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Does experience drive potential buyers away? The influence of consumption values, emotions and experience on the purchase of battery electric vehicles

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ABSTRACT

Consumption values influence consumer choices in many industries. However, prior experience does not appear to have been combined with consumption value theory to explain attitudes towards electric vehicles. According to consumption value theory, value is multi-dimensional and product choice is influenced by perceptions of utilitarian and emotional value. The objective of this study is to evaluate the extent to which perceived values, emotions and experience influence attitudes and purchase intentions. As a high involvement decision, car buying is generally considered from a utilitarian, cost-benefit perspective. By considering the emotional and experiential facets of decision making, this study contributes to the literature and extends the theory of consumption values. The findings are based on a survey of older, higher income car buyers (n = 340), a segment that might convert from conventional to battery electric vehicles. Data analysis consists of partial least squares structural equation modeling. The results show that anticipated emotions, contextual change, charging anxiety and hedonic value have a significant effect on attitudes, which drive purchase intentions. The results show that prior experience is a double edged sword: although prior experience weakens charging anxieties, it dampens emotions. Several recommendations for policy makers and practitioners are made to promote the diffusion of battery electric vehicles in Australia and other laggard markets.

1. Introduction

Transport demand is increasing globally, and there is an urgent need to decrease CO_2 emissions by shifting to low carbon travel options, which includes electric vehicles (EVs) (International Energy Agency, 2023), as they cause significantly less environmental damage than conventional vehicles in terms of air pollution and greenhouse gas emissions (McCollum et al., 2018).

The adoption of low-carbon vehicles continues to attract substantial attention. Systematic literature reviews have identified the factors that facilitate and impede the adoption of EVs (Gerber Machado et al., 2023). Factors that support their diffusion span social-psychological, demographic, economic, technological, infrastructural and policy-related factors (Singh et al., 2020). The theory of consumption value (Sheth et al., 1991) is a comprehensive model that identifies five sources of value: functional, social, hedonic, epistemic and conditional. It is well suited to explaining consumer choice in a high involvement product category, such as cars. Yet relatively few studies have used consumption value theory to predict the purchase of electric vehicles (Alganad et al., 2023; Bridi et al., 2022; Han et al., 2017; Schuitema et al., 2013). Furthermore, prior experience does not appear to have been combined with consumption value theory to explain purchase intentions in the context of electric vehicles; thus this study fills a research gap in the literature and builds on prior knowledge on the role of experience in influencing EV adoption (Aravena & Denny, 2021; Liu et al., 2020; Manca et al., 2020). The main research questions of this study are as follows: to what extent does an extended consumption values model (Sheth et al., 1991) explain attitudes and purchase intentions in relation to battery electric vehicles (BEVs)? Does prior experience build or erode value?

Experience with EVs is a factor that falls within the realm of the firm's control, thus studying it is important since it may help firms and

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policy makers identify whether promoting direct experience (i.e. test drives, car rental and sharing options) holds promise for increasing sales of EVs. This study is of paramount importance, especially when research specific to the Australian electric vehicle context is relatively scarce (Broadbent et al., 2019; Foley et al., 2020; Gong et al., 2020; Loengbudnark et al., 2022).

In the literature on adoption of EVs, the general public tends to be imagined as rational consumers who are primarily concerned about cost (Bergman et al., 2017) and policy incentives are critical to supporting a faster transition to EVs (Broadbent et al., 2024). However, prior research tends to overlook the emotional facets of consumer decision making. This study adds value to the literature by extending the consumption value model (Sheth et al., 1991) and including anticipated emotions (Schneider et al., 2017) and anxieties to predict outcomes. As noted by Adnan et al. (2017, p.331), "…consumer emotion is an overlooked aspect in the domain of consumer EVs adoption related research". A criticism of the theory of consumption values is that it identifies critical values but does not elucidate the causes of the given values (Hyun & Fairhurst, 2018). Prior studies have examined the role of emotions in EV adoption (Han et al., 2017; He & Hu, 2022; Moons & De Pelsmacker, 2012). Yet, they have either applied different theories, such as the Theory of Planned Behaviour (Moons & De Pelsmacker, 2012) or have not considered the antecedents of emotions (Han et al., 2017; He & Hu, 2022). Hence, this research responds to the call for scholars to better understand emotions in theoretical frameworks (Adnan et al., 2017) and the interactions between emotions with other psychological factors (Revani et al., 2015). For instance, positive emotions could be strengthened or weakened by direct experience with electric vehicles.

Scholars have analysed early adopters, their emotions and the motivations for buying EVs in the United Kingdom (Schuitema et al., 2013) and in Norway (Ingeborgrud & Ryghaug, 2019). While these studies are instructive, they tend to focus on leading markets, and the findings may not transfer to Australia, which is a laggard nation (Philip et al., 2023; Broadbent et al., 2024). It is important to study specific contexts, since cultural background and stage of product life cycle influences preferences (Barbarossa et al., 2015; Song et al., 2020). Despite the burgeoning literature, the factors that drive demand for electric vehicles in different countries are still being debated (Wicki et al., 2023). For instance, Australian culture propagates a lifestyle that is car-dependent. As a large continent, with vast distances between regions, its geography is not ideally suited to electric vehicles (James et al., 2023). Furthermore, the country is a laggard and lacks supportive government policies that could drive the diffusion of BEVs (Broadbent et al., 2024; Foley et al., 2020; Lodhia et al., 2024; Philip et al., 2023). Practically, this research provides insights for policymakers and industry stakeholders both within Australia and internationally. It helps practitioners fine-tune strategies that bolster the diffusion of BEVs, thereby contributing to policies that advance climate mitigation.

This study makes several contributions to the literature. Firstly, we extend consumption value theory by adding anticipated emotions into the theoretical framework. Secondly, we test the effect of prior experience on attitudes and examine the mechanism through which prior experience operates. Thirdly, we add new, context-specific dimensions to the 'conditional value' measure in the model, a construct that captures a change in circumstances that motivate consumer behaviour. By scrutinising relatively underexplored concepts in an laggard market, this study contributes to the literature and to ongoing scholarly debates.

2. Research aim and theoretical background

2.1. Aim of study and research questions

The aim of this study is to evaluate the extent to which perceived values, emotions, and experience influence attitudes and purchase intentions in relation to BEVs. This study focuses exclusively on battery-operated electric vehicles, and excludes hybrids, which still have an internal combustion engine. More specifically, the research questions are as follows:

- To what extent do perceptions of consumption values influence attitudes towards BEVs?
- What is the impact of anticipated emotions, charging anxiety and prior experience on attitudes towards BEVs?
- Does experience moderate emotions and charging anxiety?
- Do attitudes influence purchase intentions?

In line with the above research questions, several hypotheses were developed and justifed by prior research.

2.2. Introduction to consumption value theory

A wide range of theories have been used to study the adoption of electric vehicles, and the full gamut of factors that influence the adoption decision have been explored. For instance, adoption is influenced by socio-demographic variables; economic, technical or vehicle-related features; charging infrastructure; environmental concern and behavioural aspects (Gerber Machado et al., 2023). For this study, the theoretical lens is consumption value theory since it is an empirically grounded and credible model for explaining consumer choices (Biswas & Roy, 2017). It is not commonly used in the literature on EVs and scholars have favoured other theories such as the diffusion of innovation theory and the theory of planned behaviour (Singh et al., 2020). Only a handful of studies have used consumption value theory to predict the adoption of EVs (Bridi et al., 2022; Han et al., 2017; Schuitema et al., 2013).

According to consumption value theory (Sheth et al., 1991), value is a multi-dimensional concept and covers five forms of value: functional, social, hedonic, epistemic and conditional value. Consumers are seen as "value optimizers" and consumption value is defined as "the degree of fulfillment of consumer need by overall assessment of consumers" net utility or satisfaction from a product after comparing the gains with the gives" (Biswas & Roy, 2017, p. 333). The framework is ideally situated to addressing complex buying decisions and it is flexible enough to incorporate additional constructs. Following a review of the theory, researchers were urged to consider additional values depending on the nature of the product (Tanrikulu, 2021), thus experience with EVs or "experiential value" is considered in this study. To the best of the authors' knowledge, no study has included experience in the consumption value framework, therefore this study fills a research gap. Table 1 presents a preliminary assessment of the literature on consumption value theory. The table shows the that five value dimensions largely predict sustainable behaviour. The next section presents the hypotheses and explains the conceptual framework in more detail. Fig. 1 presents the conceptual framework.

2.3. Consumption value dimensions

Functional value refers to people's perception of the product's quality, durability, price or value-for-money (Biswas & Roy, 2015). Numerous studies have examined the impact of economic barriers and drivers to EV adoption, such as the price (or cost of acquisition), government subsidies, tax exemptions, fuel savings and low maintenance costs, thus functional value is seen as the primary driver of EV demand (Singh et al., 2020).

Social (or symbolic) value captures the social meaning that consumers associate with EVs (Ingeborgrud & Ryghaug, 2019). It often refers to the status and prestige associated with conspicuous consumption (Holbrook, 1999). Research shows that people are motivated to buy electric cars due to their symbolic attributes (Biswas & Roy, 2015; Bridi et al., 2022; Schuitema et al., 2013; White & Sintov, 2017). Symbolic motives imply that people want to signal something about themselves through the cars they drive, such as wealth, social position,

Table 1
Literature review: studies (n = 13) applying consumption value theory.

