivers (4%) also mentioned the image of overly futuristic vehicles, implying that different people held completely different views:

[People] expect it to look more like, more like a different design you know, space agey and perhaps to have funny things sticking off it, or perhaps to have a long bit sticking out where the battery is or something like that. It’s weird. (P14)

[BEVs] might have an appearance of, it’s far too new and it’s probably a silly passing fad. (P01)

A further five drivers (9%) referred to BEVs as being seen as a ‘gimmick’, implying that they carried the image of being some sort of unfeasible fashion toy:

I think a lot of people think they’re a bit of a joke. I’ve had quite a few jokes directed at me in work. People say, “You’ll be holding up the M1 doing 20 miles an hour”, all those sort of things. I think a lot of people [think] they’re a bit gimmicky and a bit of a joke. (P39)

Most people think electric cars are gimmicks, so yeah, there definitely is a difference in perception. (P52)

All of these images (too old, too new, and too gimmicky) were linked to stereotypes of eccentric and impractical technology. They evoked the impression of incongruity, and carried the idea that they could raise ‘a good laugh’ (P07) from people who imagined them to be nothing more than a ‘joke’ (P07, P22, P39, P47) in the age of modern motoring.

These images appear to have emerged partly from widespread ‘lack of knowledge’ (P16) about BEVs amongst the general public, but drivers also made reference to deeper, more psychological issues such as resistance to change:

There’s a psychological issue there in that people have got to overcome perceived concerns whatever they might be, about using electric cars. (P45)

I think there are lots of people out there who would be afraid of the change and couldn’t cope with that kind of open-mindedness and future-facing concept. (P15)

They often implied that BEVs could be seen as a threat to existing lifestyles and to the connotations of freedom and mobility associated with ICE cars. Eight drivers (15%) made reference to the negative impact of the popular UK television programme *Top Gear*, highlighting the influence of the 'ridicule' (P49) that the presenters liked to direct at EVs by portraying the cars as 'a load of rubbish' (P25) and 'sort of setting them up to fail' (P03). Many drivers stated the need to remove public assumptions that BEVs were 'a bit weird' (P27) and 'freaky' (P19) by promoting the image of normal and viable technology with a desirable edge of uniqueness:

I think they need to improve their image a lot more. [. . .] I think it's getting people to realise that these are, you know, sort of useable vehicles, they are reliable, they are affordable, they look good, they're comfortable, and they could be your main family car. (P07)

I wouldn't make it too small, too quirky or too different from a normal car. [. . .] You need to be as normal as you can [. . .] and maintain a certain level of 'coolness'. (P32)

This subtheme emphasises again how the validity of the 'innovative technology' image for BEVs can be viewed as highly contestable. Mainstream consumer negativity was often felt to be linked only loosely to reality; this echoes the findings of our paper (Burgess et al., 2013), which discussed the formation and maintenance of such stereotypes in the public sphere, explaining how negative and resistant attitudes towards BEVs appeared to be 'primarily an affective response, triggered by heuristic processing of limited or inaccurate information' (p. 41). BEVs could also be seen as representing a form of unwelcome change, and people with negative views 'tended to stereotype EVs strongly, reinforcing their sense of them as "other" and inferior by emphasising perceived homogeneity within the EV category, and exaggerating perceived differences between the EV category and that of conventional cars' (Burgess et al., 2013, p. 41). This falls in line with Tajfel's (1981) concept of the social psychological process of stereotyping through accentuation. As with the undesirable images of 'green' BEV drivers, the main characteristics of the undesirable technology images of BEVs were that they deviated from established norms; this allowed the cars to be regarded as strange, amusing, ridiculous, and even absurd (see Burgess et al., 2013, and Salomon & Singer, 2011, for further discussion of theories of humour and absurdity applied to the transportation field).

Perceptions in a state of flux

Despite the proliferation of sceptical attitudes outlined above, the majority of drivers also referred to an ongoing change in public perceptions of BEVs. Thirty-eight of the 53 drivers (72%) made reference to mixed or ambiguous perceptions which indicated that opinions were beginning to shift:

I get a lot of people asking me, you know, questions about it, and all that kind of thing. [. . .] Some people think it's completely mad and other people are sort of really interested. [. . .] You get all kinds of reactions. (P04)

[Friends and family are] generally... ambivalent I think. Some will knock [BEVs] on the head and some will say, "Yes, could be..." or "The future is going to be something that isn't fuel". [. . .] So really one has a mixed response. (P11)

I think, some people are wary because they would worry about whether it's going to take off, just like anything else when new technology comes out, but I think there is a growing sense of there are going to be more and more of these things. [. . .] I think it'll change over time. I think it's already changing. (P44)

Seeing real BEVs on the roads was felt to be an important factor in removing negative stereotypes:

You need to see more of them around, don't you? They just need to be accepted into people's consciousness that [. . .] they are genuine cars that serve a purpose. (P06)

Twenty-three drivers (43%) made reference to very positive images being adopted by other people, usually after encountering the trial BEV and realising that it shattered their preconceptions:

I had a lot of people say, "Oh, is it like a milk float?" and only last night we went to our office meal and I gave some people a lift, and they were going around and saying, "Oh gosh, it's just like an ordinary car!" [. . .] I've given friends and family a lift in it, and as I say, they're quite amazed. (P14)

Several of my friends have driven it, they all get so enthusiastic, "My God, this is the future, this is the way to go!" Very positive I would say. [. . .] Consistently people have been surprised by the power and the performance of the vehicle. (P51)

These positive images of BEVs were felt to strike a balance between being sufficiently 'ordinary' while at the same time being different and superior in some ways to ICE cars. They revealed how the negative stereotypes were

largely detached from reality and could, in many cases, be overcome in a short space of time.

These findings again largely reflect those of our paper (Burgess et al., 2013), which observed how ambivalent people tended to draw on 'a pre-existing, socially-sanctioned stereotype of EVs as underdeveloped technology, futuristic but potentially unfeasible', and aligned themselves with the majority of mainstream market consumers by being 'hesitant, cautious, sensible, and risk-averse' (p. 42). Their attitudes appeared to operate on a primarily cognitive level, based on rational assessment of advantages and disadvantages of the technical features. This stance could be overcome, however, by encountering the TSB trial BEVs and realising that they were 'real', 'normal in appearance and performance', and 'viable as a functional means of transportation' (Burgess et al., 2013, p. 42). Opportunities to drive or ride in a BEV triggered enthusiasm and enjoyment, which in turn led people to seek more information about the new technology. Unlike the complex and individualistic positive meanings attached to EVs in other studies (Gjølén & Hård, 2002; Heffner et al., 2005, 2007a, 2007b), the TSB data showed evidence of broader, group-level images that revolved primarily around BEVs being sufficiently 'ordinary' while maintaining a level of what social identity theorists would term 'positive distinctiveness' (Tajfel, 1978; Tajfel & Turner, 1979). Some drivers in the participant sample selected for this thesis referred to public awareness of the sense of an imminent zeitgeist shift away from dependence on fossil fuels, a social context which could prove powerful in breaking entrenched habits, activating new norms and values, and facilitating a large-scale behaviour change (Verplanken, Walker, Davis, & Jurasek, 2008).

6.2.2. The 'innovative technology adopter' identity of BEV drivers

As in Chapter 5, the findings presented in this theme reveal two different perspectives on how the drivers viewed their identities in relation to the 'innovative technology' image of the BEVs. The first is *how drivers perceived their own self-images*. This forms the basis of subthemes 6.2.2.1 (*Validity of 'innovative technology adopter' identity*) and 6.2.2.2 (*Desirable 'innovative technology adopter' identity*). The second is *how drivers thought that other people perceived their self-images*, i.e., the 'looking-glass self'. This forms the

basis of subtheme 6.2.2.3 (*Undesirable 'innovative technology adopter' identity*). Images in this latter category do not necessarily reflect reality, as they emerged partially from drivers' expectations, inferences, and interpretations of other people's views. As stated at the start of subtheme 6.2.1.2, it is not the aim of the analysis to examine the views of the UK public by taking the drivers' statements at face value; instead, it focuses primarily on investigating the psychological influence that these 'looking-glass' reflections had on the drivers' sense of identity.

6.2.2.1. Validity of 'innovative technology adopter' identity

An extensive body of research has attempted to define the concept of consumer 'innovativeness' (see Bartels & Reinders, 2011, for a review of various models constructed). On the most basic level, it is logical to assume that for people to be considered to possess a genuine 'innovative technology adopter' identity, they must hold positive attitudes towards new technology and engage in related behaviours (e.g., adopting and using new technological products). This subtheme draws again on the drivers' responses to the three pre-trial interview questions asking about their motivation for taking part in the TSB ULCVD programme. Subtheme 6.2.1.1 established that most of the drivers believed that BEVs were a desirable form of innovative technology (37/53, 70%) or had the potential to become so (13/53, 25%); this subtheme explores their responses at a deeper level, looking at the extent to which their interest in new technology motivated them to adopt a BEV (i.e., implying that they considered themselves to be 'innovative technology adopters'). Numbers and percentages for each of the main categories of response are presented in Table 14.

Table 14

Validity of 'Innovative Technology Adopter' Identity: Summary Table for Pre-Trial Interview Data

Questions:	
(a) 'For you personally, what are the most important reasons for taking part in the trial?'	
(b) 'What do you expect to get from your participation?'	
(c) 'In effect, you'll be involved in testing innovative transport technology. To what extent does that interest you?'	
Response	No. and % N=53
Reference to interest in innovative technology	31 (58%)
Stated in response to questions (a) and/or (b)	24 (45%)
Innovative technology as primary motivating factor	19 (36%)
Innovative technology as subsidiary motivating factor	5 (9%)
Reference to specific interest in cars	9 (17%)
Stated in response to question (c), but not (a) or (b)	7 (13%)
No reference to interest in innovative technology, but expressed enthusiasm for using and assessing a BEV	17 (32%)
Reference to not being particularly interested in technology	5 (9%)

Twenty-four of the drivers (24/53, 45%) indicated clearly in response to the three pre-trial interview questions that their interest in innovative technology was a primary (19/53, 36%) or subsidiary (5/53, 9%) motivating factor for taking part in the trial. These drivers can be broadly described as 'technology enthusiasts'. Nine of these drivers (17%) also expressed a specific interest in cars, and can be described as 'car enthusiasts'. These two categories, especially the latter, can be classified as form of 'domain-specific innovativeness', a term which 'captures an individual's predisposition toward a product class and reflects the tendency to learn about and adopt new products within a specific domain of interest' (Bartels & Reinders, 2011, p. 604). A further seven drivers (13%) made positive statements in response to the prompt question. Out of these 31 drivers, 12 (23%) indicated that they worked in some kind of technological field, but it was apparent that their interest in BEVs operated on a personal as well as a professional level.

An additional 17 drivers (32%) did not refer clearly to being motivated by the appeal of technology or cars, but did express enthusiasm towards the idea of trying out and assessing a BEV. Some of these drivers may have fallen on the periphery of the 'technology enthusiast' / 'car enthusiast' categories. Finally, five drivers (9%) stated that they were not particularly interested in the technological side of the BEVs. They responded negatively to the prompt question or made statements such as:

Probably my husband was [more interested] than me. I like the idea that obviously it's zero emissions, so... but in terms of from a technology point of view, that's probably not why I buy cars. (P49)

[It does not interest me] in that respect, not to try new technologies for the sake of new technology. (P22)

It is worthy of note that four of these five were female (29% of the 14 female drivers in the participant sample). Existing research has found that female consumers can be negatively affected by perceived cultural gender norms and 'the masculinising of technology', leading to aversion and anxiety towards technological products (Gilbert, Lee-Kelley, & Barton, 2003, p. 254). Varma (2007) argued that technology can carry highly masculinised messages which conflict with traditional feminine identities:

Men are traditionally seen as capable, rational, and driven, whereas women are perceived to be dependent, emotional, and lacking the intensive focus necessary to succeed in demanding and highly technical professions. [. . .] Machine or gadget fetishism is practically a given among the vast majority of US men, with the automobile constituting the classic example of individual identity being bound up with machine stewardship. (pp. 262-263)

This suggests that an 'innovative technology' image of BEVs may be less appealing to female than to male consumers if it is felt to conflict with 'socially accepted gendered prescriptions' (Varma, 2007, p. 263).

It must also be noted that none of the drivers made reference to regular purchasing of new technological products. This does not rule out the possibility that some did engage in such behaviour; it may simply be the case that this was not captured in the data. One driver stated explicitly, however, that he typically fell in the middle of the adopter curve:

I'm not the first person in the street with a flat screen telly or an iPad but, you know, when critical masses reach [that stage] I move there as well. But with the vehicle in particular, I felt it was really essential to understand just what it was like. (P53)

This quote reflects the low interaction found by Morton and colleagues (2012) between consumer purchasing of technological items and stated preferences for low emission vehicles (as discussed in section 6.1 of this chapter), and supports the idea that BEVs may be seen in a different way to other technological products on the market.

Together, these findings show a much stronger identification with the 'innovative technology adopter' image than with the 'green' image, as presented in Chapter 5. They also highlight the need to define and contextualise the term 'innovative technology adopter', however. The issue of consumer innovativeness has become 'a central topic in both new product marketing and the explanation of early adoption' (Foxhall & James, 2009, p. 71), but existing research is expansive and diverse with little integration (Bartels & Reinders, 2011; Hauser, Tellis, & Griffin, 2006). As outlined in the introduction to this chapter, some research in the EV field has drawn on Rogers' (2003) DoI theory. This model is used in many fields, but focuses on the *process* by which innovations are adopted or rejected by social systems, rather than on the specific variables or characteristics of the five consumer categories identified (innovators, early adopters, early majority, late majority, and laggards). Its 'measure of innovativeness' (i.e., the classification into adopter categories) is 'based upon the relative time at which an innovation is adopted' (Rogers, 2003, p. 22), so an 'early adopter' is defined as a person or other unit of adoption belonging to the category which adopts a particular innovation after the 'innovators' and before the 'early majority'. The normal distribution curve is divided into the five categories based on standardised percentages (2.5%, 13.5%, 34%, 34%, and 16% respectively). Rogers gave a brief description the typical members of each category and summarised a 'voluminous' body of literature into 25 'generalizations' on the differences between 'earlier adopters' and 'later adopters' (pp. 287-292), but these were relatively broad and not universally applicable. Examples such as 'Earlier adopters have a more favorable attitude towards change than do later adopters' may be relevant to UK vehicle market today, but others such as 'Earlier adopters are more likely to

be literate than are later adopters' are probably not (Rogers, 2003, pp. 290, 288).

