Erasmus School of Economics

MSC Economics and Business, Behavioural Economics

Feature on Demand Users Do Not Pay Twice: The Testing of Behavioural Mechanism to Improve Acceptance of Features on Demand in the Automotive Industry.

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Abstract

Features on Demand are a new development in the automotive industry. Since first consumer reactions displayed reluctance against Features on Demand, this paper seeks to develop and test behavioural mechanisms to improve the acceptance of Features on Demand. We developed a reference price and a visual trigger to influence consumer acceptance of Features on Demand. In an online experiment, we tested the effect of both mechanisms on Fairness Perception and Purchasing Intention, using data of 118 car users. While comparing differences in the 4 treatment groups, our study yielded evidence indicating that the Reference Price has a positive effect on Fairness Perception. There was no effect of the Reference Price on Purchasing Intention. The Visual Trigger did not demonstrate a significant positive effect on Purchasing Intention. Although this may be caused by a power problem. We further investigated how the combination of both mechanisms influences Fairness Perception and Purchasing Intention. It appears that randomization could not fully neutralize the strong acceptance heterogeneity among participants, given the small sample size.

Keywords: Features on Demand, Access-based consumption, Reference point, Behavioural mechanisms, psychological-ownership

Content

This thesis found its inspiration during the seminar Applied Behavioural Economics at Erasmus University, Rotterdam. In teams, we consulted an automotive manufacturer about consumer reluctance toward Features on Demand. This research was conducted in cooperation with Hyundai to develop a more profound understanding of the acceptance of Features on Demand.

Introduction

The shift from ownership to more flexible forms of car consumption is transforming the automotive industry. Car manufacturers are currently exploring innovative business models that allow customers not only to choose the features of their car during the initial purchase, but also to have the flexibility of locking or unlocking specific features throughout the entire lifespan of the vehicle. In this case, cars will be by default equipped with every technology necessary to support the full range of available features.

Car owners can access additional *Features on Demand* (FOD) by subscribing to either a monthly or yearly plan. This allows customers to adjust their cars based on changing preferences or special occasions, even though they already purchased the car, or they are second or third-hand car owners. With the possibility of creating a car that responds to the changing needs of the owner, cars might become more attractive both to the current owner and to future owners who might buy a used car (Deloitte, 2021).

Car manufacturers would profit in different ways from the FOD concept, but also take some risks. The success of this business model depends on consumer acceptance of FOD and the ability of car manufacturers to generate sufficient recurring cash flows through subscription sales (Deloitte, 2021).

However, initial reactions from consumers indicate reluctance. Even though a study (Leimann, 2019) indicates an interest in FOD from consumers, there are indications that consumers would be reluctant to subscribe to them in practice. On social media, BMW received great criticism for its introduction of subscription-based seat heating (Autolist, 2021). In an online survey, they found that 44% of respondents preferred an upfront payment, while only 18% favoured the subscription model (Autolist, 2021).

Given the steady growth of subscription-based business models over the past decade (Digital Media Solutions, 2019), this consumer reluctance is surprising. Subscriptions seem accepted for streaming, smartphone contracts, and applications. Market research indicates a projected growth in the subscription market, anticipated to reach a valuation of 1.5 trillion US dollars by

2025 (Ilagar, 2023). Consequently, subscriptions are becoming an increasingly integral part of consumers' lives.

The automotive sector is increasingly adopting subscription-based models, with more leasing contracts and fee-based services emerging (Frost, 2014). In Germany, 76% of new leasing investments were due to cars and other vehicles (Statista, 2022) and the leasing share has grown from 43% in 2012 to 47% in 2022 (Statista, 2023a). These trends suggest that subscription models are increasingly being adopted within the automotive sector.

However, despite that subscription-based consumption in general is becoming increasingly accepted in society, there is a notable gap in the existing literature when it comes to understanding and improving the acceptance of Features on Demand (FOD). Drawing from first findings of a Pilot study, which suggested that influencing consumers' reference points can enhance FOD perception (Bosbach et al., 2023), this research seeks to fill that gap and delve deeper into the study of decision-making. Specifically, this thesis investigates whether behavioural mechanisms can enhance the acceptance of FOD.