Study	Research Method	Domain	Other constructs	Dependent Variable	Findings
Alganad et al., (2023)	A survey of 368 consumers in Malaysia. PLS-SEM.	Green cars, including hybrids.	Green self-identity and self-expressive benefits.	Attitudes	Resale value, variety-seeking and fuel prices influence green cars' purchase behaviour. Conditional value is the most significant predictor, followed by functional and epistemic values. Symbolic value is not significant.
Axsen and Long (2022)	A survey of citizens in Vancouver (n = 986), including six focus groups (n=37) .	SUVs	Societal impacts or benefits	Willingness to downsize	Functional and hedonic features (safety, space handling, fun) are seen as superior to smaller cars. SUVs have symbolic value (status symbol) and social approval. Environmental impacts are downplayed.
Biswas and Roy (2015)	Online survey of 201 students and staff in Indian universities. Structural Equation Modeling.	Green products	Environmental attitude. Consumer innovativeness. Contextual factors.	Green consumption. Willingness to pay a price premium.	Price and epistemic value (knowledge) are major determinants of behavior.Environmental attitudes are related to consumption values (value-for-money, social, conditional and epistemic value) . Contextual factors and conditional value are positively correlated. Consumer innovativeness and social value are related. Consumption values predict green consumption.
Bridi et al., (2022)	Online survey of 5,459 people in the United Arab Emirates. Structural equation modeling. Cross tabulations.	Electric vehicles	Demographics and its relationship to the functional private value of EVs	Evaluation of EVs (appeal)	Functional (private) value, such as saving money, is significant. Functional (societal) value, such as reducing air pollution, is significant.Symbolic (private) , such as conveying high social status, is significant.Symbolic (public) , such as conveying a message to others, is significant. Females, respondents aged 20–29 and city residents find more appealing functional and symbolic values regarding EVs.
Gonçalves et al., (2017)	Online survey of 197 respondents in Portugal. Fuzzy-set qualitative comparative analysis. Regression.	Green consumption	Demographics.	Purchase behavior	The functional value is sufficient for green purchase behavior when combined with the emotional, conditional, or social values. Social value combined with emotional or epistemic values are also sufficient. Not all consumers are alike: for some consumers, if functional value is not acceptable, they will not buy. Social and emotional aspects are important for the decisions of women, whereas functional aspects are important for men.
Han et al. (2017)	Online survey of 607 consumers in China. Structural equation modelling. Confirmatory factor analysis.	Electric vehicles	Attitudes as a mediator of adoption intentions.	Intentions to adopt EVs	Value was classified into two general categories.Functional (monetary, performance and convenience values) has direct and indirect effects on adoption intentions.Non-functional values (emotional, social and epistemic values) have only indirect effects on the adoption intention, which is mediated by attitude.
Hur, Yoo, & Chung (2012).	Online survey of 506 participants in South Korea. Hierarchical moderated regression model.	Convergence robots	Consumer innovativeness and its moderating role on emotional, social and epistemic values.	Purchase intentions	Functional, epistemic and emotional (hedonic) values are important. The effect of emotional value has a greater influence on purchase intentions for the high consumer innovativeness group than for the low consumer innovativeness group.
Jabeen et al., (2021)	Online survey of 287 Pakistanis.Partial least	Green energy technologies	Costs, benefits and investment risk.	Willingness to buy	Functional and conditional dimensions (pushing dimensions) encourage willingness to buy.

(*continued on next page*)

Table 1 (*continued*)

Study	Research Method	Domain	Other constructs	Dependent Variable	Findings
	squares (PLS) path modeling technique.				Cost and investment risk act as inhibiting dimensions. Social and emotional dimensions are neutral dimensions.
Jamrozy and Lawonk (2017)	Online survey of 314 participants. Descriptive analyses, factor analyses, multiple regressions.	Eco-tourism	Trust and perceived risk as mediators on perceived values	Purchase intentions	Four significant predictors of ecotourism purchase are emotional, functional and epistemic value, and boredom alleviation. Trust partially affects the relationship between perceived values and purchase intention.
Lin and Huang (2012)	Study of 412 consumers in Taiwan. Multiple linear regression. One-way ANOVA.	Green consumption	Environmental concern	Consumer choice behavior	Consumers with high environmental concern are willing to choose green products. Psychological benefit, desire for knowledge and novelty seeking, and specific conditions influence choice behavior.
D'Souza (2022)	Online survey of 307 Australian consumers. Structural equation modeling, cluster analysis, and multigroup analysis	Game meats	The moderating influence of food neophobia or neophilia on behavior is examined.	Choice behavior. Purchase Intention.	Epistemic and social value were found significant. Consumer's perceived well-being mediates the relationship between intention and purchase behavior. Consumers with food neophobia moderated the purchase behavior.
Schuitema et al., (2013)	Survey of new car owners in the UK (n = 2728). OLS linear regression analyses. Analysis of variance (ANOVA). Paired t-tests.	Electric cars.	Pro-environmental identity. Car authority identity.	Adoption Intention. Intention to adopt plug-in hybrid electric vehicle (PHEVs) and battery electric vehicle (BEVs) as main and second car.	Pro-environmental identity leads to positive evaluations of the instrumental, hedonic and symbolic attributes of EVs.Symbolic and hedonic (pleasant to drive) attributes mediate effects of instrumental attributes (price, running costs, reliability, range, recharging) on EV adoption intentions. A weak correlation between a car-authority identity and perceived attributes was observed.
Yuan, Liu and Blut (2022)	Survey of 437 Chinese Consumers. Structural equation modelling.	Green products (including alternative fuel vehicles)	Materialism Value consciousnessAcquisition utility (i.e., good value from product acquisition) Transaction utility(i.e., a good deal) .	Purchase Intention	For alternative fuel vehicle consumers, ecological and symbolic values determine acquisition utility, and functional performance determines transaction utility. Functional value is salient for materialistic consumers. Value conscious consumers perceive benefit from searching for information more than symbolic and experiential values.

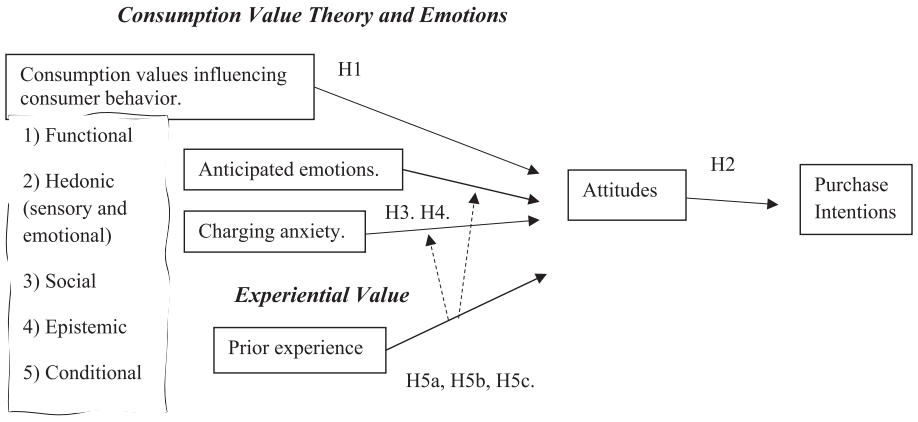

Fig. 1. Conceptual framework: battery electric vehicles and factors influencing purchase intentions. Note: straight lines indicate hypotheses; dashed lines indicate moderation.

environmental concern and innovativeness (Song et al., 2022). Sustainable innovations signal status and identity to others, but also to the self, even though people may not wish to acknowledge they buy goods to show off or to feel good about themselves (Noppers et al., 2014). The significance of social value is well documented, and its effect will vary depending on the person, cultural background and product life cycle or motorisation stage (Song et al., 2022). Self-congruity theory (Sirgy, 1985) predicts that people will purchase consumer goods whose symbolic meanings are congruent with their self-identities. For example, early adopters tend to prioritise symbolic goals over instrumental goals and are willing to consider a BEV since self-congruity is high (Skippon et al., 2016).

Hedonic consumption refers to the emotional and sensory aspects of consumption (Hirschman & Holbrook, 1982). The experience of driving an electric car is associated with feelings of pleasure and comfort (Han et al., 2017). Hedonic value refers to affective states, such as fun, feeling excited about the fast acceleration, or enjoying the low noise feature of EVs, and this dimension influences purchase intentions (de Oliveira et al., 2022; Ingeborgrud & Ryhaug, 2019; Moons & De Pelsmacker, 2012; Schuitema et al., 2013). BEVs emit very low volume sounds at low speeds, which is generally seen as a positive criterion for buyers (Brescia et al., 2023; Ottesen et al., 2023). However, low noise may be a negative factor for some consumers, since the quietness of the ride can be disconcerting (Graham-Rowe et al., 2012) and it may pose a risk to the safety of pedestrians (Higueras-Castillo et al., 2021). Since previous studies have not reached consistent results, it is important to investigate hedonic value further.