Papers seeking to identify the consumer groups most likely to adopt EVs in the first instance often use the term 'early adopters' in a more general way, sometimes combining Rogers' (2003) 'innovator' and 'early adopter' categories into one (e.g., Campbell, Ryley, & Thring, 2012; Carley et al., 2013; Plötz et al., 2014). Studies in this area have usually applied a predictive approach and attempted to identify potential early adopters of EVs from participant samples drawn from the mainstream market. They have analysed diverse sets of individual variables and often relied on objective and quantifiable data such as socio-demographics and socio-economics. Consumers' psychological engagements with innovative technology have been ignored to a surprising extent. Studies that have touched on this topic have typically used attitudinal surveys that led to brief summarisations such as 'early adopters [of EVs] [. . .] like to try technical innovations' (Plötz et al., 2014, p. 106).

This subtheme reveals the need to examine this issue in greater depth, as opposed to assuming that the majority of BEV drivers share some easily identifiable common personality trait, or cluster of traits. Although the TSB drivers can be categorised by default as 'early adopters', it is problematic to assume that they all liked technology in a very similar way, or to categorise them on the whole as typical technology *consumers*. It is also important to avoid drawing the conclusion that because the majority of the drivers indicated that they liked technology, the majority of people who like technology will automatically like BEVs. Egbue and Long's (2012) study (as outlined in Chapter 3) focused on attitudes towards EVs at a US technological university where the 'vast majority' of the sample population could be classified as 'technology enthusiasts' (p. 719), but revealed a wide range of views and a large degree of ambivalence towards the new vehicle technology. Despite a moderate to high level of interest (possibly due to a priming effect), respondents to Egbue and Long's survey voiced a number of reservations towards EVs' technical features, and a few expressed strong resistance to the entire EV concept. These kinds of divided public attitudes emerge again in the following subtheme, which goes on to explore the drivers' 'innovative technology adopter' identities in more detail.

6.2.2.2. Desirable 'innovative technology adopter' identity

Analysis of the complete set of interview data revealed that over two-thirds of the drivers (36/53, 68%) saw the 'innovative technology' image of the BEVs as interacting with their own identities in a positive way, either by matching their existing self-images or by enhancing their existing self-images. This is more than double the number of drivers who reported a positive interaction for the 'green' image (14/53, 26%). Sixteen drivers (30%) fell into both the matching and enhancing categories in this chapter; they indicated that they were already interested in technology, but felt that the BEVs added to their identities by offering something novel and unique. As in Chapter 5, Sirgy's image congruency theory (e.g., Sirgy, 1980, 1981, 1982a, 1982b) would describe the findings as positive congruency between product-image and actual self-image in the first instance, and between product-image and ideal self-image in the second. In the second category, however, a clear sense of social identity emerged and the social identity perspective provides a more appropriate theoretical framework. Numbers and percentages for each of the main categories of response for this subtheme are presented in Tables 15, 16, and 17.

Table 15

Desirable 'Innovative Technology Adopter' Identity: Summary Table for Interview Data

Topic: 'Innovative technology' image of BEVs linked to identity in desirable way	
Relevant statements	No. and % N=53
Clear reference to 'innovative technology' image interacting with identity in positive way	36 (68%)
Image matches but does not enhance self-image	9 (17%)
Image enhances but does not match self-image	11 (21%)
Image matches and enhances self-image	16 (30%)
Implicit reference to 'innovative technology' image interacting with identity in positive way	7 (13%)
No reference to 'innovative technology' image interacting with identity in positive way	10 (19%)

Table 16

'Innovative Technology' Image Matches Self-Image: Summary Table for Interview Data

Topic: 'Innovative technology' image of BEVs matches self-image	
Relevant statements	No. and % N=53
Clear reference to 'innovative technology' image matching self-image	25 (47%)
Reference to long-standing interest in cars	9 (17%)
Established 'car buff' identity	2 (4%)
Ongoing, personal interest	7 (13%)
Reference to liking new technology in general	10 (19%)
Reference to liking concept of innovation	6 (11%)
Implicit reference to 'innovative technology' image matching self-image (positive response to prompt question)	7 (13%)
No reference to 'innovative technology' image matching self-image	21 (40%)

Table 17

'Innovative Technology' Image Enhances Self-Image: Summary Table for Interview Data

Topic: 'Innovative technology' image of BEVs enhances self-image	
Relevant statements	No. and % N=53
Reference to 'innovative technology' image enhancing self-image	27 (51%)
Reference to personal, holistic experience only	3 (6%)
Reference to new kind of social identity only	21 (40%)
Reference to personal, holistic experience and new kind of social identity	3 (6%)
No reference to 'innovative technology' image enhancing self-image	26 (49%)

'Innovative technology' image matches self-image

Almost half of the drivers (25/53, 47%) indicated clearly that the 'innovative technology' image of the BEVs functioned to reinforce and/or communicate their existing sense of identity by matching their self-image in some way. An additional seven drivers (13%) implied that this might be the case by giving a positive response to the specific prompt question regarding their interest in testing innovative transport technology. This is four times the number of drivers who reported the 'green' image to match their self-image (8/53, 15%) in Chapter 5. On close examination, a fairly disparate range of views emerged.

Nine drivers (17%) spoke about a long-standing interest in and enthusiasm for cars. Two of these drivers (4%) described themselves as 'car buffs', explaining how they had expertise in engineering and were looking forward to being able to experience and assess the technical functionality of the BEVs:

[I'm] absolutely delighted, really pleased [to be taking part]. [. . .] I've got a PhD in electronic and electrical engineering and I'm very interested in cars generally. [. . .] I'm very interested in this topic area and very keen to experience all this and see what the advantages and problems are. [. . .] [Friends and family] all know I'm a car buff, so we do talk about it. [. . .] I think they're very excited about it, the novelty. (P45)

I was very happy [to be selected]. [. . .] I think it'll be an enjoyable experience. [. . .] I'm a car buff and for me it's going to be very interesting in terms of how the car handles, what are the practical elements of the car, in particular within changing environmental conditions and how it reacts with the cold, etc. [. . .] I'm an engineer by trade which is why I'm interested in all this kind of stuff. [. . .] My son, he's a bit of a tech-head, he's very excited about the technology. (P20)

These drivers hoped to extend their knowledge of both the specific mechanical features and the overall performance of the BEVs. They also emphasised the psychological and affective benefits of taking part in the trial, showing that the appeal of the technology did not operate on a purely pragmatic and cognitive level. They explained how their interest had spread to friends and family, creating a strong sense of social support for BEV adoption. In addition, their quotes conveyed the sense of belonging to a more abstract and wider social group; by categorising themselves as 'car buffs', they implied that other people who were car experts would share their views.

The remaining seven car enthusiasts (13%) gave less detailed descriptions, indicating that cars and the world of motoring were more of an ongoing, personal interest. They explained how they possessed background knowledge of developments in the car industry and were keen to learn more about BEV technology:

I am interested in the motor industry trends and I like cars anyway so I'd been reading about developments in the press, particularly AutoCar, that is a weekly publication so it is very up to date. So I'd been following the [trial] vehicle from its early stages in Japan and it definitely seemed to be ahead of any other competitors. (P10)

I'm quite interested in motor vehicles generally and I do find that's quite an interesting topic for me, almost sort of special interest really, and so, yeah, to move forward into a different form of power source is quite interesting. (P21)

Ten drivers (19%) made broader statements about liking new technology in general. They indicated that they were familiar and confident with the experience of using, testing, and evaluating novel products:

I like new technology and things and I think this is quite an interesting new technology. The thing for me is really the new technology and getting to try it out. (P39)

Yeah, I mean I'm interested [in technology]. [. . .] I'm a gadget bloke really, there's a lot of gadgets in my life. (24)

I like testing things that are going to happen. I work with software, so for example when they come out with a new release, I'm one of the first to, not to criticise it, but give feedback as to whether it actually does work. (P32)

A further six drivers (11%) made reference to personality traits linked to the concept of innovation on a more abstract level. They stated that they enjoyed experiencing change and the challenges that it could involve:

I am one for pushing boundaries. [. . .] I think [the BEV] says I'm an entrepreneur. (P48)

I like to try things that are different. My job is all around change and transition so it's right up my street really. (P44)

In life I am quite a flexible person and I don't mind giving things a try, and if it's working, happy to change. I'm quite adaptable to change and trial, you know, and I'm a good reflector, I understand about making mistakes and using that to my advantage. (P07)

I'm open-minded, future-thinking, interested in change, interested in new technology. It's generally much more kind of, what's the word we're looking for here...? Sort of robust. (P15)

These personality traits differed slightly between the drivers but carried the underlying theme that they saw themselves as holding progressive and proactive attitudes, and were willing to adapt and adjust to the BEVs as necessary. This can be defined as 'innate innovativeness', an 'innate tendency to seek out new information, stimuli, or experiences' (Bartels & Reinders, 2011, p. 602).

Together, these findings support to an extent the logical assumption that BEVs will appeal initially to consumers who like to engage with new technologies and with innovations in general. It appeared that at least 47% of the participants could be broadly classified as typical 'early adopters', differing from mainstream consumers who regard a new product as more desirable if they see it as low in complexity and easy to use (Rogers, 2003; Davis, 1989; Davis et al., 1989). This suggests that stakeholders seeking to identify potential BEV adopters could benefit from focusing on 'innovative' personality characteristics, and that an effective BEV image would need match the self-image of a technology enthusiast or car enthusiast; as stated by Sirgy (1982a), 'Positive self-congruity will determine the strongest level of purchase motivation' (p. 289). It is important to note, however, that 21 drivers (40%) did not make any reference (explicit or implicit) to possessing an 'innovative technology adopter' identity outside of the TSB trial.

The idea that car enthusiasts would be the best consumers for stakeholders to target also conflicts with the findings of two of the existing EV studies (outlined in Chapter 3). Schuitema and colleagues (2013) used Sirgy's image congruity theory to hypothesise that consumers who perceived themselves as having a strong 'car-authority identity' would view PHEVs and BEVs as particularly appealing, but their UK survey revealed an unexpectedly weak correlation between the two variables. Skippon and Garwood's (2011) study showed that after a short BEV test drive, UK trial participants who rated highly on 'personal involvement with cars and driving' were actually more sceptical about BEVs, and less willing to consider having one as a main car than the participants who

had lower involvement with cars (p. 530). Little explanation was given for these findings.

A potential reason was offered by the fact that nine of the TSB drivers (17%) made reference to traditional ICE car lovers (often categorised as ‘petrol-heads’) being the most resistant consumer group to BEV technology:

If you are a petrol-head you have no time for electric cars – you probably hate them. (P48)

If you want a Ferrari or a Porsche, I suppose an electric car doesn’t do it for you. (P06)

A couple of people that we know [. . .] they’re into their Subarus and, you know, top speed. [. . .] He’s always being a bit flash and that type of high speed, sort of high end driving, just I know just wouldn’t even consider it. And there are always going to be people like that aren’t there? You know the Porsche drivers [. . .] perhaps are never going to engage with this as an idea and a concept. (P07)

The ‘petrol-heads’ were described as valuing high speed, high performance, and a ‘flashy’ appearance, and the prototypes were felt to be the *Top Gear* presenters. They appeared to regard themselves as belonging to a distinct social group to which the BEV drivers posed a threat. These findings suggest that a clear divide operates in the ‘car enthusiast’ category, and that drivers on either side hold very different views of what constitutes a desirable vehicle. This division in the car market reflects the findings of another study (Avery, 2012), which analysed conversations conducted in an online international community of ICE Porsche enthusiasts. The paper revealed great resistance and antagonism directed by some members towards the first Porsche SUV, the Porsche Cayenne, a conventional ICE vehicle which was felt to have a much more feminised image than the traditional and highly masculinised Porsche sports car. The online community derogated Cayenne users in a way that was ‘consistent with social psychological research on stereotyping’, by attempting to diminish the social status of the outgroup in order to maintain the status of the ingroup (Avery, 2012, p. 329).

These findings suggest that trying to promote BEVs to ‘petrol-head’ car enthusiasts would backfire and lead to negative consequences. They also highlight the need for careful, qualitative investigation into driver identities as opposed relying on broader, deductive, quantitative conclusions. It became

apparent over the course of the TSB interviews that a number of TSB drivers *did* own (or had owned) high-performance ICE cars. Eight drivers (15%) mentioned these luxury ICE vehicles (e.g., Aston Martins, Jaguars, and Lotuses) of their own volition in the interviews, and it became apparent that they saw themselves as ‘not exactly petrol-heads’ (P01) but as connoisseurs of cars, valuing quality and new experiences over speed and flashiness. They emphasised benefits of BEVs such as the ‘graceful and serene’ driving experience (P10), the ‘total ease of use’ in London (P16), and the ‘pleasure of driving something new’ (P01), making clear that that they considered the BEVs to be superior in some ways to their high-performance ICE cars. The TSB drivers did not define the ‘petrol-heads’ solely on the grounds of the vehicles that they owned but on the mindsets that accompanied them, distancing themselves psychologically from the social category that they considered to comprise show-offs and risk-takers. This behaviour aligns with the social identity perspective, which distinguishes clearly between objective, sociological categories and subjective, psychological ones:

The social identity perspective [. . .] uses the term “category,” not in the sense of sociological categories, but in the sense of self-categories. Such “categories” are psychological representations in the mind; they are cognitive structures which people use to define themselves and change their behavior. (Turner & Reynolds, 2001, p. 137)

The complexities which emerge in this subtheme undermine the more simplistic approaches adopted by other studies to identify potential EV adopters by using socio-demographic data, stated preference studies, or forms of highly rational modelling (e.g., Campbell et al., 2012; Carley et al., 2013; Hackbarth & Madlener, 2013; Lebeau, Mierlo, Lebeau, Mairesse, & Macharis, 2012; Li, Clark, Jensen, Yen, & English, 2013; Lieven, Mühlmeier, Henkel, & Waller, 2011; Plötz et al., 2014; Qian & Soopramanien, 2011; Tran, Banister, Bishop, & McCulloch, 2013).

‘Innovative technology’ image enhances self-image

Just over half of the drivers (27/53, 51%) felt that the ‘innovative technology’ image of the BEVs enhanced their existing self-images. Sixteen drivers (30%) fell into both the ‘matching’ and ‘enhancing’ categories, while the remaining 11 (21%) indicated that the BEVs benefited their self-images in a whole new way.

Six drivers (11%) appeared to regard engaging with the innovative technology as a holistic experience that opened up all sorts of possibilities for self-development and self-improvement. They often expressed enthusiasm for opportunities to advance their knowledge and skills:

[The most important reason for taking part in the trial] it's because I can and I'm going to learn something I think and at my age you sort of think, you know, I can still use my brain and do these things... so it's the learning experience and why just sit back and do nothing, you know, let's do something. (P38)

[I hope to get] a new experience really and maybe change the sort of habits that you get into just relying on a normal car for everyday use. [. . .] Everything becomes routine and you get stagnant, so... when you put something as big as this into it, it's obviously going to have an effect. (P02)

The technological side of the BEVs was felt to offer stimulating opportunities for learning, and drivers expressed enthusiasm for actively engaging with the novel features of the cars. This differs from the enhancing effect of the 'green' image, which largely appeared to confer a more passive 'feel-good factor' onto the drivers. The idea of a positive 'challenge' emerged again, and one driver went so far as to describe his first encounter with the BEV in quasi-religious terms:

It was a revelation, an absolute revelation, from the moment I got into it [. . .] I thought, this is fantastic! [. . .] The important thing, there's a driving sensation, we call it a Damascus moment don't we, this absolute moment of revelation. *That* eclipsed any of the worry about running out of electricity. The sample of this new technology was such that I thought, look we can cope with this. (P15)

His account evokes the phenomenon of 'flow', a state of complete absorption in an activity where perceived challenges and skills operate at a high level and are felt to reach an ideal balance, leading to a surge of intense enjoyment which can overcome anxieties (Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2005). Interestingly, the phrase 'we can cope with this' implies a sense of group identity as well as a heightened feeling of competence and control.