To answer this research question, we will focus on two aspects of acceptance: Fairness perception of FOD, which has been shown to be stimulated by a feeling of betrayal (Garbas et al., 2023; Schaefer et al., 2022), and Purchasing Intention as a predictor for purchasing behaviour in real life. Using these two measures, we tested if two designed mechanisms influence FOD acceptance.

For our between-subjects online experiment, we collected a dataset yielding 118 valid responses. We found a positive and economically relevant effect of the Reference Price on Fairness Perception. We did not find an effect of the Visual Trigger, nor any interaction effect on Fairness Perception. Furthermore, we did not find significant effects of our mechanisms on Purchasing Intention. While these findings provide only modest evidence regarding the efficacy of altering consumer FOD acceptance, it's important to acknowledge that the absence of an effect on Purchasing Intention could potentially be attributed to a power problem or uneven randomization.

Literature Review

A new Trend in the Automotive Industry; The Concept of Features on Demand

A recent development in the automotive sector is the trend toward FOD-equipped cars. Consumers who buy a car with FOD have the option to unlock certain features on their car

through subscription (Vogt, 2020). Unlike traditional cars, FOD cars are produced fully equipped, even if the consumer just chooses a certain set of features while purchasing the car (Wucher, 2019). This allows consumers and future consumers to unlock those features independent of time and location and benefit from unlocked features immediately (Tyron, 2013).

Subscription based business models are attractive for car manufacturers as they extend revenue streams beyond the sale of the vehicle (Wucher et al., 2019). Over the entire life cycle, the car can thus generate revenue streams while car owners unlock new features depending on the life stage or when buying a used car.

From the consumer's perspective, FOD-equipped cars offer the capability to activate features that were not initially acquired at the time of purchase. This allows the customers to satisfy changing needs (van der Burg et al., 2019). The FOD concept further allows consumers to instantly access the feature at the exactly needed time for the required duration (van der Burg et al., 2019). This is a sharp contrast to traditional cars, where changing needs could only be addressed by buying a new vehicle or undergoing the costly and time-intensive process of hardware installation (Garbas et al., 2023).

Consumer responses, however, indicate a degree of reluctance toward FOD. Leiman's (2019) market report reveals that 31% of participants expressed a desire to install FOD for personalizing their vehicles. However, concurrently, a notable 35% of participants considered locked features within a car to be "outrageous." In a different example, an Autolist survey (2021) investigating BMW's heated seating feature unveiled that 44% of respondents preferred an upfront payment approach over a subscription model, with only 18% showing a preference for the subscriptions (Autolist, 2021).

The acceptance of FOD subscriptions by consumers is integral for the concept of FOD. While subscribing to car features is a recent development, previous research has already explored subscription acceptance in other fields.

Access-based Consumption

Subscribing to features instead of owning them is a consumption model known as access-based consumption. Access-based consumption is a form of consumption that is mediated through the market and does not involve a transfer of ownership (Bardhi & Eckhardt, 2012). The consumer pays a negotiated fee to purchase consumption time (Durgee and O'Connor, 1995). Prior studies have indicated that in access-based consumption, as opposed to ownership-based consumption, there tends to be a reduced sense of attachment to the object in question (Bardhi

& Eckhardt, 2012). This sense of attachment typically develops after extended interaction with the item, accompanied by the feeling of "ownership" (Bardhi & Eckhardt, 2012; Belk, 1988).

Access-based consumption ranges from video streaming providers and clothing to bicycle and car rental. Moreover, this type of consumption is continuously expanding into other areas of life (Bardhi & Eckhardt, 2012).

Determinants of Access-Based Consumption

The subscription market is undergoing tremendous growth. In just five years, from 2011 to 2016, subscription sales in the US increased from 57 million to 2.6 billion (Chen et al., 2018). Worldwide, the subscription market is expected to grow further and reach a market size of 1.5 trillion US dollars by 2025 (Ilagar, 2023). Reasons for the expansion of access-based consumption are manifold.