Epistemic value refers to the capacity of a product or service to satisfy needs in relation to curiosity, novelty and the pursuit of knowledge (Sheth et al.,1991). BEVs are an innovation in automobility, and thus offer epistemic value, such as learning about the car's battery technology or other technical features. The satisfaction of such needs positively influences consumers' attitudes towards electric cars (Han et al., 2017). The epistemic value of new products and services is likely to appeal to innovative consumers. The diffusion of innovation theory has used the label 'consumer innovativeness' to describe the type of person who is novelty-seeking and predisposed to seeking out new products, including electric vehicles (Morton et al., 2016; White & Sintov, 2017).

Conditional value is the measure of utility derived from consumption based on a change in the situation or the set of circumstances faced by the decision maker (Sheth et al., 1991). The foundation for conditional factors is 'time' 'place' and 'context' (Belk, 1975). For example, a person might buy a car because it is Christmas time, and the person wants to spend money on themselves. Thus, situational triggers can motivate buyer behaviour. In the literature, conditional value is typically measured by contextual variables such as the availability of subsidies, discounts or worsening environmental conditions (Biswas & Roy, 2015). Prior research tends to examine conditional value rather generally. Conditional value is the most ambiguous dimension of value, but it helps enrich functional values (Jamrozy & Lawonk, 2017). For instance, government subsidies can improve value for money perceptions (Biswas & Roy, 2017). Research indicates that increases in fuel prices have an effect on people's preferences for 'green' or fuel-efficient vehicles (Alganad et al., 2023). Scholars emphasise the major constraints that hinder the adoption of EVs, and it is concluded that access to charging infrastructure (Axsen et al., 2015) and fast charging facilities (Philip et al., 2023) significantly affects consumers' choices. This study contributes to the literature by adding additional dimensions to the conditional value construct, including a change in the price of petrol, access to second-hand cars, and the possibility of more people adopting EVs. These aspects have been given little attention in studies that investigate conditional value.

In prior research, it is found that attitudes mediate consumption values (both functional and non-functional) and adoption intentions in relation to electric vehicles (Han et al., 2017). Furthermore, the seminal Theory of Planned Behaviour (Ajzen, 1991) emphasises that if consumers' attitudes are positive, then they are more likely to perform a specific behaviour. Based on the afore-mentioned studies, the following hypotheses are formulated:

H1: Perceived consumption values (functional, social, hedonic, epistemic, conditional) positively influence attitudes towards battery electric vehicles.

H2: Attitudes towards battery electric vehicles influence purchase intentions.

2.4. Anticipated emotions

Emotions are seen as a significant dimension in ethical decision making (Joshi et al., 2021). According to Kollmuss and Agyeman (2002), emotional involvement is a learned ability to react emotionally to complex and abstract environmental problems. For example, the adoption of EVs is explained by a moral emotion, such as the desire to avoid feeling guilty for driving a conventional, polluting vehicle (Graham-Rowe et al., 2012). Notwithstanding the sustainability challenges in EV supply chains, market research shows that one in five new car buyers in Australia cite emissions as a factor that influences their choice of new car (Colmar Brunter, 2017), so moral emotions are likely to be relevant. The study of emotions, such as joy or elation, sadness, fear, anger, disgust, shame and guilt, often draws on cognitive appraisal theory (Scherer, 1997). It is argued that cognitive processes elicit a specific emotion, and a small number of 'appraisal dimensions' cause emotions, and such conditions are consistent across cultures. For example, guilt is linked to the 'self-consistency' dimension (where one is likely to be responsible for the eliciting event) and joy is linked to the 'coping ability' dimension (where joy is linked to events that are conducive to one's needs and goals) (Scherer, 1997).

Anticipated emotion is a prediction about future emotions (Schneider et al., 2017). Prior research has found that looking forward to, and anticipating, an event can outweigh the pleasure of looking back on happy events (van Boven & Ashworth, 2007). There is an interesting debate in the literature as to whether anticipated negative or positive emotions are more influential in supporting a particular outcome (Escadas et al., 2019), therefore, this study considers positive emotions as well as negative emotions. It is reported that anticipated pride is stronger than guilt in relation to EV purchase intentions (He & Hu, 2022), arguably due to the arousal of perceived consumer effectiveness, meaning that people are less likely to rationalize inaction (Antonetti & Maklan, 2014). The literature on EVs show that positive emotions influence purchase intentions (de Oliveira et al., 2022) Moons and Pelsmacker (2012) found that emotions mediate cognitive considerations regarding intention to use. In other words, cognitive beliefs generate negative or positive emotions that inhibit or stimulate intentions. Rezvani et al., (2017) found that positive anticipated emotions such as feeling proud and excited motivate adoption. While emotions are sometimes linked to hedonic consumption (Hirschman & Holbrook, 1982), in this study, emotions are treated separately from the hedonic construct. In line with the literature, it is hypothesised:

H3: Anticipated emotions positively influence attitudes towards battery electric vehicles.

2.5. Charging or range anxiety

'Range anxiety' is described as the fear of running out of charge in the middle of a journey or not being able to easily find a charging point when needed (García de Blanes Sebastián et al., 2023). It is generally seen by scholars as an irrational fear or a psychological and mental barrier (Bergman et al., 2017). Noel et al., (2019) describes range anxiety as a feeling of being in jeopardy and it continues to be the main obstacle to EV adoption in Northern Europe.

The main advantage of a conventional vehicle compared to a BEV is the relatively quick refilling of the tank (Smit et al., 2018). Switching to

an electric vehicle require a change in mobility patterns, such as considering where to charge, when, the cost and duration of the task. In general, consumers value fast charging (Philip et al., 2023) and home charging due to its convenience (Funke et al., 2019; Smit et al., 2018). The lack of public charging stations to support both regular charging and long-distance trips is seen as a key barrier to adoption (Axsen et al., 2015; Egnér & Trosvik, 2018; Funke et al., 2019). Studies show that the vast majority of car trips are for journeys less than 30 km and such trips could easily be provided by electric vehicles (Rafique & Twon, 2018). However, charging myths prevail and charging is still a concern for Australian consumers (Electric Vehicle Council, 2023). Based on the afore-mentioned studies, the following hypothesis is proposed:

H4: Charging anxiety negatively influences attitudes towards battery electric vehicles.

2.6. Experience with battery electric vehicles

Experience is a salient dimension in the Universal Theory of Acceptance and Use of Technology (UTAUT) and prior use of technology can be a strong predictor of continued use (Venkatesk et al., 2003). In the context of EV adoption, experience refers to short-term usage through a rental or a test-drive experience, but it may also refers to sustained usage through owning and operating an electric vehicle (Song et al., 2022). It captures direct, hands-on experience with BEVs (Schmalfuß, Mühl, & Krems, 2017).

A key question is: does experience build or erode value? Prior experience is found to be a positive factor influencing adoption (Rezvani et al., 2015; Liu et al., 2020), if not the most positive influence on EV adoption (Gerber Machado et al., 2023). Practical experience improves consumers' understanding of EVs and alters their stereotypical view of EVs, particularly with regards to functional features such as battery life, charging, acceleration, speed, and also hedonic features such as fun and low noise emission (Pamidimukkala et al., 2024). Short-term experience with EVs can alter preferences, such as a preference for larger electric vehicles with increased range and shorter charging times (Aravena & Denny, 2021). Prior experience helps reduce mental barriers such as range anxiety (Bergman et al., 2017) and attributions of symbolic meanings to BEVs change after direct experience with BEVs (Skippon et al., 2016). Some studies report that direct experience reduces the tolerance for short driving range and decreases mass-market consumer willingness to consider adoption of electric vehicles (Skippon et al., 2016). A study of drivers in the UK found that people become more positive about recharging and prefer it to 'refuelling' conventional cars. Furthermore, they become more relaxed about charging and do not rely on public charging infrastructure (Bunce et al., 2014). Liu et al., (2020) found that there was no significant difference between experienced and inexperienced consumers in terms of attitudes towards charging convenience (as charging infrastructure did not meet people's needs). Experience has been incorporated into the Theory of Planned Behaviour (Schmalfuß, Mühl, & Krems, 2017) and the results of the study show that experience has a direct effect on purchase intention and perceived behavioural control. Experienced BEV people have fewer concerns regarding range and charging than inexperienced people. It is important to continue the study into the role of experience with EVs due to the mixed findings in the literature, and the dynamic nature of the industry. For example, battery performance tends to improve with each new model release.