The idea of a new kind of social identity was echoed by many other drivers and forms the major finding of this subtheme. Twenty-four drivers (45%) stated clearly that they felt 'involved in' or 'part of' something special and unique. This sense of belonging stemmed partly from the TSB trial itself, but only two drivers

(4%) made clear reference to communicating with other participants and having 'a real sort of community feeling' (P02). The majority referred to a more abstract and psychological sense of belonging to a project and to a group of people who were moving things forward and helping to 'shape the future' (P51):

It's being part of evolving technology really, I mean, I think it's the way forward and this is a good opportunity to be a part of it. [. . .] It is innovative, you know, this is the way forward. [. . .] We're going to be [. . .] involved in something in the future so, you know, it's great to be a part of it really at the outset. (P47)

These drivers felt that they were 'actively contributing' (P29) to the development of innovative technology by trying out the BEVs and providing useful feedback on their experiences. For many, this led to a sense of achievement and gratification:

When I first applied I thought ok, they probably need [. . .] a wide variety of people to test these things out so that's a fair trial, and I thought that I can do it. [. . .] When I got selected I was over the moon and I thought, yes, I'm going to be part of it. (P38)

I enjoyed doing it and being involved in something like that and I thought the whole thing worked really well, really. [. . .] It was quite interesting just to be involved with that and give feedback and be part of something which is a bit ground-breaking. (P42)

For some drivers, using a BEV created the sense of belonging to a small social group considered superior to the non-BEV-driving outgroup:

It was like, new, there weren't any others out there, so that was quite nice to be one of the privileged few. (P49)

Yeah, it's kind of cool to be involved in something cutting-edge, early adopter and all that. [. . .] It's having something different. [. . .] To be absolutely honest, there is a little bit of fun in saying, "Look what I've got, you haven't got one of these, ha ha ha!" (P50)

I feel quite sorry for poor mortals driving cars with engines in. (P11)

This ingroup was not a *closed* group, however. Drivers typically saw themselves as 'pioneers' (P14, P32) and 'one of the first' (P09, P10, P15), implying that they were simply taking the lead and that the mainstream market would soon start to follow their example. Many drivers embraced the role of being 'ambassadors' (P11, P34, P51), 'advocates' (P07, P15), and 'evangelists' (P40) for the BEVs,

explaining how they had gone to some effort to try to promote the benefits of the cars as much as possible:

I take someone out for a ride in it pretty much every day. I've made it my job to do it. All of them are impressed by the car. [. . .] When they're inside, it looks like a normal car and has good acceleration and it's a fine, fine car. When they come out, they say, "That's amazing". (P22)

Two drivers went to the extent of taking the BEVs into schools and giving talks, where they received very positive reactions from the children (P15, P30). One driver explained how she had taken to infecting others with her positive attitude:

I'm quite viral, me. I'm quite viral. If something's great, I have to spread the word. I'm a virus! People then think, do you know what, I'm going to do that. (P13)

These ambassadorial drivers regarded themselves as agents of social change, gaining a sense of influence, authority, and social status from converting others over to their point of view.

Together, these findings reveal how the 'innovative technology adopter' identity enhancement took place on two different levels: drivers reported a sense of improved *individual* identity in the first instance, and a new form of *social* identity in the second. For the latter, they indicated that they felt 'involved in' or 'part of' a future-shaping project and a group of people who were taking the lead in advancing the BEV technology. On the pragmatic side, they liked the fact that they were playing a constructive role in the development of BEVs by giving useful feedback to the TSB consortia. On the psychological side, they talked about a more abstract sense of belonging to a unique and superior social group. This helped to overcome typical public perceptions of BEV drivers being a bit 'out on a limb' (Burgess et al., 2013, p. 42), and to increase the drivers' self-esteem through enabling them to see themselves as 'one of the privileged few' (P49). Their shared group identity was based less on a love of technology than on the broader idea of being adventurous 'pioneers' who could engage enthusiastically with 'ground-breaking' and 'cutting-edge' innovations. They compared their ingroup favourably with the outgroup of the non-BEV-driving public, but the ingroup was not perceived as closed and exclusive; many drivers regarded the group

boundaries as permeable and strongly encouraged others to join them. In this sense, they could be described as ‘opinion leaders’, a crucial group to target in the early stages of innovative product promotion (Grewal, Mehta, & Kardes, 2000; Rogers, 2003).

Overall, the *desirable ‘innovative technology adopter’ identity* subtheme suggests that consumers who see themselves as ‘car enthusiasts’ or ‘technology enthusiasts’ will form a significant proportion of the early adopter market for BEVs. As observed by Grewal and colleagues (2000), ‘expertise’ and ‘involvement’ are two traditional antecedents of innovative behaviour because people with technical competence in a particular field are more likely to be able use an innovation successfully (pp. 237-238). On the other hand, however, the findings also show that other car enthusiasts with a strong attachment to ICE vehicles may be the most highly resistant consumers to BEV technology. This indicates that it would be better to promote a BEV image that will appeal to a wider range of consumers. Creating and supporting the image of a pioneering BEV consumer group at the forefront of a social change could potentially be an ideal solution, attracting both pro-BEV technology enthusiasts and consumers with an interest in innovations on a broader scale.

6.2.2.3. Undesirable ‘innovative technology adopter’ identity

In direct contrast to the desirable identities mentioned by 36 drivers (68%) in the above subtheme, 18 drivers (34%) mentioned some form of undesirable and low-status identity associated with the technological image of the BEVs. These images emerged from how the drivers thought that other people would view BEV adopters. Four drivers (8%) referred only to a negative identity, while the remaining 14 (26%) fell into both the ‘desirable’ and ‘undesirable’ identity categories, as they felt that the BEVs possessed a positive technological image from their own points of view and a negative technological image for other people. Numbers and percentages for each of the main categories of response for this subtheme are presented in Table 18.

Table 18

Undesirable 'Innovative Technology Adopter' Identity: Summary Table for Interview Data

Topic: Technological image of BEVs linked to identity in undesirable way	
Relevant statements	No. and % N=53
Reference to 'innovative technology' image interacting with identity in negative way	18 (34%)
BEV drivers seen as foolish for using outdated, inferior technology	16 (30%)
BEVs drivers also seen as radical for using overly futuristic technology	7 (13%)
BEV drivers seen as foolish in more general terms	2 (4%)
No reference to 'innovative technology' image interacting with identity in negative way	35 (66%)

One theme underpinning most of the perceived undesirable identities (16/53, 30%) was the image of the BEV driver as someone who had deviated from social norms by adopting a form of strange, inferior, and outdated technology. Six drivers (11%) felt that they could be seen as a bit 'daft' (P01, P07), 'silly' (P01, P05), 'dotty' (P26) or (on a humorous level) 'mad' (P01, P04, P17).

Participant 01 interpreted many of his friends' reactions in this way:

I think the reaction when I put it into my director's slot at the golf club was, he *really* has lost it! (P01)

[Friends] think that I shall be totally mad! They say, "What on earth do you think you're doing?" They'll go home and say to their wives, "You won't believe what he's done now!" (P01)

Will people notice? Yes, but I don't think they'll say, "Oh that's an impressive", or "You must be well off to drive a car like that", they're more likely to think I'm mad! [Laughter] (P01)

He appeared to enjoy being on the receiving end of such stereotypes, however, and regarded them as a challenge and a 'red rag to a bull':

The biggest challenge is going to be getting used to people's reactions, you know, "What on *earth* are you driving one of those for after the cars you've had?" But that's fun, that's fun. (P01)

They allowed him to enhance his perceived strength of character, as he took a headstrong approach to confronting them and made strong efforts to 'convince people that [BEVs are] not a passing phase'.

Two other drivers (4%) held less positive attitudes, feeling that some people saw the whole concept of BEVs as being 'mad' and the drivers as foolish:

There's a bunch of dissenters who think it's mad. [. . .] They may laugh about the fact that I might find myself halfway down some sort of A-road, standing on the side, scratching my head because the battery's expired. (P50)

You don't even start the conversation [about BEVs] with [some people] because they'll just argue with you and accuse you of being stupid, so you know there will be a big element of that. (P10)

These stereotype holders were regarded as the minority for Participant 50, however; the phrase 'dissenters' implies that this view was not held by the mainstream public. Four additional drivers (8%) reported encountering a few 'jokes' and 'sniggers' from colleagues and friends. Six male drivers (11%) felt that some people perceived BEV drivers as effeminate, but implied that they had sufficient confidence in their own masculinity not to take this seriously:

I've had the odd look, generally from very large SUV drivers, the head shake, they do the head shake, and I'm trying to understand what that emotion is but they just look at it and go, "Uchhh oh," as if they saw me wearing a dress! [Laughter] "Oh, there's a bloke in a dress, oh!" sort of tragic, you get that look. (P40)

[I'm] open-minded enough to give anything a try. [. . .] I didn't worry that it undermined my identity as a male or whatever [but] I think there would be a lot of men who wouldn't touch it with a barge pole for that very reason. (P10)

All of these images seemed to be based on the idea of BEVs as old-fashioned, underpowered, and unviable technology.

On the other side of the scale, seven of the above drivers (13%) also made reference to BEV adopters being seen by other people as radical technophiles using overly futuristic technology. Three of these images were linked to stereotypes of risk takers (P01, P26) and 'someone that's in early with technology [. . .] a bit obsessive' (P40). Another four drivers (8%) used the terms 'geek' (P39), 'geeky' (P31, P46), or 'nerd' (P34). This identity was mentioned in a relatively light-hearted way, and one driver explained how his

children's perceptions were converted to a much more positive view by the 3-month stage of the trial:

I've got four kids and they all thought I was being a geek, being on this trial, and my younger children pretty much said, "I'm not coming out with you in that, Dad, I'm going to be so embarrassed", and so they were fairly negative about it. [. . .] They're 100% converted [now]. [. . .] When their friends started saying, "Well, it's quite cool", they changed their opinions greatly. (P31)

This quote highlights again the flexibility of stereotypes and the potential influence that peer groups can have in transforming images and altering perceptions.

Together, the proportions in these findings differ considerably from those in Chapter 5, in which the majority of drivers (27/53, 51%) made reference to an undesirable identity and only a minority (14/53, 26%) reported a desirable identity (with an overlap of six drivers between the two categories). The technophile stereotypes do share some similarities with the environmentalist stereotypes, however. Both forms of identity were seen as extreme in a radical sense; as with the 'greenies', the negative perceptions of technophiles drew on images of people who deviated from social norms by being 'daft', 'silly', 'dotty', 'mad', or 'geeky'. These stereotypes were also linked to an element of invalidity, implying that the BEV drivers had chosen to embrace images of the cars as viable innovative technology when they were in fact outdated and inferior vehicles, or riskily futuristic inventions.

In addition, the technophile stereotypes evoked images of a minority social group that could be stigmatised in the public sphere. This derogation of technophiles has been addressed in a small body of literature; in a paper opposing techno-criticism, for example, Eglash (2009) observed that the concept of 'technophilia' (and by association, the 'unabashed technoscience enthusiast') has been 'routinely pathologized in the science and technology studies literature' and framed in various ways as 'a type of dangerous psychological deviance, a form of spiritual deficit, and a source of social destruction' (p. 79). In popular terms, this could translate into the image of the mad scientist or eccentric inventor (Frayling, 2013). On a more personal level, Varma's (2007) paper summarises background research on 'geeks' and 'nerds' by defining them in some detail:

[A geek] is socially inept, exhibits odd personality traits, excludes normal social and human interests, and spends free time being 'social' on a computer. [. . .] Generally, a 'nerd' is portrayed with pocket protectors, taped glasses, and plaid shirts. [. . .] A nerd aspires to become a 'true scientist' whereas a geek aspires to become a 'true technology user'. (p. 360)

In the BEV field, such prototypes appear to pose a 'stereotype threat' in the same way that the negative environmentalist stereotypes do.

The drivers did not on the whole respond to the technophile stereotypes by downplaying their pro-technology attitudes or attempting to dissociate themselves from the 'innovative technology adopter' group, however. Instead, they used more positive strategies such as confronting and attempting to change the stereotypes; assigning the stereotype holders to a minority social outgroup; or dismissing the stereotypes with a certain degree of humour. This last strategy was touched on by Steele and colleagues (2002) in their paper on stereotype threat, where they stated that one possible countering strategy was 'self-effacing humor that confesses to, but spoofs, the allegation in the stereotype' (p. 434). The power of humour was also highlighted in another paper which found that 'one manner of coping with stereotype threat is by using humor to reinterpret the situation as a challenge rather than a threat' (Von Hippel, Von Hippel, Conway, Preacher, Schooler, & Radvansky, 2005, p. 22). The TSB drivers who laughingly imagined themselves being viewed as completely 'mad' or as 'a bloke in a dress' did not deny the stereotypes but at the same time did not fully accept them; instead, they exaggerated them to the extent where they became implausible and could even be considered absurd. This approach carries the potential to reflect the negativity back onto the stereotype holders by implying that they are the foolish people with a poor grasp of reality.

This subtheme obviously raises the question of why the drivers responded to the two kinds of stereotypes in different ways. One reason appears to be that the 'innovative technology' image of the BEVs was perceived as more valid than the 'green' image, and the drivers could regard themselves as being in a stronger position to confront and refute other people's negative views. The frequent references to transforming public opinions showed how the stereotypes could be disproved quite easily, often through simple exposure to a

BEV; this differs from the contestable 'green' image which operated on a much more abstract level. A higher proportion of drivers also felt that the 'innovative technology' image matched or enhanced their existing self-images, and provided a desirable sense of belonging to a new social group. Social identity theorists propose that strong identification with an ingroup can lead people to perceive themselves and their group positively even in the face of stigmatism and prejudice. Some TSB drivers appeared to use the strategy of 'social competition' (Tajfel & Turner, 1979, 1986), a way of maintaining positive distinctiveness through 'a direct attempt to reverse the relative position of the groups on some salient dimension of comparison' that all relevant groups share (Bourhis & Hill, 1982, p. 438).

In addition, it may be the case that new forms of technology have become so prevalent in twenty-first century societies that older technophile stereotypes are becoming obsolete. The last two decades have seen an explosive uptake of consumer technology around the world, with people becoming highly dependent on products such as personal computers and mobile phones. The term 'geek' has been transformed in some social domains; as observed by Mendick and Francis (2011), 'within popular culture there are many examples where "geek" has kudos, notably in the "geek chic" phenomenon' that has recently emerged from various US television series (p. 18). This transformation appeared in Heffner's (2007) study on HEV adoption, in which some HEV buyers challenged the traditional meaning of 'geek' by expressing enthusiasm for the 'geek factor' of their cars and describing them as 'geek-a-rific' (p. 164). Tajfel and Turner (1979, 1986) would describe this as a 'social creativity' strategy in which members of a low-status group alter the values of an attribute assigned to it by converting them from negative to positive ones. A large-scale move towards acceptance of new technologies was suggested in the quote from the driver whose four children initially regarded him disapprovingly as a 'geek' for adopting a BEV, but soon changed their minds when their peer group voiced opinions about the car being 'cool'. This differs again from the negative stereotypes of environmentalists, which the drivers appeared to regard as being relatively stable in the public sphere.

6.3. Conclusion

This chapter reveals a number of complex and conflicting meanings associated with the 'innovative technology' image of BEVs and the 'innovative technology adopter' identity for BEV drivers. As with the 'green' image and 'green' identities discussed in Chapter 5, these meanings have not been fully addressed in the background literature. The findings from the TSB data undermine a number of logical assumptions made by other studies, but also offer potential explanations for some of the ambiguities and contradictions. Unlike the majority of existing studies, this chapter examines the drivers' perceptions of BEV technology on a holistic level as opposed to focusing on specific technical features. Detailed TSB driver feedback on specific features has formed the basis of publications (e.g., Bunce, Harris, & Burgess, 2014; Carroll et al., 2013) and been fed back to the project consortia to facilitate technical BEV development, allowing this chapter to take a more widely applicable approach.

With regard to the BEV image, the findings suggest that an 'innovative technology' image would be more appealing to consumers than a 'green' one, especially if the 'innovative' element was promoted in a fun and interesting way. A good image should strike a balance between being 'new' and retaining a sufficiently 'normal' factor, highlighting the superior technical features in comparison to ICE cars while not veering towards the idealistic; if a driver adopts a BEV with inflated expectations, he or she is likely to encounter the disillusionment and dissatisfaction expressed by Participant 43. A desirable 'innovative' image could be integrated with a 'clean' image (as discussed in Chapter 5), helping to extend the connotations of independence, freedom, and control by appropriating and transforming some of the traditional meanings of ICE cars. By focusing on examples such as the convenience of home charging, perceived technical barriers such as lengthy recharging times could be reconceptualised as more positive features that offer liberation from having to queue at 'dirty' petrol stations that rely on imported oil.

The findings highlight a wide diversity in mainstream perceptions of BEVs, supporting various other non-academic sources which show how scepticism towards EVs still exists in the UK public sphere. Negative stereotypes emerge frequently in the UK media despite more positive perspectives and information

also being promoted; as observed in an online article for *The Guardian* newspaper, many drivers 'remain sceptical', and 'electric cars have suffered from a reputation as an eccentric toy' (Rankin, 2013, paras. 16, 23). Columnists for other newspapers have expressed more opinionated views, arguing in an online article for *The Telegraph* that 'The pros of electric vehicle (EV) ownership are still outweighed by the cons' (Rutherford, 2012, para. 2) and that the EV is simply a 'Tonka toy' or 'Noddy car designed for maximum humiliation' (Kite, 2009, paras. 7, 4). Websites in favour of EVs often refer to the need for disproving the stigmatising and unrealistic stereotypes of 'tiny plug-in cars' plastered with 'Lefty bumper stickers' (Harvey, 2011, para. 5), 'hopelessly boring lame twitmobiles' (Frawley, 2012, para. 4), and 'boring ugly golfcarts that snarl up traffic' (Herron, 2013, para. 1). These images echo the TSB drivers' allusions to BEVs being seen as milk floats, golf carts, and 'Noddy cars'.

The attributes of 'trialability' and 'observability' proved crucial in shifting these stereotypes and confirming the 'relative advantage' and 'compatibility' (Rogers, 2003, pp. 15-16) of the BEVs, both for the TSB drivers and for the other people that they mentioned. The need to provide consumers in the UK with experience of the new technology was presented as a 'headline finding' by OLEV (2013): 'Once they have driven an [ultra-low emission vehicle], people's preconceptions are often contradicted and their response to the car's characteristics in terms of smoothness, quietness and acceleration is overwhelmingly positive' (p. 10). The TSB data revealed that even just seeing a modern BEV on the roads could remove assumptions about poor appearance and performance, and that the driving experience often resulted in a dramatic attitude change. Many drivers and passengers emphasised the positive sensory and affective side of BEV usage, evoking Sheller's (2003) observation that cars are 'machines that move people, but they do so in many senses of the word' (p. 3). This suggests that increasing opportunities for people to encounter and try out BEVs (e.g., through providing easy access to test drives at conspicuous public venues and events) would be highly beneficial in establishing a new image.

The TSB drivers' liking for a manageable degree of challenge appeared partly due to the fact that they fell into the categories of 'innovators' and 'early adopters' in the domain of BEVs. Rogers (2003) observed that 'earlier adopters'

are generally more favourable than 'later adopters' towards change, risk, and uncertainty, as well as being more knowledgeable about innovations (pp. 290-291). Conquering a learning curve was felt to be rewarding to the drivers, adding an edge to the 'novel' and 'exciting' image which allowed them to escape from the sense of getting 'stagnant' (P02) and habituated in everyday routines. It also countered the 'boring' BEV media stereotypes (Herron, 2013; Frawley, 2012) and the idea that EV drivers were similarly 'boring and sensible', 'dull', and 'lacking that sense of fun' (Graham-Rowe et al., 2012, p. 148). This desire for a challenge has emerged in other papers on ICE cars; Avery (2012), for example, quoted a Porsche driver who posted an online statement revelling in the fact that his car's high performance required a proficient driver who could gain 'physical mastery of the machine', in comparison to the typical mainstream car that was 'easy & boring to drive and requires almost no driving skills at all' (p. 327). This emphasises how cars differ from more mundane technological appliances, allowing skilled and confident drivers to perceive themselves as belonging to a superior social category. The learning curve for the TSB drivers was not *overly* steep, however, as all 53 drivers agreed in the 3-month questionnaire that 'Learning how to use my electric car was easy'. This indicates that the ideal BEV image at this stage of development should strike a balance between being easy to use and maintaining a degree of pleasurable complexity.

In terms of the BEV driver identity, the drivers regarded the 'innovative technology adopter' identity as more valid, more desirable, and more congruent with their existing self-images than the 'green' identity. Many of the drivers could be categorised as technology and/or car enthusiasts, and some made clear that they worked in fields which provided them with expert technical knowledge and a high degree of confidence. The findings also showed, however, that other ICE car enthusiasts were felt to be the most resistant consumers towards BEVs. In addition, five drivers (9%) stated explicitly that they were *not* particularly interested in technology, and this proportion may well rise in a participant sample containing more female drivers. These findings suggest that just focusing on targeting technophiles as the early market would be detrimental, potentially generating the impression of BEV drivers being a small and closed social group, exclusive and inaccessible to people without

technical expertise or a passion for novel cars. Like the high-status 'green' group image, this could be regarded by ingroup members as positive but by the mainstream outgroup as negative, leading to reinforcement of the homogenised and alienating BEV driver stereotypes.

One key finding from this chapter was the emergence of a desirable form of social identity. This was absent from drivers' discussions of the 'green' identity, and appeared to offer benefits on both a pragmatic and a psychological level. The social identity perspective provides a strong theoretical framework for explaining these psychological factors. It was not simply a case of individual personalities clustering to form a group ('the individual in the group'); instead, the group membership enhanced drivers' self-perceptions and shaped their behaviours ('the group in the individual') (Hogg & Abrams, 1988, p. 3). It allowed drivers to perceive themselves as belonging to a small team of adventurous pioneers, trailblazing the way for the mainstream market and embracing the role of opinion leaders. They developed and disseminated group norms and values (i.e., the belief that BEVs were a desirable form of innovative technology) and used the outgroup of non-BEV drivers as a point of social comparison to enhance their sense of positive distinctiveness. It also helped them to deal with the barrier of stereotype threat in a more constructive way. Whereas drivers reported responding to 'green' stereotypes by using individualist tactics (i.e., by dissociating themselves from the stigmatised 'green' group), they responded to technophile stereotypes on a social level (i.e., by attempting to alter the position of their ingroup on a salient dimension, or by transforming the negative values assigned to it) (Brown, 2000; Tajfel & Turner, 1979, 1986). The latter tactics would obviously be much more beneficial for the BEV market as well as for BEV drivers. This suggests that rather than using the traditional approach of attempting to identify potential early BEV adopters on the grounds of aggregated individual demographics or personality characteristics, an alternative approach for stakeholders would be to promote the image of an influential and desirable 'innovative technology adopter' group that will appeal in its own right to forward-thinking consumers. Potential strategic interventions to achieve this aim are outlined in the following chapter.

Chapter 7

Discussion and Conclusion

This concluding chapter draws together the findings of this thesis by outlining and evaluating its key contributions. It opens with an overall summary of the main novel findings, and a brief reflective summary of the methodological approach and theoretical approach. It then turns to answering the research question by presenting a summary of specific findings (section 7.2, divided into three subsections), followed by suggestions as to how the implications could potentially be addressed in a real-world context (section 7.3, divided into a further three subsections). Finally, it presents a discussion of the limitations of the thesis (subsection 7.4.1), directions for future research (subsection 7.4.2), and a final conclusion (section 7.5).

7.1. Overall summary

In addressing the issues of image and identity for BEV drivers, this thesis expanded in several ways on the existing body of background literature. Much research has examined the perceived practical barriers to EV uptake and proposed various practical solutions, but these solutions can be difficult to put into place, and the global future outlook for EV adoption is still unclear. Chapter 2 identified a gap between three relevant fields of research: transportation research (which included much literature on EVs); consumer research (which included much literature on image and identity); and social psychology (which included much literature on the social identity perspective). Very few studies had attempted to bring these fields together, and no publications were found to have applied the social identity perspective to issues of image and identity in relation to EVs. This thesis positioned itself in the gap. An extensive and systematic literature search in Chapter 3 revealed that only 17 out of the 334 publications focusing on EVs had engaged with issues of image any identity to any significant extent. These 17 publications raised some interesting points, but the overall findings were diverse and sometimes contradictory. This thesis took the limitations of the existing literature into

account, and analysis of the selected sample of data from the TSB BEV drivers revealed a number of novel findings.

Firstly, the most obvious finding was the fact that issues of image and identity *did* play an influential role in shaping consumer attitudes and behaviours towards BEVs. This extended the small amount of existing evidence showing that such factors could prove crucial in moving the BEV market forward, and require attention from researchers, stakeholders, and policymakers. Secondly, two distinct categories of image and identity were revealed: the 'green' category and the 'innovative technology' category. This partially echoed some of the Californian studies (Heffner, 2007; Heffner et al., 2005, 2007a, 2007b), but a new finding from the TSB data was that the latter category was generally regarded as more valid and more desirable than the former. In addition, both carried complexities that have not been addressed in the existing literature (e.g., they conflicted on some levels, as the organic associations of the 'green' image were felt to undermine to a degree the image of innovative and viable technology). Thirdly, the negative side of the images and identities proved to be just as important as the positive side, if not more so. This kind of negativity has been described by researchers as 'one of the most neglected and under-theorized' areas of study in consumer research as a whole (Hogg, Banister, and Stephenson, 2009, p. 148), and has been given very little attention in the EV field. In addition, the choice of methodological and theoretical approaches helped to contribute to the novel findings. These approaches are briefly summarised and reflected on below.

Contribution of the methodological approach

As explained in Chapter 3, 14 of the 17 identified publications looking at issues of image and identity for EV drivers were academic studies, which fell into two methodological clusters: quantitative and qualitative. Each cluster carried its own set of strengths and limitations. The findings of the four quantitative publications were argued to be ultimately simplistic and reductive, but the 10 qualitative publications posed the opposite challenge; although they offered deep and complex insights into rich datasets on one hand, they also tended to present subjective and idiosyncratic findings from unique sets of participants on the other. This thesis attempted to strike a balance by adopting a primarily

qualitative analysis of interview data supported by appropriate questionnaire data. It also applied the flexible analytical framework of thematic analysis, which allowed for identification of surface-level 'semantic' data patterns alongside deeper interpretation of the underlying, 'latent' content.

In retrospect, the findings provided strong evidence of the need for inductive qualitative analysis when addressing psychological issues in the EV field. The emergent themes sometimes contradicted logical assumptions made by other papers (e.g., that most drivers should perceive the 'green' BEV image as positive). In addition, the findings offered insight into *why* the drivers held the views they did (e.g., the 'green' image was felt to lack validity and be linked to negative 'tree hugger' stereotypes). This form of explanation was largely missing from the existing literature. At the same time, however, the findings also highlighted the advantages of a relatively large participant sample and the inclusion of appropriate questionnaire data. These allowed a broader approach than presented by other qualitative studies (e.g., Gjøen and Hård, 2002; Graham-Rowe et al., 2012; Heffner, 2007; Heffner et al., 2005, 2007a, 2007b), and the 'validity' subthemes helped to establish clearly the more surface-level findings (i.e., the link between images and reality) before addressing the deeper issues which required increasingly complex interpretation. The indication of numbers and percentages allowed themes and subthemes to be established and compared in a credible way, confirming the prevalence of driver perceptions as opposed to relying on a potentially biased selection of idiosyncratic quotes.

Contribution of the theoretical approach

As outlined in Chapter 2, image congruity theory (e.g., Sirgy, 1980, 1981, 1982a, 1982b) was initially selected on the grounds that it is a well-established and well-tested theoretical model in the field of consumer research. It was the first clear and integrative framework to be developed at a time when existing studies on self-concept in relation to consumer behaviour were 'fragmented, incoherent, and highly diffuse' (Sirgy, 1982a, p. 287), and it offered a good basic explanation for some of the relationships between drivers' perceptions of their self-images and the images of the BEVs. It clarified the link between the two, as drivers' quotes in both Chapter 5 and Chapter 6 fitted into the framework of

positive congruity between product-image and actual/ideal self-image (the 'desirable identity' subthemes), and negative incongruity between product-image and social self-image (the 'undesirable identity' subthemes). This allowed for a more structured and cohesive psychological analysis of the interview data than was presented in other, atheoretical papers (e.g., Caperello & Kurani, 2012; Gjøen & Hård, 2002; Graham-Rowe et al., 2012).