Construal level theory (Trope & Liberman, 2010) posits that the psychological distance of an event or a decision influences people's perceptions. When something feels distant in terms of time or space (i.e., a high-level construal) and is a hypothetical scenario, people tend to think about it in abstract terms, focusing on general benefits. Conversely, when something feels close (i.e., a low-level construal), people focus on concrete, practical details. Applied to electric vehicle (EVs), a consumer who perceives EV purchase as a distant possibility may focus on abstract benefits such as sustainability and anticipate feeling happy about that decision. However, as they get closer to making a purchase, their focus may shift to concrete factors like battery life, access to charging infrastructure and charging time, and emotions are likely to change. Therefore, compared to inexperienced people, experienced people will have a shorter psychological distance to BEVs. The shift in construal can influence the attitudes of experienced buyers, such as by decreasing (or deepening) their anxieties over charging and dampening (or amplifying) their emotions. This mechanism will firstly, moderate the relationship between emotions and attitudes, and secondly, moderate the relationship between charging anxiety and attitudes. In other words, positive feelings and positive attitudes are likely to be aroused when thinking about BEVs, but prior experience is expected to weaken this path. Since the charging process is better understood through usage of EVs, we hypothesise that charging anxiety is likely to be reduced through a period of sustained usage, so prior experience is expected to weaken the negative 'charging anxiety-attitudes' path in the model. Thus, the following hypotheses are formulated:

H5a: Prior experience with electric vehicles positively influences attitudes.

H5b: Prior experience moderates (weakens) the 'anticipated emotions-attitudes' relationship.

H5c: Prior experience moderates (weakens) the 'charging anxiety-attitudes' relationship.

2.7. Socio-demographic variables

Along with the key constructs, the survey captured demographics variables (i.e., gender, age, income, education and household size) as they influence decision-making and are often as proxy measures of consumer preferences or motivation (Axsen et al., 2016). The early adopter of EVs is typically seen as male, middle-aged, high-income, well-educated, with high levels of environmental concern and a technology-oriented lifestyle (Axsen et al., 2016; Chen et al., 2020; Pamidimukkala et al., 2024). The significance of income is not surprising given the premium price of EVs. Some studies associate older age with EV purchase intentions since age is linked to earning potential (Mukherjee and Ryan, 2020), yet it is reported that younger individuals express a higher level of interest in EVs than their older counterparts(Ferguson et al., 2018). The significance of education is explained by the idea that enhanced knowledge of environmental problems increases with higher education (Sovacool et al., 2018). Regarding gender, studies show that mobility preferences are gendered (Sovacool et al., 2019) and while men are more likely to adopt EVs, women value the environmental benefits of electric vehicles more than men (Vassileva & Campillo, 2017). Since household size has a substantial effect on transport emissions (Büchs & Schnepf, 2013), it is an important demographic variable. A study of Nordic countries found that households with more children were more likely to adopt EVs than smaller households (Chen et al., 2020).

Demographic variables play an important and complex role in the adoption of EVs (Sovacool et al., 2018), and conflicting findings have been reported in the literature. Since it is not clear whether the effects of demographics on EV adoption are positive, negative or even significant at all (Liao et al., 2017), further research is justified. Moreover, the inclusion of demographic variables is not necessary for the present research given the investigation is only considering testing a theorised relationship between BEV experience, attitude and purchase intention. As Memon et al., (2024) argues, introducing demographic variables into the structural model can muddy the statistical analysis and interpretation. In particular, the interaction effects between the demographic variables and other terms can make interpretation more difficult compared to a more parsimonious structural model without the added arbitrary configuration of demographic variables. Ideally, the demographic variables would be used to control for confounding effects, however, doing so in a small sample setting for structural equations would, in line with the thinking of Johnstone & Titterington (2009), require stratification of the small sample and compromise the estimation

of parameters as a result of the increased dimensionality. Therefore, we maintain our theory led investigation without the inclusion of demographic control variables, but report statistical characteristics of demographic variables for transparency and comprehensiveness.

3. Materials and methods

3.1. Sampling and measurement scales

Purposive sampling was used in this study. Exclusion criteria consisted of people under the age of 18 and people who did not have a driver's license. Inclusion criteria were based on income (above average) and age (older), since these factors are the primary determinants of car ownership (Heinonen et al., 2021), and young adults under the age of 35 years are less likely than older adults to have BEVs (Mukherjee and Ryan, 2020). Market research reports that the typical new car buyer in Australia comes mostly from affluent, older age groups, and people under 35 years of age are more likely to buy a second-hand car than a new car due to competing priorities (Roy Morgan, 2017).

Data was collected in November 2022, through a web-based panel, managed by Qualtrics, a market research company. Eligible survey participants were selected from Australia and nationwide sampling was chosen because there is demand for EVs across all major cities, states and territories in Australia (Electric Vehicle Council, 2023). The duration of the survey was approximately 5 to 10 min, and the respondents were assured that their anonymity would be maintained. Guidelines from the literature were followed to ensure the quality of online samples, such as matching the sample with the targeted population and ensuring that participants were suitably attentive (Arndt et al., 2022). For example, cases were deleted if respondents demonstrated 'straight-line responses' (i.e. providing identical answers on several Likert-scale items). Survey respondents were paid a small incentive, based on gift vouchers and a points-based reward system.

The online questionnaire consisted of three parts with 30 questions. The main part of the questionnaire covered consumption values, attitudes towards EVs and anticipated emotions. A brief explanation of a battery electric vehicle was given in the survey to ensure that the questions would not confuse or frustrate respondents. Vehicle and travel-related patterns were also captured in the questionnaire since they could influence the willingness to buy an electric vehicle. Demographic data was gathered, such as gender, age, education, income, employment status, household size and area of residence. The measurement scales were informed by the literature (see Table 2) and were multiple-item, 7-point Likert scales. Some constructs were measured by two or three items to keep the survey short and avoid straining respondents. Ethical approval for the study was granted by the Human Ethics Committee at the authors' university (H6601).

3.2. Sample size, data analysis and statistical techniques

Before undertaking data analysis, invalid surveys were removed (i.e., not having a driver's license, not giving consent) and missing values were checked. After data cleaning, a total of 340 usable surveys were used for data analysis.

A decision was taken to use partial least squares structural equation modelling (PLS-SEM) rather than covariance-based SEM because of the need to estimate a formative structural model; for the causal relationship under investigation here i.e., "perceived consumption values" impact "attitudes about BEVs" which in turn impact "purchase intentions". Similar to PLS-SEM, the CB SEM method investigates causal relationships between latent structures (Whittaker & Schumacker, 2022), yet PLS-SEM and CB-SEM assume very different measurement philosophies. Whereas CB SEM is able to model reflective structural models, PLS SEM can model both reflective and formative structural models; as a result of PLS-SEM being a purely composite model, whereas CB-SEM is a purely factor model (Hair et al., 2022). Factor analysis aims to achieve a

Table 2
Measurement scales.

Constructs	Measurement Items	Sources
Purchase intentions	Next time I buy a car, I will consider buying an electric vehicle. I expect to own an electric car in the near future.	Higueras-Castillo et al., (2021).
Attitudes	I like the idea of an electric car. I have a good attitude towards electric cars. Buying an electric car is a bad idea (reverse coded).*	Taylor & Todd (1995)
Anticipated emotions (positive)	Scenario: Imagine that you want to buy a new car and you have two options which are equally affordable to you: an electric car or a conventional (petrol or diesel) car. You think about the electric car as an option. Imagine that you **buy** an electric car. How would you feel? I would feel proud. I would feel excited.* I would feel happy.	Schneider et al., (2017).
Anticipated emotions (negative)	Scenario: Imagine that you want to buy a new car and you have two options which are equally affordable to you: an electric car or a conventional (petrol or diesel) car. You think about the electric car as an option. Imagine that you decide **not to buy** an electric vehicle. How would you feel? I would feel guilty. I would feel ashamed.* I would feel regretful.*	Schneider et al., (2017).
Consumption values	*Functional value (economic value)* Electric cars are economical. The purchase of an electrical car is a means to save money. *Functional value (quality)* The electric cars available on the market are of good quality.* Electric cars are well made. *Social value* An electric car improves the image of its owner. An electric car makes a good impression on other people. *Epistemic value* I am willing to seek out novel information. I like to search for what is new and different. *Hedonic value (low noise)* The lack of engine noise from the electric car increases the driving pleasure. I (would) like the low noise or soundscape of electric cars. *Hedonic value (fun)* The fast acceleration of an electric car is (would be) an exciting experience. It is (would be) fun to drive an electric car. *Conditional value* Would a change in the situations, outlined below, encourage you to buy an electric car in the future? If electric cars could travel longer distances without recharging. If there were more chargers installed everywhere.* If I had free public charging. If faster charging was available.* If the price of petrol went up.	Han et al., (2017) Lin & Huang (2012) Biswas & Roy (2015). Lin & Huang (2012) Higueras-Castillo et al., (2021) Axsen and Kurani (2013). Biswas and Roy (2015)

(continued on next page)

Table 2 (*continued*)

Constructs	Measurement Items	Sources
	If more people were already driving electric cars. If the technology was more established or proven.* If a conversion or electric retrofit of a conventional vehicle was available.* If I could obtain a second-hand electric car.*	
Charging anxiety	*Inconvenience of charging* Compared to a normal car, I would always be worried about running out of charge. Compared to a normal car, an electric car is impractical (due to the need for charging).	Schuitema et al., (2013).
Prior experience	Experience gained as a driver, renting, leasing and as a passenger.	Recoded as binary. Song et al., (2022)

Note[1]: certain items were removed from the scales in the PLS-SEM model due to low reliability scores or high VIF scores, indicated by * an asterisk. Positive and negative emotions were combined into one scale.