Image congruity theory also carries a number of limitations, however. By focusing on individual personality characteristics, it largely ignores social context and cannot account for the influence of group membership on consumer identities. In this sense, it offered little insight into the emergence of a desirable 'innovative technology adopter' group identity in Chapter 6. In addition, it could not fully explain the psychological factors behind the negative stereotypes, or the drivers' responses to the discrepancy between positive actual/ideal self-images and negative social self-images (i.e., how they responded when they saw the BEVs as simultaneously conferring a desirable self-image from their personal point of view, but an undesirable self-image from the 'looking-glass self'). This was a key finding from Chapter 6, and the social identity perspective offered a better interpretation.

The social identity perspective opened new avenues for this thesis, as very few studies to date have applied it to the field of consumer research, despite the significant impact that it has had in the field of social psychology. With regard to the undesirable identities, it showed that the BEV drivers were not simply confronted by negative images reflected back to them on an individualistic level (e.g., 'You hold overly idealistic environmental views') but by more powerful stereotypes targeting stigmatised social groups (e.g., 'You belong to a strange group of "eco-warriors"'). The micro-theory of stereotype threat allowed a distinct pattern to be identified across Chapter 5 and Chapter 6, as it revealed that the range of apparently disparate negative images of BEV drivers (i.e., low-status environmentalist, high-status environmentalist, and geeky technophile) actually shared very similar characteristics (i.e., they were all conceptualised as representing minority groups that were felt to deviate from social norms). It also helped to explain the drivers' responses, as some adopted the individualist strategies of 'disengagement' and 'disidentification' from the undesirable 'green' groups in Chapter 5, but the more positive collective strategies of 'social

competition' and 'social creativity' when they identified with a desirable 'innovative technology adopter' ingroup in Chapter 6. This social group level of explanation was a new contribution to the existing EV literature.

It should be noted that the two theoretical models did not conflict; on the contrary, they complemented each other in this thesis because image congruity theory covered the individualistic side ('personal identity') of the self-concept that the social identity perspective acknowledges but chooses not to address. Together, they formed a dovetailed model that enabled both the 'personal' and 'social' identities of the drivers to be studied. The social identity perspective captured the most important points in the data, however, and provided the strongest overarching framework. It also helped to emphasise the wider *societal* influence on consumer perceptions of image and identity issues, shifting the focus towards 'the dynamic impact of society on self' (Hogg, Terry, & White, 1995, p. 264) in terms of the prominent group images circulating in the public sphere. Unlike more mundane products which might appeal to consumers on a purely individualistic level, BEVs are deeply embedded in social, cultural, and political contexts which need to be taken into consideration.

7.2. Summary of specific findings in relation to the research question

As stated in Chapter 1, the research question for this thesis was:

What are the potential image and identity-related barriers and facilitators to BEV adoption?

In addition, it was noted that:

The findings will carry significant implications for developing strategies to remove the barriers and to promote the facilitators, and to identify which kinds of consumers to target at this stage of BEV development.

This section addresses the initial research question, divided into subsections which draw together the findings of Chapters 5 and 6 and provide a summary of the main barriers (7.2.1), the main facilitators (7.2.2), and the overall implications of the findings (7.2.3). Potential suggestions for developing real-world strategies to remove the barriers, promote the facilitators, and target appropriate consumers are then discussed in section 7.3.

7.2.1. What are the potential image and identity-related barriers to BEV adoption?

This thesis revealed the negative aspects of image and identity to be highly significant, exposing and exploring what Dalli, Romani, and Gistri (2006) termed the “‘dark side’ of consumer preferences’ (p. 87). The findings counterbalanced other studies looking at image and identity in the EV field, which have focused predominantly on the positive aspects (Axsen & Kurani, 2013; Gjølén & Hård, 2002; Heffner, 2007; Heffner et al., 2005, 2007a, 2007b; Schuitema et al., 2013). In terms of BEV image barriers, the TSB drivers expressed concern about the validity of the ‘green’ image in Chapter 5; although 85% agreed that BEVs had the potential to become increasingly environmentally friendly in the future, 68% expressed uncertainty or scepticism about their current overall credentials, and this rendered the ‘green’ image ambiguous or off-putting. In addition, the associations of the word ‘green’ with immobile plants and slow-moving creatures conflicted with the image of fast-moving, mechanical technology. In Chapter 6, the majority of drivers appeared to regard the ‘innovative technology’ image of BEVs as more attractive than the ‘green’ image from their personal points of view, but 75% made reference to negative images held by the public. These negative images were usually based on out-dated impressions of milk floats and ‘Noddy cars’, or sometimes on overly futuristic vehicles. They were caused partly by lack of public knowledge, but also partly by affect-driven consumer resistance to change, supported to an extent by promotion of negative EV images in the media. Together, these images communicated the message that BEVs were a strange, underperforming, and unviable form of technology.

In terms of the identity barriers, negative ‘looking-glass self’ reflections were mentioned by 51% of the drivers in Chapter 5, and by 34% in Chapter 6. These reflections were linked to the negative BEV images, and indicated that the drivers thought that the public could view them as belonging to minority groups of radical consumers: self-sacrificing ‘tree huggers’, hypocritical ‘green’ celebrity copiers, or socially inept technophiles. Application of the social identity perspective allowed this to be defined as the ‘stereotype threat’ phenomenon, which even in the absence of real-world encounters can lead to a ‘formidable predicament’ that operates like ‘the threat of a snake loose in the

house' (Steele et al., 2002, pp. 385, 389). It revolved around homogenised public perceptions of social categories, implying that the BEV drivers were seen as similar to prototype members of groups that evoked and deserved a certain amount of ridicule. The idea of *incongruity* and *absurdity* arose in both Chapter 5 and Chapter 6, as drivers felt that other people saw them as embracing incongruous and bizarre sets of images that led to dissonance between the images themselves, and between the images and reality (Salomon & Singer, 2011).

7.2.2. What are the potential image and identity-related facilitators to BEV adoption?

This thesis also revealed a number of significant positive aspects of image and identity. In terms of BEV image facilitators, 17% of drivers in Chapter 5 conceptualised the cars as contributing tangibly to the local environment by being 'clean'. This 'clean' image was associated with the lack of exhaust fumes and convenience of home-charging, but also on a more abstract level to the idea of moral cleanliness and a sense of freedom, independence, and control. It was more compatible than the 'green' image with the idea of viable technology. In Chapter 6, the majority of drivers (70% pre-trial, rising to 84-100% at the 3-month stage) viewed the 'innovative technology' image as both valid and appealing from their personal perspectives. They thought the BEVs to be advanced and future-facing, and many conceptualised potential prototype flaws or driver learning curves as an interesting challenge rather than a problem, especially after gaining experience and incorporating them into their lifestyles. In addition, 43% of drivers made reference to other people converting to very positive views, usually after they had seen or been given a ride or a drive in one of the trial BEVs. These desirable images appeared to strike a balance between being sufficiently 'normal' while maintaining an edge of uniqueness and superiority in comparison to ICE cars.

In terms of the identity facilitators, some drivers indicated that they felt the BEV images to match and/or enhance their individual identities. This had a much stronger effect in Chapter 6 (where it was reported by 68% of drivers) than in Chapter 5 (where it was only reported by 26% of drivers). The logical assumption that technology enthusiasts might be an ideal consumer group to

target for BEV promotion was undermined by other factors, however. One was that traditional ICE car enthusiasts ('petrol-heads') were referred to by 17% of TSB drivers as being the most resistant type of consumers to the idea of new vehicle technology. Another was that four of the female drivers (4/14, 29%) stated that they were not particularly interested in the technological side of the BEVs, implying that creating an overly technological image might be unappealing to female consumers who had identified with traditional gender norms. This presented a paradox, which was partly resolved by another key finding: the reference by 45% of the drivers in Chapter 6 to a desirable form of 'innovative technology adopter' social identity. These drivers saw themselves as belonging to a new group of adventurous pioneers who were helping to shape the future. They perceived their ingroup as superior to the mainstream outgroup, but it was not a *closed* group as many drivers made efforts to convert other people over to their side. This ambassadorial role created a sense of influence, authority, and social status, increasing drivers' confidence that BEVs were the right way to go.

7.2.3. What are the implications of these barriers and facilitators?

These barriers and facilitators obviously carry real-world implications. They were shown in this thesis to influence consumer attitudes and behaviours towards BEVs, and can be assumed to have an impact on potential purchase decisions. For the large majority of TSB drivers, the positive images and identities appeared to outweigh the negative ones. The positive BEV images also reinforced the *practical* benefits of the cars (e.g., the 'innovative technology' image advocated the BEVs' good performance) and helped to overcome some of the practical barriers (e.g., the 'clean' image reconceptualised the charging process, often seen as a hindrance, as something that offered cleanliness, convenience, and control). For the general public, however, the negative stereotypes appeared to carry more weight than the positive ones. These images and identities were often linked only loosely to reality, but they exaggerated the practical disadvantages of the BEVs (e.g., the frequent references to 'Noddy cars' implied that the BEVs' performance was similar to that of a 1950s' cartoon car) and undermined some of the practical benefits (e.g., BEVs would not be at all environmentally friendly if adopted only

for display by jet-setting ‘green’ celebrities). These negative images functioned to make the BEV drivers look foolish and/or hypocritical. Overall, the findings indicated that promoting the positive images and identities, along with removing the negative images and identities, could help to influence consumer perceptions of BEVs in a powerful way. Suggestions for potential strategies are offered in the following section, divided into three subsections: *What is the best image to promote for BEVs?* (7.3.1), *Who are the best consumers to target at this stage of BEV development?* (7.3.2), and, *What real-world actions could be put into place?* (7.3.3).

7.3. What real-world strategies could be developed to encourage BEV uptake?

7.3.1. What is the best image to promote for BEVs?

The above findings highlight the need to promote a strong and positive image for BEVs. The existing images were found to cover a broad and complex spectrum, and in contrast to other papers (Gjøen & Hård, 2002; Heffner, 2007; Heffner et al., 2007a, 2007b), this diversity was argued to be detrimental as opposed to liberating. The images that emerged from the TSB data conflicted on various levels, and the trial BEVs did not simply offer a situation where ‘the individual constructs a unique self that is capable of viewing product meaning in novel ways’ (Heffner, 2007, pp. 32-33). It is not of course the case that one ultimate, ideal image should be attached to all BEVs, or that all BEV brands should be seen as identical; as more brands and new BEV models enter the market, increasingly tailored images are likely to emerge. At present, however, it seems that a more cohesive and stable prototypical BEV image would be beneficial for the UK market. This would help to remove some of the negative images if accepted by mainstream consumers, and provide a strong grounding for more heterogeneous images in the future. Such an image would evidently need input from stakeholders as well as from the BEV drivers themselves, and this is discussed in more detail in subsection 7.3.3.

The TSB data revealed four key components that could contribute to such an image. Firstly, a good image would need to be seen as *valid*; if it was not felt to reflect the functional features of the BEVs, it could draw accusations of

deception (e.g., greenwashing) and lead to consumer disappointment if performance failed to meet expectations. Secondly, it should *integrate* the existing positive images; rather than presenting the ‘green’ side and the ‘innovative technology’ side as separate and competing features, a stronger image could orientate itself around the concept of ‘clean innovative technology’. This would reduce the incongruous and absurd element of the negative stereotypes. Thirdly, the image should *strike a balance* between various extremes (e.g., being too distinctive/too ordinary, too challenging/too boring, too complex/too easy, and too futuristic/too familiar). Lastly, it should emphasise BEVs’ *superiority to ICE cars on appropriate dimensions*. The social identity perspective proposes that ‘a group has no existence but in its relation to other groups’, and that its meanings and values are brought into being by intergroup comparison (Deschamps, 1982, p. 87); consumers will automatically compare and contrast BEVs to their ICE counterparts, and this is where the image could play a crucial role by helping to appropriate and transform some of the traditional meanings of ICE cars.

To give an example, one of the core traditional meanings of ICE cars is widely acknowledged to be personal freedom (Kemp et al., 1998; Redshaw, 2007; Stokes & Hallett, 1992). This is generally conceptualised as freedom to travel independently in a highly flexible way; as stated clearly in a report commissioned by the UK’s RAC Foundation, ‘No invention in the history of mankind has done more to extend personal freedom – our ability to go where we want, when we want – than the car’ (Frankel, 2014, p. 1). On a deeper level, it can also carry connotations of escape from the confines of society and the ‘inhospitable public realm of mass transportation’ (Schroeder & Zwick, 2004, p. 39). BEVs are frequently seen as inferior to ICE cars on this front due to their limited driving range and long recharging times, despite the fact that the range of a single charge appears to be perfectly adequate for the vast majority of UK drivers’ everyday journeys (Carroll et al., 2013; OLEV, 2013).

In Chapter 5, however, it emerged that some of the TSB drivers had begun to reconceptualise the idea of personal freedom by linking their BEVs to the image of liberation from ‘disgusting’ exhaust fumes, ‘dreaded’ petrol stations, and the general ‘hassle factor’ of public refuelling. They came to see home charging as offering greater independence, comfort, and privacy by removing reliance on

petrol stations and imported oil, which carried the additional implications of moral superiority. This shifted the meanings of a traditional image by placing it in a new context, in line with what the social identity perspective would term the strategy of ‘social creativity’, which allows social groups with lower assigned status to view themselves favourably through ‘reconstruing or redefining [. . .] the relevant comparison dimensions’ between the groups (Brown, 2000, p. 758). A number of drivers also indicated that they had taken on the role of ambassadorial agents of social change, suggesting that they were aiming for the more ambitious strategy of ‘social competition’, which can produce actual changes in the relative status of groups by altering the established status quo (Tajfel & Turner, 1979, 1986).

Such strategies could be supported and reinforced by stakeholder interventions taking the dual approach of undermining the image of personal freedom for ICE car drivers, and promoting the image of personal freedom for BEV drivers. The first strand of the approach could focus on road congestion, which is becoming an increasingly serious global problem; a recent UK report revealed the average British driver to have spent 124 hours in gridlock in 2013, with this figure estimated to rise to 136 hours by 2030 (INRIX & CEBR, 2014, para. 3). Even back in the 1990s, Stokes, Kenny, and Cullinane (1991) observed that there was growing consensus that UK traffic congestion was ‘leading to the end of the “open road”’ (p. 8), illustrating this point with a quote which made clear how ‘motoring images of freedom and individual triumph [. . .] individual liberty and self-expression [. . .] splendid isolation and independence’ were no more than a delusion in the modern age (Elton, as cited by Stokes et al., 1991, p. 9). The second strand of the approach could focus on promoting the ease and flexibility of recharging a BEV in a comfortable home environment, as opposed to having to take detours and queue at inhospitable, outdoor petrol stations. Overall, this strategy could reverse the idea of ICE cars being superior to BEVs on the personal freedom dimension.

7.3.2. Who are the best consumers to target at this stage of BEV development?

As outlined in Chapter 6, existing research attempting to identify potential EV adopters has usually taken a predictive approach and relied on socio-

demographic data, stated preference studies, or forms of highly rational modelling. This has produced a diverse body of fragmented and sometimes contradictory findings, usually relying on clusters of individual consumer demographics and personality characteristics (see Plötz et al., 2014, for a review). Due to the number of variables involved (e.g., data collected in different countries, from different participant sets, and in relation to different kinds of EVs), very little consensus has been attained as to which kinds of consumers are the most likely to adopt EVs in general, let alone who are the best consumers to target as potential BEV adopters in the UK. Researchers usually agree that EV adopters at present fall into Rogers' (2003) categories of 'innovators' and 'early adopters' (sometimes combining the two categories into one), which implies that they differ in some way from the mainstream market. Explanation of these differences remains vague, however, and it is often unclear what role the earlier adopters will play in shifting the EV market forward. Studies which have attempted to measure specific consumer traits such as 'innovativeness' have often encountered difficulties; as stated at the end of the paper by Morton and colleagues (2012):

Innovativeness can be somewhat of a fleeting and elusive concept with its level being highly dependent on situational and environmental variables. Indeed, it would be a rare occurrence to identify an individual what [*sic*] was universally innovative regardless of the context. (p. 12)

The TSB data offered insight on this topic. This thesis focused on a sample of participants who had already chosen to drive a BEV, and could offer in-depth reflection on their thoughts and feelings. On a broad level, many of the drivers did appear to share some similar attitudes (e.g., 96% initially expressed pro-environmental views, and 58% indicated some form of interest in innovative technology). In Chapter 6, 47% made clear reference to the 'innovative technology' image of the BEVs matching their own self-images, either through 'domain-specific innovativeness' (being a car enthusiast or technology enthusiast) or 'innate innovativeness' (being open-minded and liking a degree of challenge and change) (Bartels & Reinders, 2011). The inductive qualitative approach revealed a number of complexities and ambiguities, however, and it became clear that a good strategy would not be able to rely simply on trying to promote a BEV image that matched the pre-existing, individual identities of certain consumers. Instead, the findings in Chapter 6 suggested that a better

approach would be to create, promote, and support a new form of desirable social identity for BEV adopters. This would appeal to a wider range of consumers, help to create a stronger and more stable sense of ingroup identity, and confer a self-enhancing sense of 'positive distinctiveness' for those who chose to enter the group. It appeared that *drivers to whom an early adopter image appealed* would be the ideal consumers to target at this stage of BEV development. These consumers could benefit the BEV market in several ways.

For example, many TSB drivers liked the idea of being part of a small team of trailblazers, and this led some to adopt the role of 'opinion leaders', a category of consumers who are influential in their social networks and can prove crucial in launching a new product (Grewal et al., 2000; Rogers, 2003). One TSB driver went so far as to describe herself as a 'virus' in her enthusiasm to 'spread the word' about BEVs, evoking the concept of 'viral marketing' where opinion leaders disseminate innovative products to others in 'a process resembling an epidemic' (Rogers, 2003, p. 313). These kinds of consumers do not merely adopt a product, but go on to persuade other people to do the same, facilitating a shift from the early adopter segment of the market to the much larger (and potentially more problematic) 'early majority' category (Rogers, 2003). In addition, identification with a socio-psychological group has been found to lead to better coping strategies in stressful situations (Haslam, Jetten, O'Brien, & Jacobs, 2004; Haslam, O'Brien, Jetten, Vormedal, & Penna, 2005). It provides a sense of support from other ingroup members and can 'play a key role in structuring people's experience of stress', allowing them to view a task as 'challenging and benign' rather than 'threatening and stressful' if the former conceptualisation is regarded as the group norm (Haslam et al., 2005, p. 357; see also Haslam et al., 2004). This could help to explain why the TSB drivers in Chapter 6 tended to view BEV adaptation issues and negative technophile stereotypes as a stimulating challenge rather than a cause of anxiety.

7.3.3. What real-world actions could be put into place?

Following on from the above suggestions, this subsection considers a number of more specific ways in which the outlined strategies could be translated into action. Firstly, it answers the question: who should contribute to putting such strategies into effect? In other publications, emphasis has been placed on the

creative consumer who can build and manipulate unique sets of idiosyncratic images for their EVs (Garland et al., 2013; Gjøen & Hård, 2002; Heffner, 2007; Heffner et al., 2005, 2007a, 2007b). This thesis acknowledges the importance of consumer contribution, but also argues that stakeholders need to play a greater role in constructing a more stable image for BEVs and BEV drivers that will be accepted by a larger proportion of the UK market.

The most obvious stakeholders here would be the marketing departments of BEV manufacturers. As explained in Chapter 3, advertising plays a huge role in the UK car industry and vast sums of money are invested in it every year. Advertisements can be skilfully crafted and disseminated to the public via a multitude of sources, and 'advertising is identified as one of the principal components of image creation' in the public sphere (Meenaghan, 1995, p. 28). Relying solely on the vehicle marketing industry would be problematic in the case of BEVs, however. The main reason is that BEVs are still a niche product, and despite a 'remarkable surge in demand' for EVs between 2012 and 2015, the total number of BEVs and PHEVs accounted for only just over 1% of the UK's total new car market in December 2015 (Lane, 2016, paras. 1, 3). Manufacturers are unlikely to want to promote BEVs as being superior to their ICE counterparts at the present time, or to advertise images of ICE cars and petrol stations as being undesirable. In addition, vehicle manufacturers compete with each other and have vested interests in their own products, so may be resistant to collaborating together to any significant degree. This highlights the need for input from stakeholders such as the UK Government, national research and marketing centres, regional and local governing bodies, and independent organisations, institutions, consultancies, and businesses. The media and social media could also play a central role.

The UK Government has acknowledged the need to launch new enterprises to support and encourage the take-up of plug-in EVs across the country, and in January 2016 announced the four winning cities to receive money from a £35 million project grant to be Nottingham, Bristol, Milton Keynes, and London (DfT, McLoughlin, & OLEV, 2016). A further £5 million for specific EV initiatives will be awarded to Dundee, Oxford, and North East regions. This Go Ultra Low (GUL) City Scheme is 'a jointly funded partnership between Government and several major car manufacturers to explain the benefits of ultra low emission

vehicles to drivers and fleets' (OLEV, 2014, p. 4), and will involve development of 'exciting, innovative ideas' such as the installation of charging points that double as street lights in the Hackney borough of London; solar-canopied park-and-ride hubs in York; a plug-in EV lease scheme in Bristol; and a £9 million Electric Vehicle Experience Centre which offers consumer advice and short-term EV loans in Milton Keynes (DfT et al., 2016, para. 5). These developments could open ideal opportunities for promoting new images for BEVs and their drivers, but although OLEV's (2014) original document for potential bidders touched on the idea of improved images for *cities*, stating that the scheme would allow the winners 'to cultivate a regional, national and international reputation for their uptake of ULEVs' and 'develop and nurture a reputation as exemplars in the field' (p. 4), the Government's publicly accessible communications about the scheme (DfT et al., 2016; OLEV, 2014) have focused otherwise only on the pragmatic and financial sides of the project. This sub-theme proposes a number of additional strategies which could help to promote BEVs on a psychological level to a wide range of consumers across the UK.

Advertising would almost certainly play a key role, and conventional manufacturer-led promotion of BEV models could be supplemented by a stakeholder-driven, image orientated campaign emphasising the superior aspects of BEVs in comparison to ICE cars. This could draw on vivid imagery of air pollution in UK cities and the health risks posed by exhaust fumes, in the same way that the UK's influential anti-smoking campaigns from 2002 onwards emphasised the negative effects of nicotine. It could also promote the image of personal freedom in relation to home charging, in contrast to the inconvenience of queuing at petrol stations. On the cinematic and media side, action films and television dramas may carry huge potential for advocating the novel and distinctive element of BEVs, while the normal and viable element could be communicated by including them in popular television programmes focusing on local communities (e.g., soap operas and reality television series). As suggested in Chapter 6, it would also be beneficial to advertise BEVs in a real-world context by increasing opportunities for people to encounter and test-drive the cars in easily accessible venues. These would not need to all involve £9 million 'experience centres'; the TSB data revealed that even just seeing a BEV on the road could have a dramatic effect on public attitudes, and

two drivers reported taking their BEVs into schools and giving talks. Educational institutions, including colleges and universities, could prove ideal locations to spread positive BEV images to the younger generation who have not yet developed attachments to ICE cars. This population group would probably be the most likely to see BEVs as a 'continuous' rather than a 'discontinuous' or 'disruptive' form of innovation which threatened their existing lifestyles.

In terms of the BEV driver identities, the image of a unique, desirable, and accessible group could be promoted in several ways. On a pragmatic level, support and publicity for BEV hire clubs, BEV enthusiast clubs, and online communities could encourage BEV drivers and potential adopters to exchange information, share experiences, and give and receive advice (see Le Vine, 2012, for extensive discussion of different kinds of ICE car hire clubs in the UK). BEV hire club schemes, such as the pioneering North Oxford E-Car Club, would allow consumers to experience BEV technology in everyday situations before committing themselves to purchase. Short-term EV loans have been proposed as part of the GUL City Scheme (DfT et al., 2016), but a hire club could offer 'tighter social links and the greater sense of community cohesion associated with sharing a common resource' (Le Vine, 2012, p. 2). BEV enthusiast clubs and online communities could additionally create a strong sense of social belonging for their members, in line with research findings that such clubs are felt to provide 'intellectual and social support through experiences of learning, social activism, and fellowship', as well as helping to increase members' affection for and loyalty to the product and brand (Algesheimer, Dholakia, & Herrmann, 2005, p. 19; see also Algesheimer, Dholakia, & Herrmann, 2004; Fournier, Sensiper, McAlexander, & Schouten, 2000). One good location for establishing such communities might be universities, where students typically run an extensive variety of clubs and societies and avidly recruit new members at events like the annual Freshers' Fair. If stakeholders were willing to offer university clubs access to BEVs, along with appropriate training, higher education students could potentially present a very open-minded and optimistic consumer group to target.

On a more psychological level, the image of a superior and privileged BEV driver group could be emphasised through promotion of the idea of a higher-class category of drivers, applying a similar model to that used by railways and

airlines which make clear the divisions between first-class and economy-class passengers. In a paper looking at the 'stylization of elites' in frequent-flyer programmes across 51 international airlines, Thurlow and Jaworski (2006) presented an in-depth analysis of how the concepts of 'distinction', 'social privilege', and 'superiority' were constructed and regulated by airline industries through highly symbolic means (p. 99). They gave examples such as the issuing of a membership card which indicated access to a social group with an elite and exclusive name (e.g., 'Club Premier', 'Gold Circle'), and linked this to Tajfel and Turner's (1979) conceptualisation of the 'minimal group phenomenon' where 'even the most insignificant marker of difference can immediately generate a powerful sense of distinctive social identity' (Thurlow & Jaworski, 2006, p. 107). Although the material differences in facilities offered to the stratified passengers were often very slight, the emphasis on images of 'comfort', 'choice', and 'attention' for the elite groups greatly enhanced the meanings of token items such as 'a personalized luggage label' (Thurlow & Jaworski, 2006, p. 117). Another symbolic resource was the conceptualisation of elite airport lounges as 'the promise of greater space, private space and separation from other people (the "masses")', which allowed for clear 'social comparison' in line with Tajfel and Turner's emphasis on 'the need always to compare one's ingroup favourably to outgroups' (Thurlow & Jaworski, 2006, pp. 118, 114).

Such strategies could be applied in numerous ways to improve BEV drivers' sense of a desirable social identity. Public charging payment cards could double as membership cards, and offer a 'repertoire of "perks", "privileges" and "rewards"' (Thurlow & Jaworski, 2006, p. 118) to BEV drivers in the form of things such as free hot beverages at participating service stations and retail stores. These could allow drivers to view themselves as being in a position of luxury while waiting for their vehicles to recharge, as opposed to a position of inconvenience. In addition to ensuring that the public charging points are easy to locate and clearly signposted (OLEV, 2013, p. 95), stakeholders could improve their image by making the BEV parking spaces slightly larger than the ones for ICE cars, positioning them in the most desirable areas of public car parks, and distinguishing them by attractive paintwork and designs. This would improve the image of comfort, convenience, and separation from the general public, and additional features such as overhead cover in outdoor

locations could make a clear distinction between privileged BEV drivers and mainstream ICE car drivers, especially in inclement weather. Priority lanes, and permitted access to bus lanes in urban areas (as currently offered in Oslo, Norway, and soon to be offered in Milton Keynes, Nottinghamshire, and Derby as part of the GUL City Scheme), could promote BEV drivers' sense of superiority, personal freedom, and control in the same way that speedy boarding of an aeroplane can create a very positive affective sensation when 'being sequestered from the bustle of the terminal concourse, and side-stepping the throngs' (Thurlow & Jaworski, 2006, p. 101).

Advertising and the media could also play a large role in promoting the image of a desirable BEV driver group, potentially through strategies such as establishing popular prototypes with whom members of the public are inclined to identify. In addition, they could turn the tables on the prototypical petrol-heads. A good example was offered on 1st April 2015 by *The Guardian* (a broadsheet UK newspaper with a left-wing political orientation), which presented an online article by 'Daisy Pofallor' announcing that 'the disgraced former Top Gear presenter Jeremy Clarkson' had become 'the latest celebrity to support the Guardian's campaign for fossil fuel divestment' after experiencing a 'wake-up call' following his dismissal from the BBC (Pofallor, 2015, paras. 1, 6). He was reported to have re-evaluated his priorities, offered to 'become the new face of the Guardian campaign', and started driving a Toyota Prius, although he admitted that, 'If you'd told me a month ago that I would be joining the tree-huggers in their hand-knitted kerb-crawlers I'd probably have punched you' (Poffalor, 2015, paras. 15, 8). It stimulated surprise and debate from readers who had not realised that 'Daisy Poffalor' was an anagram for 'April Fool's Day', and was praised by many who did recognise it as a satirical swipe at Clarkson and his derisive attitude towards EVs and their drivers. The article operated cleverly on several levels: it used Clarkson's own voice to make his 'petrol-head' views of EVs sound absurd; it highlighted the potential for a large-scale swing of public opinions if a popular figure with 'the thick end of five mill[ion]' followers on Twitter decided to lead a pro-environmental campaign (Poffalor, 2015, para. 14); and it carried the underlying question of, who is the fool? On the surface, it appeared to be the reader who was tricked into believing that Clarkson had converted to a

dramatically new perspective, but on a deeper level the article implied that it was actually Clarkson himself and the reader who admired and endorsed his foolish and 'outrageous' behaviour on *Top Gear* (Poffalor, 2015, para. 11).