"purification, boiling away the unwanted elements within the observed variables, leaving only items with high correlations to represent the underlying unobserved entity" (Ridgeon et al., 2017, p.7). Therefore, factor indeterminacy elicits a validity gap between a common factor and the conceptual variable that it represents (Hair et al., 2019). Composites in PLS-SEM are a weighted sum of a specific subset of the model's manifest variables. While there are debates over which is the 'best' method to use in the literature (Rigdon et al., 2017), both methods are effective for model development (Dash & Paul, 2021). If the research objective is theory testing and confirmation, then the appropriate method is CB SEM (Dash & Paul, 2021). Composite models are often considered better than factor models when the primary research goal is prediction and theory development, and when dealing with constructs that are not well-defined (Hair et al., 2019), which is the case in this study. For instance, hedonic value, which refers to pleasure, fun, recreational benefits and emotional value (Vieira et al., 2018), might mean different things to different people in different contexts. Given these considerations, composite-based PLS-SEM seems to be the safer choice in this study. It has been used before in studies of electric vehicle adoption (Liu et al., 2020; Zamil et al., 2023). PLS-SEM was chosen for two main reasons: firstly, the ability to test a complex model and perform moderation and mediation analyses in a single model, and secondly, the ability to undertake exploratory data analysis (i.e., to extend consumption value theory) (Sargent et al., 2023). In addition, when the sample size is small, in comparison with CB-SEM, PLS-SEM achieves larger or equal statistical power. PLS-SEM works well with non-normal data (which was not a major concern in this study), whereas CB-SEM demands that the data have a normal distribution (Rigdon et al., 2017).

The minimum sample size requirement for PLS-SEM is the subject of much debate (Sargent et al., 2023). Following recent guidelines, the inverse square root method was applied rather than the oft cited but misunderstood '10 times rule' (Hair et al., 2022). This method uses the inverse square root of a sample's size for standard error estimation. It is simple to use although it leads to small overestimations (Koch & Hadaya, p. 228). The minimum sample size based on one of the lowest path coefficients was 320, and thus the sample size of 340 is acceptable. Given that the market for electric vehicles is a niche one in Australia (James et al., 2023), a very large sample is not needed.

3.3. Common method bias

Common method bias is a phenomenon that is caused by the measurement methods used in a study. For example, it is likely to occur when the independent and dependent variables are measured within one survey, using the same response method, such as Likert scales (MacKenzie & Podsakoff, 2012). According to Kock (2015), common method bias may lead to the inflation or even the deflation of the path coefficients, potentially leading to type I (false positives) or type II errors (false negatives). Common method bias was addressed in this study using procedural and statistical remedies. In the survey design stage, several strategies were used, such as using reverse coded items, ensuring that scale items were clear, separating the independent and dependent variables, explaining the purpose of the research and giving clear instructions to respondents. Harman's single-factor test is commonly used as a statistical remedy (Jabeen et al., 2021). The test showed that the total variance extracted by one factor did not exceed the cut-off mark of 50 %. The variance inflation factors (VIF) can also be used as a test for common method bias and if all VIFs resulting from a full collinearity test are lower than 3.3, the model can be considered free of common method bias (Koch, 2015). In this study, the Variance Inflation Factor (VIF) values are well under 3, apart from two values, indicating that common method bias is not a major concern.

4. Results

4.1. Descriptive statistics: Profile of sample and descriptive data

The sample demographics are presented in Table 3. There were more females than males in the sample. The majority of respondents were middle-aged or older and over half of the sample were employed full-time. The sample captured people who were well-educated, with qualifications above the national average (Australian Bureau of Statistics [ABS], 2022). The sample also captured respondents who were earning more than the national median weekly household income (i.e., $1,770), based on the last census (ABS, 2023). The sample reflected the profile of a new car buyer in terms of age, income and education (White & Sintov, 2017).

Descriptive analysis was undertaken. The summary data for the variables (i.e. mean, median, kurtosis, etc) are reported in Table 4. Mean scores for perceived consumption value items showed that respondents agreed somewhat that BEVs offered value. The highest scores were achieved for conditional value.

4.2. Bivariate analysis: Exploring differences and relationships

T-tests were used to compare the effects of experience on the main constructs investigated, such as consumption values, charging anxiety, emotions, attitudes and purchase intentions. The results revealed significant differences between those with experience of BEVs and those without any direct experience of BEVs. The results are presented as supplementary data in Table A1. The mean values of nearly all constructs, except for charging anxiety, were higher for experienced respondents than for inexperienced consumers.

T-tests were also used to compare the effect of demographics on the main constructs investigated. The Tables (A2 to A7) are presented in the supplementary data section. The results show that differences in responses between the genders was significant in the case of three statements. For males, "fast acceleration" and "liking the idea of an electric vehicle" attracted a higher mean score, and for females, a higher mean score was associated with one item measuring charging anxiety, "an electric car is impractical". The results showed that the differences in responses between the employed and unemployed groups were statistically significant. The employed group had higher mean scores for nearly all of the constructs, except for charging anxiety and one item measuring functional quality. The results showed that the differences in responses between the well-educated and the less educated were statistically significant. Respondents with a higher degree gave higher mean scores to the social, hedonic (i.e., low noise) and conditional value of BEVs and had stronger purchase intentions. Other statements such as

Table 3
Description of the sample (n = 340).

Item		n	%
Gender	Male	142	41.8
	Female	198	58.2
	Other/prefer not to say	0	0
Age	Below 21	1	0.3
	22–29	9	2.6
	30–39	13	3.8
	40–49	103	30.3
	50–59	85	25.
	60–69	66	19.4
	70 or above	63	18.5
Education	Primary school	1	0.3
	High school/secondary level	67	19.7
	Certificate (from TAFE or equivalent)	27	7.9
	Diploma or advanced diploma (from TAFE or equivalent)	47	13.8
	Bachelor's Degree	111	32.4
	Graduate Diploma/Graduate Certificate	21	6.2
	Postgraduate degree – Master's degree	61	17.9
	Post graduate degree – Phd	5	1.5
Employment	Employed full time	176	51.8
	Employed part time	56	16.5
	Unemployed	5	1.5
	Not in the labour force – Stay-at-home parent or caregiver	16	4.7
	Not in the labour force – Full-time student	1	0.3
	Not in the labour force – Retired	82	24.1
	Not in labour force – Other	4	1.2
Household Income	Prefer not to answer	12	3.5
	Less than $399 per week ($20,799 per year)	6	1.8
	$400 to $799 per week ($20,800 to $41,599 per year)	31	9.1
	$800 to $1,249 per week ($41,600 to $64,999 per year)	33	9.7
	$1,250 to $1,999 per week ($65,000 to $103,999 per year)	55	16.2
	$2,000 to $2,999 ($104,000 to $155,999 per year)	97	28.5
	$3,000 to $3,999 ($156,000 to $207,999 per year)	49	14.4
	$4,000 to $4,999 ($208,000 to $259,999 per year)	30	8.8
	$5,000 or more per week (more than $260,000 per year)	27	7.9
Household size	1 person household	40	11.8
	2 persons	126	37.1
	3 persons	57	16.8
	4 persons	79	23.2
	5 persons	29	8.5
	6 persons	9	2.6
Area of residence	Urban	60	17.6
	Suburban	232	68.2
	Rural	46	14.2
Likely to buy a new car	Yes	160	52.9
	No	180	47.1
Experience with BEVs	Yes	148	43.5 %
	No	192	56.5 %
Number of cars in household (average)		1.84	
Household size (average)		2.88	

the "searching for what is new and different", "feeling happy" and "liking the idea of an electric vehicle" received higher scores. In relation to household size, larger households displayed higher mean scores in relation to social, hedonic and epistemic value, as well as emotions, charging anxiety and purchase intentions. The results showed that the differences in responses between the higher income and lower income groups were statistically significant. The higher income group reported higher mean values for social and epistemic value. One item measuring conditional value, "if more people were already driving electric cars" and one item measuring purchase intentions, "I expect to own an electric car in the near future" also received higher mean scores. Younger people gave high scores to nearly all statements related to consumption value, particularly social, hedonic and epistemic value. Higher scores were evident for purchase intentions (one item only), emotions and attitudes.

Chi-square analysis was performed to identify whether there was a relationship between experience and socio-demographic variables (see Table A8 in the supplementary data section). Respondents were-categorized into dichotomous groups based on median scores for demographic measures.

In terms of gender, there was no significant difference in experience between respondents that were male and those that were female (χ^2 [1, 340] = 2.159, p < 0.143; Cramer's ν = 0.080, p = 0.013). There was a significant association between experience and employment (χ^2 [1, 340] = 25.183, p < 0.001; Cramer's ν = 25.183, p < 0.001). For instance a higher percentage employed people (56 %) had experience with BEVs whereas a lower percentage of unemployed people (29 %%) had experience with BEVs. There was a significant association between experience and age (χ^2 [1, 340] = 17.629, p < 0.001, Cramer's v = 0.228, p < 0.001). For instance, a higher percentage of younger consumers (55 %) had experience with BEVs whereas a lower percentage of older consumers (35 %) had experience with BEVs. There was a significant association between experience and education (χ^2 [1, 340] = 20.494, p < 0.001, Cramer's v = 0.246, p < 0.001). For instance, a higher percentage of university-educated consumers (53 %) had experience with BEVs whereas a lower percentage of less educated consumers (29 %) had experience with BEVs. There was a significant association between experience and income (χ^2 [1, 340] = 8.771, p < 0.003, Cramer's v = 161, p < 0.003). For instance, a higher percentage of high-income consumers (49 %) had experience with BEVs whereas a lower percentage of low-income (33 %) had experience with BEVs. There was a significant association between experience and household size [χ^2{1, 340] = 11.929, p < 0.001, Cramer's v = 0.187, p < 0.001). For instance, a higher percentage of larger households (52 %) had experience with BEVs whereas a lower percentage of small households (34 %) had experience with BEVs.