Overall, these are just a few suggestive strategies that stakeholders could draw on to remove the image and identity-related barriers and to promote the facilitators to BEV adoption. Collaboration between stakeholders would be necessary to determine where and when they could best be applied, and implementation would require monitoring and evaluation of consumer responses to ensure that they have the desired effect. Overly ambitious approaches, such as converting a large part of a well-used carpark to BEV-only parking spaces, would probably draw a very negative reaction from many ICE car drivers, and lead them to take anti-BEV actions such as showing hostility to BEV drivers and complaining to local authorities. Similarly, creating the image of a BEV driver group as being overly elite could alienate mainstream consumers and cause them to identify more strongly with their ICE car driving ingroup by trying to diminish the status of the BEV-driving outgroup (as discussed in relation to the high-status 'green' identity in Chapter 5).

Strategies would also need to make clear that the intergroup boundaries were sufficiently permeable to allow social mobility from the ICE car driver group to the BEV driver group. When group boundaries are perceived as being relatively impermeable, the 'social competition' strategy is likely to occur and 'group lines are drawn more sharply, values and norms are underscored, and we/they differences are accentuated' (Ashforth & Mael, 1989, p. 25). Unlike many situations to which studies have applied the social identity perspective (e.g., those involving groups distinguished by gender, ethnicity, and/or nationality), the consumer field offers extensive opportunities for individuals to identify and disidentify with social groups of their own choice. The TSB data revealed intrinsic motivation for BEV adoption to play a role in shaping the drivers' positive attitudes in Chapter 6, and mainstream consumers should be encouraged to join the BEV driver group of their own volition rather than feeling pressurised by external forces or goals.

In addition, stakeholders must take into account the fact that in the early stages of uptake, EVs may appeal most strongly to multi-car households

(Campbell et al., 2012; Gärling & Thøgersen, 2001), and BEV drivers may also rely on ICE cars to varying degrees. The Final Report for the TSB ULCVD programme showed that only 33% of the total number of drivers imagined themselves using a BEV as their only vehicle after the trial (Carroll et al., 2013, p. 47). The social identity perspective acknowledges that it is necessary to avoid 'the idea that identification expresses some kind of fixed and stable self-structure or personality trait which is chronically salient across situations' (Turner & Reynolds, 2001, p. 139), and a burgeoning body of research has examined the effect of multiple social identities held by individuals (see Roccas & Brewer, 2002, for an overview of their 'social identity complexity' theoretical construct). Social identities can be 'context specific or situation specific' (Roccas & Brewer, 2002, p. 90), so an individual might perceive him/herself as a BEV driver during one journey and as an ICE car driver during another. Stakeholders would need to avoid implying that the BEV driver group was 'exclusive' in the sense that it excluded the possibility of ICE car usage for its members, or involved an all-consuming form of cult-like social identity such as the 'tree hugger' or geeky technophile stereotypes which were regarded as undesirable by the TSB drivers.

7.4. Limitations and directions for future research

7.4.1. What are the limitations of this thesis?

Like any study, this thesis has limitations as well as strengths. In terms of the design of the project, the TSB data were collected prior to the PhD as part of a much larger study designed to investigate BEV driver perceptions and attitudes across a wide range of topics. The main aim of the TSB interviews and questionnaires was to examine how the drivers engaged with the practical aspects of their BEVs, so only a small proportion of questions specifically addressed issues of image and identity. This was beneficial in some ways as the drivers' emergent quotes revealed the importance of image and identity on an inductive level, but it also meant that some of the drivers' thoughts and feelings may not have been fully captured. For this reason, the numbers and percentages drawn from the interview data must be taken with a degree of caution (e.g., only 17% of drivers indicated that they conceptualised the environmental image as being 'clean', but this proportion may have risen if a

more direct question had been asked). In future research developed to extend these findings, increasingly targeted questions could lead to clearer and more detailed responses, and a greater number of relevant questions could ensure that all participants' views were adequately represented. In addition, data collection methods for future EV trials could be designed to allow comparison of drivers' perceptions of image and identity issues between time points (i.e., by using correlated interview and questionnaire questions at the pre-trial stage and at one or more successive post-experience stages). This would enable a stronger mixed methods approach to be taken, as both interview and questionnaire data could be examined for each time point.

In terms of the focus of the study, it must be noted that this thesis looked only at the TSB drivers' subjective perceptions. These may well have been biased to varying extents, especially in drivers' reports of how they interpreted other people's views. This was an interesting phenomenon in its own right and lent itself to psychological analysis through the lens of the social identity perspective, but future research could examine the socio-cultural context surrounding BEV usage in the UK by conducting a systematic review of how BEVs and other EVs are represented in the media and social media, and by collecting data from other non-EV users. It could also look at BEV advertisements and promotion material, in line with the study on Toyota Prius advertisements by Garland and colleagues (2013), as discussed in Chapter 3. This would provide an alternate perspective on BEV image and identity issues by exposing the top-down attribution and communication of meanings by manufacturers and marketing teams. Such studies could help to track any changes or vacillations in public attitudes and social norms since the TSB data were collected. It would be important for stakeholders to ascertain whether a sizeable proportion of the UK public do hold negative views of BEVs and BEV drivers today, or whether the stereotype threat experienced by the TSB drivers was in fact a relatively harmless, imaginary, or rapidly expiring 'snake loose in the house' (Steele et al., 2002, p. 389). The former situation would require more extensive strategies to change public opinion on a larger scale.

In terms of the time period over which the data collection took place (December 2009 – March 2012), it is necessary to recognise that the BEV market has changed over the last few years. In 2008, only 70 pure BEVs

(excluding 'quadricycles' such as the G-Wiz) were registered in the UK, followed by a further 20 in 2009, but this rose to 1,262 non-commercial BEV cars in 2012, and to 9,934 non-commercial BEV cars in 2015 (SMMT, 2013, 2016a).

Registrations of non-commercial plug-in hybrid cars showed a steeper rise from 992 in 2012 to 18,254 in 2015 (SMMT, 2014, 2016a). This might suggest that the context for BEVs has changed considerably, calling into question the significance of the TSB findings for the UK BEV market today. Looking at the whole picture, however, calculations show that despite the increased uptake, pure BEVs accounted for only 0.38% of the total number of new, non-commercial cars registered in the UK in 2015 (SMMT, 2016a). According to Rogers' (2003) DoI model, this would place them at the very start of the diffusion curve, as the 'innovator' category forms the first 2.5% of the market and the 'early adopter' category forms the next 13.5%. The largest challenge for an innovative product is generally considered to be the shift from the 'early adopter' to the 'early majority' stage, and the BEV market still appears to be a long way from reaching this tipping point. In addition, sales of ICE vehicles are also rising in the UK; 2015 saw an unprecedented total of 2,560,735 conventional ICE cars registered after a steady upward trajectory from 2012 onwards (SMMT, 2016a, 2016b). This suggests that the need for innovative solutions to promote BEV uptake is becoming even more critical, given the UK Government's aim for all new cars to be ultra low emission vehicles by 2050 (DfT et al., 2015; OLEV, 2013).

The TSB findings were to some extent unique to the time period of the trial, when BEVs were less developed than the newer models available on the market today, and the public charging infrastructure was still in its infancy. Despite continuing advancements in BEV technology and infrastructure, however, the majority of practical barriers to uptake still exist, as BEVs on the UK market in 2016 are still more expensive to buy than their ICE equivalents, have limited driving range, and take longer to recharge than to refuel with petrol or diesel. There have been no large-scale movements to date towards making the electricity sources for BEVs more environmentally friendly, such as switching to extensive use of solar power or wind power. With these barriers still in place, it is reasonable to infer that the present day situation is sufficiently similar to that encountered by the TSB drivers for the main findings to be

considered relevant for stakeholders in the transportation field. What would benefit future research is in-depth analysis of consumer perceptions of further ongoing changes, as these may not always match rational assumptions that technological advances will be universally regarded as positive.

To give an example, the number of public charge points has increased in the UK from just over 300 in June 2011 (SMMT, 2011) to over 10,000 in June 2016 (GUL, 2016). While this is often assumed to make things easier and ‘a breeze’ for BEV drivers (GUL, 2016, charging point map section, para. 1), however, a number of media reports have expressed the opposite opinion, arguing that the emergence of various different membership schemes, payment methods, subscription rules, and non-integrated online maps have made public charging difficult and complex (e.g., Charlton, 2015; Kiss, 2015). These perceptions suggest that the advanced public charging infrastructure may convey an image of inconvenience and frustration for some people, as opposed to one of increased independence, freedom, and control. In addition, extensive installation of public charge points is causing controversy in some circles; as stated in an online article for *The Independent* newspaper, ‘The [UK] Government and local councils have splashed millions of pounds of taxpayers’ cash on building thousands of electric car charging points that barely anyone uses’ (Stone, 2015, para. 1). This view was echoed recently by the president of the US Consumer Coalition Fair Energy Initiative in an online article for *The Washington Times*:

Electric utilities have already begun a stealthy and unfair practice of installing thousands of vehicle charging stations across the country financed on the backs of ratepayers. [...] If electric utility companies are allowed to pass along the costs of the installation of this infrastructure to ratepayers, the vast majority of whom don’t own electric cars, the resulting backlash could be explosive. (Wise, 2016, paras. 2, 4)

Such attitudes imply that what might logically be regarded as a practical facilitator to BEV uptake might actually prove to be a psychological barrier, leading drivers to feel uncomfortable and anxious if they believed that other people could see them as belonging to a group of freeloaders who attracted resentment and antagonism. These issues highlight the need for additional psychological research to examine the subtleties and complexities of BEV market changes.

In terms of the content, one factor not addressed to any significant extent in this thesis was the financial issues related to BEV usage. Many reports and papers have drawn attention to the fact that EVs differ from ICE cars in that they are currently more expensive to buy, but cheaper to run due to the lower price of electricity compared to petrol or diesel. The high upfront purchase cost is frequently highlighted as a major practical barrier to uptake (e.g., Accenture, 2011a; Deloitte, 2011; HM Treasury, 2008; OLEV, 2013; Rowney & Straw, 2013) as the low running costs are often ‘not given sufficient weight by the average consumer’ (OLEV, 2013, p. 79). In some of the Californian studies, however, the *image* of ‘saving money’ on fuel emerged strongly for the HEV drivers (Heffner, 2007; Heffner et al., 2005, 2007a, 2007b), as they felt that this reinforced and communicated their idea of being ‘smart consumers’ and ‘intelligent people’ (Heffner, 2007, p. 157). This image revolved largely around ‘symbols of cost saving rather than financial calculations’ as the drivers did not in general conduct any financial analyses or try to track ongoing expenses (Heffner, 2007, p. 145). Another US paper examining ‘the links between altruism, status, and conservation’ (Griskevicius et al., 2010, p. 392) presented a completely different finding, as one of its experimental studies revealed that the participants expressed preferences for a ‘green’ car over a ‘nongreen’ car only when the purchase cost of the former was presented as being *more* expensive than the latter. The authors interpreted this as revealing a desire to demonstrate altruism and ability to incur costs, in line with the ‘costly signaling theory’ which evolved from the field of behavioural ecology.

Together, these studies suggest that certain images for BEVs could potentially help to override the perceived high purchase cost barrier by shifting consumer focus onto the everyday savings and long-term financial benefits of the cars, or by reconceptualising the high upfront cost as something desirable. Neither of these findings emerged from the TSB data, however, and the only clear connections between money and image were linked to the undesirable identities (i.e., the impression of money wastage in the undesirable high-status ‘green’ identity subtheme, and of self-sacrificing frugality in the low-status ‘green’ identity subtheme). On the whole, the drivers spoke about financial issues in very pragmatic ways and highlighted a number of ambiguities and concerns (e.g., uncertainties about the cost of tax, servicing, and battery

replacements). This suggests that further studies are needed to explore more fully the potential for an attractive cost-related BEV image.

Finally, it must be taken into account that the selected TSB participant sample was not intended to be representative of the mainstream UK market, so the findings cannot be generalised to the entire UK population. Nevertheless, the TSB private drivers were largely thought to represent an 'early adopter' group who could lead the way for the next wave of consumers, and the sample analysed for this thesis was similar in demographic terms to the TSB dataset as a whole (Carroll et al., 2013). The private drivers applied for the trial of their own volition in response to public advertisements, and integrated the BEVs into their lifestyles for periods of 6-12 months, so in this sense they could be seen as more representative of real-world 'early adopters' in the UK than participants recruited by researchers for much shorter UK trials (e.g., Graham-Rowe et al., 2012; Skippon & Garwood, 2011). The biased demographic profile of the TSB drivers is interesting in its own right, as it raises the question of *why* the majority of drivers were male, white, in their mid-40s, living with a spouse or partner, and in possession of a university degree. This may have been partly due to practical factors (e.g., middle-aged people living with a spouse or partner might have been more likely to own a house with private parking space suitable for recharging), but also perhaps partly due to image and identity-related factors (e.g., the findings in Chapter 6 suggested that the 'innovative technology' image could be off-putting for some female drivers). This would be a key area for future research to address.

7.4.2. What are the additional potential directions for future research?

In addition to the above suggestions, this thesis opens a number of broader avenues for investigation. It was designed as an exploratory study, and further work on consumer perceptions of BEVs could expand on and test the robustness of the findings in various directions (e.g., by collecting mixed methods data from a larger and more diverse sample of participants on one hand, and by conducting more focused and in-depth interviews with smaller samples of participants on the other). As well as looking at consumers with a wider range of demographic profiles, another group worth examining would be corporate drivers who use fleet vehicles provided by public or private sector

organisations, as the fleet sector ‘buys around half of all new cars in the UK’ and their purchasing decisions will ‘have a crucial role in helping to accelerate ULEV [ultra low emission vehicle] uptake’ (OLEV, 2013, p. 51). This thesis focused solely on private BEV drivers because it was assumed that they would be more attuned to issues of image and identity than drivers who had simply been assigned a car by their workplaces, but organisations can nevertheless rely on projecting good images, and their employees may be attracted to BEVs for different reasons. Looking beyond the field of transportation research, the TSB findings also highlighted the value of applying the social identity perspective to the consumer field, and further studies could benefit both the domains of consumer psychology and social psychology.

7.5. Final conclusion

In conclusion, this thesis has identified a significant gap in the existing literature and revealed the importance of issues of image and identity for large-scale UK BEV uptake. It has outlined the psychological barriers and facilitators for consumers, and explained how the findings could contribute to promoting BEVs in a real-world context by helping to overcome some of the practical problems. The challenge of gaining mainstream market acceptance for BEVs is becoming an increasingly urgent concern, as rising awareness of climate change is leading countries around the world to aim for ever greater carbon-cutting commitments. Following the Paris Climate Conference (COP21) in December 2015, a number of politicians and journalists summarised the event by drawing on metaphors of ‘roads’ and the need to ‘drive’ things forward on a national and global scale; the UK Labour Party’s Shadow Energy Minister, for example, stated that, ‘It’s been such a long road, but the Paris COP21 Climate agreement offers a real breakthrough’ (Gardiner, 2015, para. 2). In this sense, a positive image for BEVs could have a wider impact than simply encouraging people to adopt the new vehicles. Positioning BEVs as an icon for innovative social change could lead the way for other sectors, and both literally and figuratively open up a newer, cleaner road to the future.

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Appendices

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NOTE: Format of documents in Appendices A, B, and C has been adjusted slightly to match thesis margin requirements.

Appendix A: Letter confirming ethical approval for PhD thesis



Dr Mark Burgess
Director of Studies
Department of Psychology, Social Work and Public Health
Faculty of Health and Life Sciences
Oxford Brookes University
Gipsy Lane

1 October 2013

Dear Dr Burgess

UREC Registration No: 130767
Self and identity for electric vehicle drivers

Thank you for submitting an application to the University Research Ethics Committee on behalf of your research student Naomi King. The Committee reviewed the application at its meeting on the 24 September 2013.

As this study involves the secondary analysis of data already collected with consent from participants, ethics approval for this subsequent phase is not required. However, we are content to provide a favourable opinion of the proposed data collection, as described in the ethics application.

Yours sincerely

Hazel Abbott
Chair of the University Research Ethics Committee

cc Margaret Harris, Second Supervisor
Naomi King, Research Student
Morag MacLean/Anna Barnett, Research Ethics Officer
Jill Organ, Graduate Office
Louise Wood, UREC Administrator

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Appendix B: Standard interview schedules

B1: Pre-trial interview schedule

INTRODUCTION

At this stage of the trial we are carrying out some research to find out about people's attitudes, beliefs and feelings towards electric vehicles.

There are **no right or wrong answers** and please just be as honest as you can. It does not matter if you feel you can't or don't want to answer some of the questions.

We would like to **tape the interview** to avoid having to scribble everything down as you speak. (We may however make notes here and there if something you say brings further questions to mind.) We will only use the recording to help with writing the report. Once we have transcribed the audio recording, the audio files will be destroyed. All information will be anonymous at all times, and so there will be no way for us to link anything you say with you personally. You will not be personally identifiable in any reports that come out of this work. Are you ok with this?

A. Initial Motivation and Knowledge of Plug-in Vehicles

1. How did you feel when you found out you had been selected as a participant in this trial?
 - Have you driven an electric vehicle or hybrid vehicle before?
 - [If so, ask participant to specify the vehicle and extent of experience]
2. For you personally, what are the most important reasons for taking part in the trial?
 - What do you expect to get from your participation?
 - In effect, you'll be involved in testing innovative transport technology. To what extent does that interest you?
 - What do you think the car will feel like to drive?
 - Listen (and prompt) for acceleration, braking, reliability, monitoring displays, low noise
3. Do you feel that powering cars in a way that limits environmental damage is important?
 - Do you feel that electric cars will be environmentally friendly?

B. Attitudes and perceptions of plug-in vehicles

4. What do you think are the benefits of plug-in vehicles compared to petrol/diesel vehicles?
 - What would make electric cars more attractive?
 - What would make you more likely to want an electric vehicle?
5. What needs to be overcome for the successful widespread adoption of electric vehicles?
 - [Listen for concrete/technical obstacles, wider infrastructure, attitudes of general public – prompt for each]
 - Do you think there is anything that would stop you using the car in this trial?
 - What would prevent you from buying an electric vehicle?
6. When considering a purchase/lease what makes a vehicle appealing to you?

C. Identity responses

7. Are electric vehicles a topic of conversation among your friends and family?
 - How do they feel about them?
 - What do they think about you driving one?
 - How do you feel about driving an electric car?
 - Does this differ from the way you feel about driving a normal car?
 - Is there any difference in the image of the vehicle?
 - Do you think that electric vehicles are a status symbol in any way?

D. Normative responses to plug-in vehicles

8. Do you think that any of the people you know will buy/lease/acquire plug-in vehicles in the future (e.g. in the next five years)?
 - [Ensure the participant specifies who they are thinking about]
 - Are there other people you know who might feel differently?

E. Behavioural intentions

9. Can you tell me about your driving in a typical day?
 - [Listen, and prompt, for: length of trip, type of trip, urban vs. rural, time of day, work vs. non-work]
 - Will you make any changes to your journeys due to having an electric car?
 - Do you anticipate any difficulties?

F. Assessing confidence in using a plug-in vehicles

10. Do you think that your life will change at all with the new car?
 - What things will you have to get used to?
 - What will you do when you have to go on a long journey?
11. What will be the biggest differences between using an electric vehicle and your current car?
 - Are you confident in dealing with the differences?
 - What will be the first things you need to get used to?
 - [refer to answer from question 10 in terms of which bits will need to be adapted to first etc]
 - What will take the longest to get used to?
12. What new challenges, if any, might using an electric vehicle (HV where appropriate) present for you?
 - Do you feel confident in charging the vehicle?
 - How frequently will you charge the car?
 - Where will you charge the car?
 - Would you be able [or allowed to?] deal with any problems with the car if they arose?
13. Is there anything else you would like to add that we haven't mentioned?

**THANK PARTICIPANT, CLOSE INTERVIEW, & REMIND OF
NEXT DATA COLLECTION POINT**

B2: 1-week interview schedule

INTRODUCTION

At this stage of the trial we are carrying out some research to find out about people's attitudes, beliefs and feelings towards electric vehicles.

There are **no right or wrong answers** and please just be as honest as you can. It does not matter if you feel you can't or don't want to answer some of the questions.

We would like to **tape the interview** to avoid having to scribble everything down as you speak. (We may however make notes here and there if something you say brings further questions to mind.) We will only use the recording to help with writing the report. Once we have transcribed the audio recording, the audio files will be destroyed. All information will be anonymous at all times, and so there will be no way for us to link anything you say with you personally. You will not be personally identifiable in any reports that come out of this work. Are you ok with this?

A. General Adaption Questions

14. First, I'd like to hear about the transition from having your normal vehicle to having your _____
- Can you describe the differences between having your normal vehicle and having your _____
 - How much money do you think you've saved on fuel?
 - Has having the _____ been as you expected?
 - What's the biggest thing you've needed to adapt to?
 - What adaptations have been easy?
 - Has your typical day changed?
 - Has your daily driving changed at all?
 - In what way?

Expand on points with follow-up questions and probe for concrete descriptions of experience

B. Specific Adaptation Questions

Ask if these areas do not get addressed in response to initial questions

1. Charging

15. Can you tell me about charging your _____
- Have there been any difficulties?
 - What has been straightforward?
 - Have you established a routine?

2. Driving

16. Can you tell me what it's been like to drive the _____
- Can you comment on
 - The handling
 - The acceleration
 - The braking
 - The Regenerative Power (Follow up – how much power can be saved through regenerative braking?)
 - The low noise
 - The displays
 - Whether anything (e.g. headlights, air con) has a noticeable impact on battery power
 - What's it been like to be in a car with a left-hand drive? (If appropriate)

3. Range

17. How are you dealing with the range of the _____
- Have you been able to estimate the range accurately?
 - How far have you driven the car on each trip?
 - Are there any journeys that you decided not to take because you had the new electric car?
 - What could be done to make that trip possible in the future?
 - Have you taken journeys that you haven't planned ahead of time?

E. Reactions

18. What have other people's reactions been to you driving your electric car and to the car itself?
19. Is there anything else you would like to add that we haven't mentioned?

**THANK PARTICIPANT, CLOSE INTERVIEW, & REMIND
OF NEXT DATA COLLECTION POINT**

B3: 3-month interview

INTRODUCTION

At this stage of the trial we are carrying out some research to find out about people's attitudes, beliefs and feelings towards electric vehicles.

There are **no right or wrong answers** and please just be as honest as you can. It does not matter if you feel you can't or don't want to answer some of the questions.

We would like to **tape the interview** to avoid having to scribble everything down as you speak. (We may however make notes here and there if something you say brings further questions to mind.) We will only use the recording to help with writing the report. Once we have transcribed the audio recording, the audio files will be destroyed. All information will be anonymous at all times, and so there will be no way for us to link anything you say with you personally. You will not be personally identifiable in any reports that come out of this work. Are you ok with this?

A. Experiences & Attitudes of Plug-in Vehicles

20. Based on your experiences so far, what would you say are the biggest positives of electric vehicles?
21. What do you especially like?
22. What are the biggest differences you've noticed in your own behaviour since picking up the electric vehicle?
23. Has your daily driving routine changed at all?
24. What do you think are the negatives for the acceptance of electric vehicles?
25. What do you think are the benefits of plug-in vehicles compared to petrol/diesel vehicles?
 - What would make electric cars more attractive?
 - What would make you more likely to want an electric vehicle?
26. What needs to be overcome for the successful widespread adoption of electric vehicles?
 - [listen for concrete/technical obstacles, wider infrastructure, attitudes of general public – prompt for each]

B. Charging

27. Can you tell me about charging your

- Have there been any difficulties?
- What has been straightforward?
- Have you established a routine?
- Do you have any personal 'rule' for when you'll charge?
- On average, how frequently do you charge?
- Any issues with the time taken to charge?
- Has your charging routine changed since you first got the plug-in vehicle?

If so (above), why?

28. Have you used public charging places?

- If so what has been your experience of these?
- Is a public infrastructure necessary for you?

C. Driving

29. Can you tell me what it's been like to drive the

- Can you comment on:
- The handling
- The acceleration
- The braking
- The regenerative power (follow up – how much power can be saved through regenerative braking?)
- The low noise
- The displays
- Whether anything (e.g. headlights, air con) has a noticeable impact on battery power
- What's it been like to be in a car with a left-hand drive? (If appropriate)

D. Range

30. Can you tell me about your experiences of the range of the

- Have there been any occasions where you have been concerned about the range?
- Have you taken any unplanned trips? Have considerations of range been an issue?
- Do you do anything to increase the range?
- Is there anything that noticeably reduces the range.

- Have there been any trips that you haven't been able to take that you would be able to take with your normal car?
- Does the electric vehicle go as far as you thought on a single charge?

E. Reactions

31. What have other people's reactions been to you driving your electric car and to the car itself?
32. Is there anything else you would like to add that we haven't mentioned?

**THANK PARTICIPANT, CLOSE INTERVIEW, & REMIND
OF NEXT DATA COLLECTION POINT**

***Appendix C: Partial copy of standard post-experience
questionnaire***

This partial copy (3 pages) of the standard post-experience questionnaire gives an example of the document sent to the TSB drivers. The full questionnaire was 12 pages long and comprised 134 questions, focusing mainly on drivers' opinions of the practical features of BEVs (e.g., charging, driving range, price, and performance).

Technology Strategy Board
Driving Innovation

**Ultra Low Carbon Vehicle
Participant Research Programme**

Cabled Questionnaire

Participant name:

Participant contact number:.....

Contacts: Elisa Lewis
Sarah Mansbridge
Oxford Brookes University
Email: elisa.lewis@brookes.ac.uk
s.mansbridge@brookes.ac.uk

Thank you very much for your participation in the research portion of this national trial. You are one of the first people to use a contemporary electric vehicle on a daily basis. As such, your views and experiences will be very important for the future development of car technology and the associated infrastructure. The most important thing for us is to get an understanding of your own personal views so feel free to tell us what you really think. Each person's responses will be treated in confidence.

Adapting to your electric car						
<i>Please indicate the degree to which you agree with the following statements:</i>		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
01	Learning how to use my electric car was easy	☐	☐	☐	☐	☐
02	Prior to getting the electric car I received enough training to enable me to use it effectively	☐	☐	☐	☐	☐
03	The car I had in this trial satisfied my daily needs	☐	☐	☐	☐	☐
04	My electric vehicle has been fun to drive	☐	☐	☐	☐	☐
05	I have felt as safe in the electric car as I do in a normal combustion engine car	☐	☐	☐	☐	☐
06	I was able to be as flexible with the electric car as I am with a normal combustion engine car	☐	☐	☐	☐	☐
07	My electric car has been as easy to use as a normal car	☐	☐	☐	☐	☐
08	My electric car has performed better than a normal car	☐	☐	☐	☐	☐
09	The time the battery takes to charge suited me	☐	☐	☐	☐	☐
10	How long does it take to fully charge your battery: _____					

11	Adapting to charging the car was difficult	☐	☐	☐	☐	☐
12	I can complete my daily trips without a public charging infrastructure	☐	☐	☐	☐	☐
13	Having this car meant I had to plan my journeys more carefully	☐	☐	☐	☐	☐
14	Having to consider how far I can drive on each trip was a pain	☐	☐	☐	☐	☐
15	Having a supportive public charging infrastructure is essential for people with electric vehicles	☐	☐	☐	☐	☐
16	I like the lack of engine noise when driving an electric car	☐	☐	☐	☐	☐
17	The low levels of noise are a danger to people outside the car	☐	☐	☐	☐	☐
18	Please indicate the percentage of your daily journeys you think you have been able to make with the car you have in the trial	_____ %				

We would like to get an estimate of how far you feel you can drive with a fully charged battery

19 With a fully charged battery I can drive _____ miles confidently before having to recharge

What influences the range of your vehicle?

20 A: _____ B: _____ C: _____
D: _____ E: _____ F: _____
G: _____ H: _____

What range (in miles) do you consider to be...

21 Perfectly adequate for *daily use*: _____ miles

22 More than sufficient for *all trips*: _____ miles

Appendix D: Supportive questionnaire items relevant to

Chapter 6

Question <i>Total participant number (N)</i>	Response				
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
My electric car has been fun to drive <i>N=53</i>	30 57%	21 40%	2 4%	0	0
I was able to be as flexible with the electric car as I am with a normal combustion engine car <i>N=53</i>	6 11%	5 9%	6 11%	26 49%	10 19%
My electric car has been as easy to use as a normal car <i>N=52</i>	28 54%	21 40%	3 6%	0	0
My electric car has performed better than a normal car <i>N=43</i>	4 9%	12 28%	14 33%	10 23%	3 7%
The time the battery takes to charge suited me <i>N=53</i>	16 30%	20 38%	7 13%	8 15%	2 4%
Adapting to charging the car was difficult <i>N=53</i>	0	1 2%	4 8%	19 36%	29 55%
The car I have in this trial has got me to my destination reliably <i>N=52</i>	20 39%	27 52%	2 4%	2 4%	1 2%
The current charging system is convenient <i>N=42</i>	6 14%	21 50%	10 24%	5 12%	0
The range of the car I have in this trial has been sufficient for my daily needs <i>N=52</i>	19 37%	27 52%	1 2%	5 10%	0
The top speed of my EV was sufficient <i>N=43</i>	9 21%	18 42%	2 5%	9 21%	5 12%
My electric car has been a smoother ride than my normal car <i>N=53</i>	14 26%	21 40%	5 9%	8 15%	5 9%
My electric vehicle had good pick up from a standing start <i>N=51</i>	20 39%	25 49%	4 8%	2 4%	0

When my EV was already moving the acceleration was very good <i>N=53</i>	17 32%	19 36%	8 15%	8 15%	1 2%
The brakes worked well <i>N=53</i>	20 38%	25 47%	3 6%	5 10%	0