4.3. Evaluation of the measurement model: Reliability and validity analysis

The PLS-SEM process generally follows a two-step process, where firstly, the outer measurement model is assessed and secondly, the inner structural model is assessed (Hair et al., 2022). A reflective measurement model was chosen, which means that reflective indicators are exchangeable and the deletion of one, or more, scale items does not change the essential character of the construct (Hair et al., 2022).

Table 5 displays the findings of internal consistency, convergent validity and reliability. In relation to internal consistency, values for Cronbach's alpha, composite reliability (C.R) and Dijkstra-Henseler's rho_A are shown in the table. Cronbach's Alpha values range are above the recommended value of 0.7. The rho_A value is also within the recommended range i.e., higher than 0.7 and less than 1. The composite reliability values exceed the threshold value of 0.7 (Bagozzi & Yi, 2012). The convergent validity measure comprises the average variance extracted (AVE), which surpass the threshold value of 0.5 (Bagozzi & Yi, 2012).

The outer (factor) loadings were also checked and were found to be acceptable. The loadings (which basically refer the extent to which each item within a factor correlates with the rest within the factor) should meet the threshold value, which is higher than 0.7 (Benitez et al., 2020).

The Fornell-Larcker criterion is traditionally used to assess discriminant validity in the PLS-SEM, although scholars cast doubt on its efficacy (Sargent et al., 2023). Therefore, the heterotrait-monotrait (HTMT)

Table 4
Descriptive analysis: independent and dependent variables.

Items	Mean	Median	Min.	Max.	SD	Kurtosis	Skewness
Conditional value							
If electric vehicles could travel longer distances without recharging	5.432	6.000	1.000	7.000	1.551	1.133	−1.250
If I had free public charging	5.768	6.000	1.000	7.000	1.476	2.135	−1.535
If the price of petrol went up	5.062	5.000	1.000	7.000	1.536	0.092	−0.741
If more people were already driving electric cars	4.721	5.000	1.000	7.000	1.598	−0.195	−0.557
Hedonic value							
The fast acceleration of an electric car is (would be) an exciting experience	4.503	4.000	1.000	7.000	1.490	−0.152	−0.341
It is (would be) fun to drive an electric car	4.809	5.000	1.000	7.000	1.569	−0.018	−0.636
The lack of engine noise from the electric car increases the driving pleasure	4.882	5.000	1.000	7.000	1.504	0.441	−0.788
Symbolic value							
An electric car improves the image of its owner	3.874	4.000	1.000	7.000	1.655	−0.662	−0.079
An electric car makes a good impression on other people	4.091	4.000	1.000	7.000	1.638	−0.535	−0.228
Functional value							
Electric cars are well made	4.706	5.000	1.000	7.000	1.362	0.541	−0.572
Electric cars are economical	4.815	5.000	1.000	7.000	1.558	0.098	−0.701
The purchase of electric cars is a means to save money	4.582	5.000	1.000	7.000	1.561	0.017	−0.636
Epistemic value							
I am willing to seek out novel information	4.779	5.000	1.000	7.000	1.351	0.538	−0.579
I like to search for what is new and different	4.841	5.000	1.000	7.000	1.401	0.269	−0.533
Charging anxiety							
Compared to a normal car, I would always be worried about running out of charge	5.562	6.000	1.000	7.000	1.387	1.395	−1.136
Compared to a normal car, an electric car is impractical due to the need for charging.	4.921	5.000	1.000	7.000	1.492	−0.151	−0.504
Anticipated emotions							
I would feel proud	5.015	5.000	1.000	7.000	1.582	0.162	−0.741
I would feel happy	5.179	5.000	1.000	7.000	1.526	0.695	−0.928
I would feel guilty	3.771	4.000	1.000	7.000	1.592	−0.716	−0.046
Purchase intention							
Next time I buy a car, I will consider buying an electric car.	4.879	5.000	1.000	7.000	1.910	−0.657	−0.695
I expect to own an electric car in the near future	4.638	5.000	1.000	7.000	1.921	−0.912	−0.497
Attitudes							
I like the idea of an electric car	5.312	6.000	1.000	7.000	1.642	0.576	−1.061
I have a good attitude towards electric cars	4.950	5.000	1.000	7.000	1.540	0.049	−0.707

Note: Items in bold (> 1) are indicative of skew and kurtosis. As a general guideline, a value between − 1 and + 1 is considered excellent, but a value between − 2 and + 2 is generally considered acceptable. Values beyond − 2 and + 2 are considered indicative of substantial nonnormality (Hair et al., 2022).

Table 5
Construct reliability and validity tests.

Construct	Cronbach's Alpha	rho_A	Composite Reliability (rho c)	Average Variance Extracted
Anticipated emotions	0.877	0.893	0.925	0.805
Attitudes	0.929	0.929	0.966	0.934
Charging Anxiety	0.798	4.393	0.862	0.761
Conditional value	0.866	0.877	0.908	0.713
Epistemic value	0.844	0.853	0.928	0.865
Functional value	0.941	0.943	0.971	0.944
Hedonic value	0.841	0.862	0.894	0.679
Purchase intentions	0.933	0.933	0.968	0.937
Symbolic value	0.937	0.938	0.970	0.941

criterion was used as the main check for discriminant validity. Table 6 presents the results. The values are below the recommended thresholds of 0.85 or 0.90 and not close to 1 (Benitez et al., 2020). There is one borderline value (0.91) but a threshold value of 0.90 is acceptable when the constructs are conceptually very similar (Hair et al., 2022).

4.4. Evaluation of the structural model: Model fit and path coefficients

After evaluating the measurement model and ensuring that the constructs are reliable and valid, the next stage is to evaluate the structural model. The bootstrapping procedure, with 5,000 subsamples, was applied to assess the model fit and the significance of the structural model relationships.

R^2 values are known as the in-sample predictive power of a model, in other words, its explanatory power, although there is a debate as to whether this measure is meaningful in PLS-SEM models (Shela et al., 2023). The adjusted R^2 value for attitudes was 0.780 and the respective value for purchase intention was 0.603. Furthermore, model fit was evaluated using the standardized root mean square residual (SRMR) criteria. The SRMR value should be < 0.08 (Hu & Bentler, 1998). Since the SRMR value is 0.065 (saturated model) and 0.071 (estimated model), the current model is a well-fitting one.

Table 7 shows the results of the path analysis, the hypotheses testing for direct effects, along with multi-collinearity statistics (VIF) and f^2 values. Multicollinearity refers to very high correlations between predictors, and its presence is indicated when the VIF values are greater than 5 (Hair et al., 2022). Table 7 shows that all of the VIF values are well below 5. As shown in the table, the path coefficients (which lie between −1 and + 1) for several of the hypothesised relationships are positive. Anticipated emotions sigificantly influence attitudes and attitudes predict purchase intentions. The results demonstrate that three consumption values (i.e., functional, hedonic, and conditional) are influential in creating positive attitudes. Epistemic and symbolic values are not significant in shaping attitiudes. Table 7 depicts the path coefficients and p values and shows that the strongest positive relationship is found between attitudes and purchase intentions, followed by anticipated emotions and attitudes, and conditional value and attitudes. Charging anxiety negatively influences attitudes.

The results show that experience is a significant moderator and it has a negative sign. Experience weakens the (positive) 'anticipated emotions-attitudes' relationship and it weakens the (negative) 'charging anxiety-attitudes' relationship. Simple slope analysis is presented in the supplementary data section (Fig. A1 and Fig. A2). Fig. 2 depicts the final model generated by the Smart PLS-SEM software.

Table 6
Discriminant valididty (the HTMT test).

	Anticipated Emotions	Attitudes	Charging anxiety	Conditional value	Epistemic value	Functional value	Hedonic value	Purchase Intentions	Symbolic value	Experience
Anticipated emotions										
Attitudes	0.896									
Charging anxiety	0.216	0.214								
Conditional value	0.690	0.761	0.159							
Epistemic value	0.709	0.732	0.154	0.585						
Functional value	0.910	0.895	0.170	0.741	0.728					
Hedonic value	0.844	0.834	0.150	0.735	0.713	0.899				
Purchase Intentions	0.783	0.835	0.179	0.784	0.594	0.767	0.728			
Symbolic value	0.783	0.669	0.114	0.571	0.531	0.767	0.788	0.594		
Experience	0.287	0.304	0.066	0.307	0.310	0.257	0.303	0.377	0.274	

Table 7
Model: structural estimates and hypotheses testing (bootstrapping) for attitudes towards electric vehicles and purchase intentions.

Path: IV to DV	Path coefficients	SD	T Values	P Values	CI Bias Lower 2.5 %	CI – Bias Upper 97.5 %	VIF (Inner)	f-square
Anticipated emotions → Attitudes	0.357	0.064	5.566	**0.000**	0.231	0.487	3.457	0.173
Attitudes → Purchase Intentions	0.778	0.023	33.237	**0.000**	0.725	0.819	1.000	1.529
Charging Anxiety → Attitudes	−0.120	0.033	3.643	**0.000**	−0.179	−0.057	1.144	0.059
Conditional value → Attitudes	0.215	0.050	4.313	**0.000**	0.121	0.314	1.974	0.109
Epistemic value → Attitudes	0.065	0.045	1.437	0.075	−0.035	0.113	2.219	0.009
Functional value → Attitudes	0.208	0.073	2.855	**0.002**	0.080	0.353	3.747	0.054
Hedonic value → Attitudes	0.139	0.059	2.334	**0.010**	0.029	0.261	3.316	0.027
Symbolic value → Attitudes	−0.036	0.047	0.768	0.221	−0.130	0.057	2.456	0.003
Experience → Attitudes	0.032	0.031	1.036	0.150	−0.022	0.108	1.225	0.004
Experience x Anticipated emotions → Attitudes	−0.091	0.036	2.545	**0.005**	−0.175	−0.027	1.142	0.029
Experience x Charging anxiety → Attitudes	−0.059	0.032	1.862	**0.031**	−0.125	−0.000	1.112	0.013

Note[1]: the critical T values around 1.65, 1.96, and 2.58 are considered with the significance level of 10%, 5% and 1% respectively.
Note[2]: Values in bold refer to significance, $p < 0.05$.
Note[3]: The VIF values are mostly < 3 or are not > 5, indicating no collinearity issues.
Note[4]: The effect size ($\int^2$) of 0.02 (small), 0.15 (medium) and 0.35 (large) are considered.

5. Discussion

The objective of this study is to examine the multidimensional aspects of consumption value and to evaluate the extent to which an augmented model (i.e., the inclusion of anticipated emotions and experience) influences attitudes and purchase intentions. This is important since the existing literature gives mixed results and lacks a precise understanding of how experience interacts with emotions. A robust model was developed using PLS-SEM and it has a high adjusted R^2 value.

The hypothesis that perceived consumption values would positively influence attitudes is partially confirmed. Hedonic value is positively associated with attitudes, which is congruent with the literature. Prior research has found that feelings of fun, pleasure and comfort are associated with driving an EV, and people like the low noise feature (Ingeborgrud & Ryghaug, 2019; Schuitema et al., 2013; Ozaki & Sevastyanova, 2011).

The results convincingly confirm the importance of conditional value and its influence on attitudes towards BEVs. The conditional factors covered hypothetical situations, such as an increase in the price of petrol, improved range, free public charging and if more people were driving electric cars. The findings are not surprising since long-term fuel saving (Graham-Rowe et al., 2012; Krause et al., 2016; Wicki et al., 2023) is a key motive for adopting EVs. As noted in recent literature reviews (Pamidimukkala et al., 2024), the most cited barriers to the adoption of EVs are the lack of charging stations, the lack of availability, and limited driving range. The importance of public investment in charging facilities is evidenced in recent literature reviews (Singh et al., 2020). As well as overcoming the problem of access to charging, it is proposed that the visibility of public charging stations can spread knowledge and social acceptance of EVs (Egnér & Trosvik, 2018). The significance of social norms and peer networks in encouraging people to adopt new technologies is well documented (Manca et al., 2020).

Functional value was a significant variable, which confirms prior studies on the centrality of this dimension in influencing choice of electric cars (Biswas & Roy, 2015; Bridi et al., 2022; Han et al., 2017) and green products (Gonçalves et al., 2016).

Not all values in the consumption model influenced attitudes. Epistemic value failed to pass the 0.5 threshold for statistical significance (but it was marginally significant at the 10 % level). One explanation may be that BEVs are no longer seen as a technological innovation and thus the ability to satisfy intellectual needs is less important in the mature stage of the industry.

Contrary to our expectations, symbolic (social) value did not significantly influence attitudes. The coefficient is negative suggesting that BEVs are a weak symbol of status or are incongruent with self-identity. This finding is inconsistent with studies that highlight the positive impact of social value in green consumption (Gonçalves et al., 2017; Noppers et al., 2014; Yuan et al., 2022). The literature on EV adoption reports that status-oriented motives are important, confirmed by a study of early adopters in the UK (Schuitema et al., 2013), as well as a study of mainstream consumers in Norway (Ingeborgrud & Ryghaug, 2019) and the United Arab Emirates (Bridi et al., 2022). Similar to this study's findings, Alganad et al., (2023) found that symbolic value did not predict attitudes towards green cars. Likewise, a study by García de Blanes Sebastián et al., (2023) found there was not a significant relationship between social influence and attitudes towards EVs or usage behaviour. There are several possible explanations for our finding on the

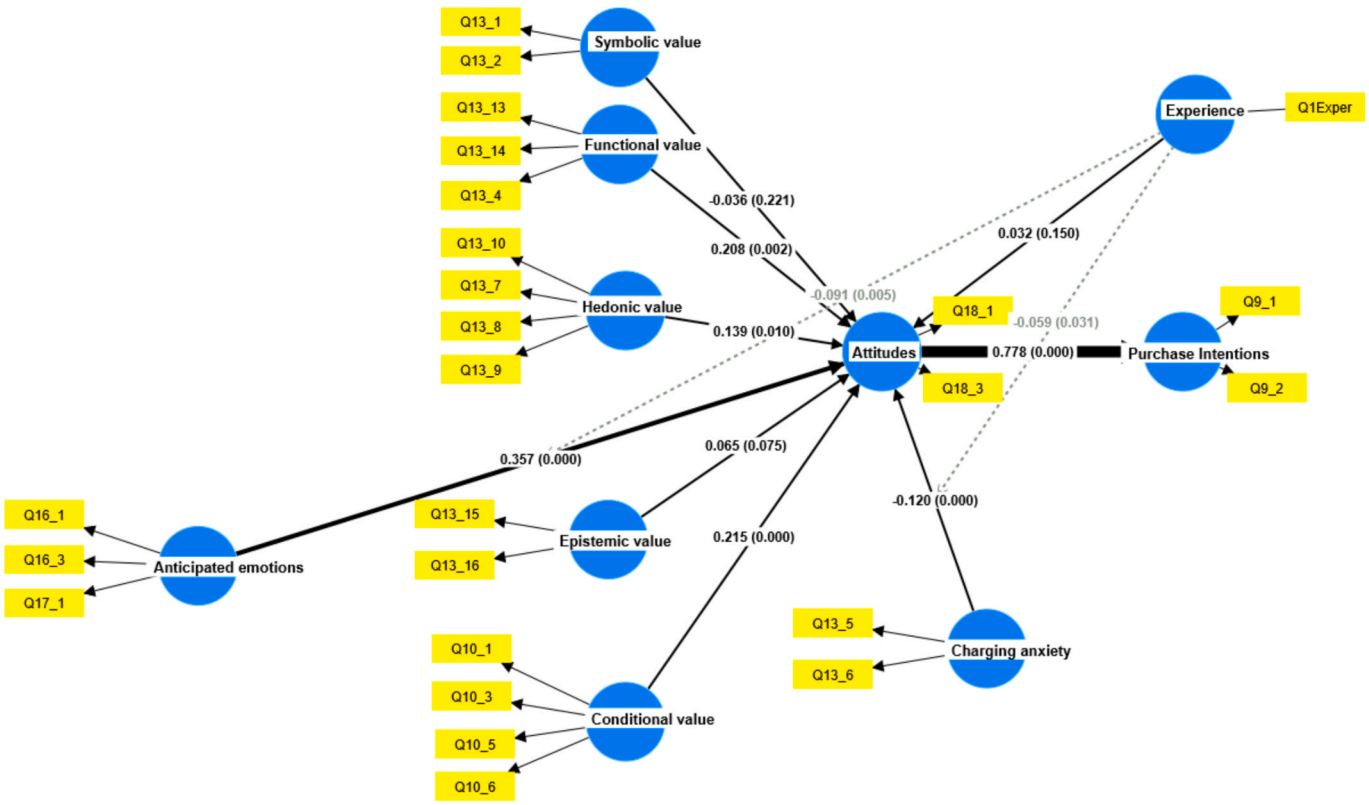

Fig. 2. The final model (generated by the PLS-SEM software). Note: Path coefficients and p values are shown.

non-ascription of symbolic value to EVs. Symbolic value is related to one's culture (Bonazzi, 2015; Yau, 1988) and Australian consumers might ignore symbolic value as Australian culture is individualistic, as identified by Hofstede (2011). Therefore, Australian consumers may not rely heavily on their reference group for guidance when making purchase decisions and their social identity may be loosely linked to the consumption of others. Older Australians may negatively view status signalling, or people may not be conscious of, or reluctant to admit to, social influences on consumption. In addition, BEVs compete with luxury SUVs in the Australian marketplace, and BEVs may not be a salient symbol of status, and might even be seen as unusual or even inappropriate in a country characterised by vast distances.

The hypothesis that attitudes would be a significant predictor of purchase intentions was confirmed and this finding is in line with prior research (de Oliveira et al., 2022) and with the well known Theory of Planned Behaviour (Ajzen, 1991).

Our study shows that anticipated emotions are significantly related to attitudes. The findings confirm the research that links EV adoption with negative emotions such as guilt (Graham-Rowe et al., 2012) as well as positive emotions such as pride and joy (He & Hu, 2022; Moons & Pelsmacker, 2012; Rezvani et al., 2017). An explanation may come from appraisal theory, where certain emotions imply high perceived coping ability (Scherer, 1997). In other words, thinking about buying an EV elicits good feelings and mitigates guilt since the consumer is taking practical steps to cope with rising fuel costs and alleviate the effects of transport on the environment.

The t-tests revealed significant differences between those with experience of BEVs and those without any direct experience of BEVs, with the experienced respondents displaying higher mean values for consumption values, attitudes, emotions and purchase intentions. However, we did not find a significant relationship between experience and attitudes in the PLS-SEM model, probably because the structural model is more stringent than t-tests. In contrast to this finding, most studies report that hands-on experience results in a more positive attitudes to electric vehicles and higher adoption willingness (Bunce et al., 2014; Schmalfuß et al., 2017). Yet, there are mixed findings in the literature. A recent study found that driving experiences and information campaigns are not significant in promoting BEV uptake (Brückmann, 2022). An earlier study by Skippon et al (2016) found that experience reduced the tolerance for the short driving range.

As hypothesised, we found that prior experience weakens the 'anticipated emotions-attitude' relationship, and this was explained by construal level theory (Trope & Liberman, 2010). To the best of our knowledge, no study has investigated the moderating role of experience in the context of consumption value theory. Thus, this study fills a gap in the literature. In contrast to the inexperienced drivers, the experienced drivers may think about BEVs in a more concrete, down-to-earth manner (i.e., the need for regular charging) and focus less on their feelings. Thus, after using the vehicle over a certain period of time, their feelings of happiness or pride dissipate.

The hypothesis that charging anxiety negatively affects attitudes was confirmed. The results are not surprising and are aligned with the literature (Bergman et al., 2017; García de Blanes Sebastián et al., 2023; Noel et al., 2019). We hypothesised that experience would dampen the 'charging anxieties-attitudes' relationship, and this hypothesis was confirmed. This finding is aligned with prior research showing that experience with EVs can reduce concerns about charging (Bergman et al., 2017; Bunce et al., 2014; Schmalfuß, Mühl, & Krems, 2017).

The bivariate analysis revealed significant differences in responses and purchase intentions between different demographic groups. The results are aligned with prior research that associates age, income and education with EV adoption (Axsen et al., 2016; Chen et al., 2020). For instance, prior studies show that younger consumers are more interested in EVs than their older counterparts (Ferguson et al., 2018). The significance of employment is not surprising since it is a proxy for purchasing power. The finding in relation to gender and hedonic value is aligned with prior research showing that males are more likely than women to place importance on acceleration (Sovacool et al., 2019). The

analysis revealed significant differences in responses between larger and smaller households which is aligned with prior research (Chen et al., 2020). One explanation is that households with children are likely to need personal transport for family activities and might value the unique attributes of EVs, such as saving money on petrol or reducing greenhouse gas emissions.

This study provides support for the conceptual model developed in Fig. 1. The results show that three of five consumption values, along with emotions, influence attitudes towards BEVs. The main conclusions are that companies seeking to increase sales have to create hedonic, functional and conditional value, and evoke positive feelings in the consumers. They need to be aware that cultivating experience is a double-edged sword. Experience builds value and weakens charging anxieties, but promoting experience is risky as it dampens positive emotions.

6. Implications for policy and practice

This research has implications for policy makers and is particularly relevant to marketing practitioners tasked with developing effective promotional strategies. Highlighting the functional, hedonic and sensory aspects of driving BEVs should be worthwhile. Given the significance of anticipated emotions, the use of emotional appeals in advertising should be persuasive. Advertisers could show the impact of reduced petrol consumption on the environment and the savings made by switching to a BEV. A concrete way of getting consumers to consider buying a BEV is to show the electric car and the conventional car in campaigns, and then emphasise the feelings of pride or happiness associated with making the right choice. The results highlight that prior experience with BEVs is a double-edged sword. For car dealers, it can be risky to offer leasing, rental or car sharing options. While it might help people adapt their routines and think in more concrete terms about how to incorporate BEVs into their lifestyles, it dampens positive emotions. Australia is a laggard nation and a country characterised by vast distances, so the anxieties over charging must be overcome. In particular households, such as those who travel a lot to sparsely populated regions, people who lack access to secure parking spaces or rooftop solar and in areas where there are clear deficiencies in charging infrastructure, anxieties are logical. Thus the resources allocated to promoting direct experience should be narrowly targeted.

Given the significance of charging anxiety and conditional value, policy makers could implement policies to lower the purchase price and invest in free public charging infrastructure. The recommendation from this study is for the automobile industry is to continue to invest in charging facilities and lobby the government to support the transition to electric mobility. The development of apps that show charging locations and have reminders for people to recharge might be useful. Offering roadside assistance programs tailored to BEV owners might be helpful in reducing charging anxieties. The recommendation for advertisers is to use testimonials from satisfied EV owners in their campaigns. Narratives in advertising that depict a ‘before and after scenario’ might be persuasive, where BEV drivers talk about their real-world experiences with their cars and how they managed their charging anxieties.

6.1. Limitations and recommendations for future research

This study used a simple measure of prior experience which is a limitation. Future studies, using qualitative methods, could be useful in identifying the various dimensions of experience, and in developing a useful, multi-item scale for further testing. For instance, the usage context is an important attribute when studying practical experience with BEVs, such as whether the vehicle is used for work, everyday life or holidays. The duration of the experience is also important in shaping attitudes, so future work could distinguish between test drives (a few hours), short-term car rental (a few weeks), and ownership (i.e., several months or years).

Whilst we have included numerous variables in our modelling we have inadvertently omitted other potentially important variables. Our results should be interpreted with this in mind, with the omitted variables being a limitation in this study. Specifically, while this study examined anticipated emotions (i.e., pride in buying a low carbon vehicle), there are many other factors that affect purchase, such as perceptions of the environmental friendliness of BEVs and brand name (i.e., Tesla, BMW, Toyota, etc.). Despite the environmental benefits of BEVs, negative impacts associated with battery production and the disposal of batteries could affect purchase intentions. Future research could augment the consumption value model with other buying motives.

The research shows that BEVs arouse positive emotions, but emotions are often mixed, and ambivalence could be tested in future work. Other emotions and psychological constructs, such as envy, surprise, regret, risk perceptions or psychological reactance, could be examined in combination with consumption values. This research found that consumption values such as hedonic, functional and conditional, are positively associated with attitudes towards BEVs. Future research could explore the cross-influence of different values on consumer behaviour. For instance, hedonic value might reenforce functional value.

This study measures consumers’ intentions to purchase BEVs and not purchase behaviour. Whilst intentions are a valid proxy measure of behaviour, intentions don’t always lead to actual behaviour, particularly in the domain of ethical consumption. Thus future work could test the model on BEV buyers.

Several strategies were used to eliminate common method bias (CMB), but there is no guarantee that it is completely free of CMB. Future studies could use longitudinal studies and multi-method research designs, including experiments, to mitigate CMD.

This study used purposive sampling to capture potential adopters of new BEVs in Australia. This limits the generalizability of the findings and broader sampling is needed in future work to capture younger demographics and second-hand car buyers. Future research could use larger sample sizes and incorporate control variables and interaction effects..

7. Conclusions

A key contribution of this study to the literature is the development and testing of an augmented consumption values model. To the best of our knowledge, no previous study has used a similar model to analyse attitudes and purchase intentions in relation to BEVs. The novelty of this study lies in its focus on prior experience and how this factor interacts with emotions to influence consumers’ attitudes. This is important since the prevailing literature on EV adoption tends to marginalise the role of emotions in consumer decision making. BEVs arouse positive emotions, conditional, functional and hedonic values influence attitudes, and attitudes predict purchase intentions. The study reveals that conventional drivers in Australia attribute several consumption values to BEVs, and direct experience can erode emotional value and weaken charging anxieties. This study extends consumption value theory by including a new dimension known as ‘experiential value’ into the framework. This study extends prior scholarship in other ways, such as by including anticipated emotions into the model, and context-specific dimensions into the conditional value construct. Despite the study’s limitations, the study offers valuable insights into the factors that underpin attitudes in a laggard market, which is warranted and helpful to scholars, policymakers and practitioners.

8. Ethics

Ethical approval for the study was granted by the Human Ethics Committee at the authors’ university (H6601).

CRediT authorship contribution statement

Breda McCarthy: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Diane Jarvis:** Writing – review & editing, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization. **Daniel Grainger:** Writing – review & editing, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization.

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cstp.2025.101436.

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