In the past, it was common not only to own but also to borrow objects of daily use, such as books. Yet, in many areas of life, ownership was the desired and respected form of consumption (Rowland & Gurney, 2000; Ronald, 2008). Home and car owners were perceived as more responsible than those who rent (Rowland & Gurney, 2000; Ronald, 2008). As internet usage increased, making short-term booking became more convenient (Walsh, 2011), thereby contributing to a shift in the sociocultural perception of access-based consumption (Bardhi & Eckhardt, 2012).

Moreover, the rise of the "liquid society", i.e., more flexible notions of partnership, work, and places of residence (Baumann, 2013), has played an important role in reshaping consumption preferences. Re-urbanisation and the accompanying worsening of the parking situation have also changed the image of car ownership (Leinberger, 2007). Those and other developments have led to access-oriented consumption becoming a respected alternative to ownership-based consumption in many areas of life.

Prior research by Lawson et al. (2016) have highlighted how sociodemographic characteristics may influence attitudes towards FOD. For instance, young, well-educated couples are more likely to use access-based (car) services. Older people, on the other hand, have stronger beliefs about ownership. Children or the wish for children might also be an indicator of a flexibility need, and therefore a higher likelihood of preferring access-based over ownership-based consumption. Seemingly, sociodemographic characteristics may impact FOD perception."

Another dimension that influences the preferences for owning or subscribing is the relevance of the subject. The more the consumer identifies himself with the subject, the more he prefers to

own the subject instead of renting it (Bardhi and Eckhardt, 2017). Garbas et al. (2023) additionally confirmed this finding within the context of FODs and consumer identification with the car. These insights give a clue that the bond between the consumer and the car might be a mediator of FOD acceptance.

Features on Demand: Understanding the Violation of Traditional Ownership and its Impact on Fairness Perception

Recent Literature suggests that the acceptance of FOD is influenced by its fairness perception (Schaefers et al., 2022; Garbas et al., 2023). Fairness perception by itself is a major determinant of purchasing decisions (Oliver & Swan, 1989; Seiders & Berry, 1998). Thus, these findings suggest that the perception of unfairness is negatively impacting consumers' purchasing decisions towards FOD.

Particularly, unlocking the use of tangible (hardware) features is perceived as unfair (Vaidyanathan & Aggarwal, 2003; Schaefers et al., 2022). Using an experimental design, Schaeffers et al. (2022) measured how the fairness perception and purchasing intention of FOD change if participants are randomly exposed to either a tangible or intangible feature. Their results indicated that tangible FOD are perceived as more unfair than intangible FOD, and that this unfairness results in lower purchasing intention for tangible FOD.

Another trigger for the feeling of being treated unfairly is that no hardware (external) upgrade is needed to access the FOD (Garbas et al., 2023). This characteristic of FOD seems to violate the exchange relationship between firms and customers, in which customers pay for a product or service that a firm provides. If the upgrade is done internally and can be performed by the customer himself instead of the firm (Garbas et al., 2023), the customer feels betrayed since she perceives that the firm did not contribute anything (Clark & Mills, 1993). This can result in a feeling that the customer pays for a product that she already owns (Garbas et al., 2023).

As with the studies on tangible and intangible features by Schaefers et al. (2022), the findings of Garbas et al. (2023) seem to confirm that consumers make no distinction between legal and psychological ownership (Garbas et al. 2023). Psychological ownership, defined as the sense of possessing an item (Wilpert, 1991; Pierce et al., 2003), can exist even when formal legal ownership is absent (Pierce et al., 2013). For instance, lacking legal ownership, truck drivers might develop feelings of responsibility and ownership toward their trucks the more time they spend driving them (Pierce et al., 2003). Individuals may also experience a sense of ownership for projects they've worked on, even when those projects are legally owned by someone else

(Kanngiesser et al., 2010). The lack of distinction between legal and psychological ownership concerning FOD aligns with research suggesting that psychological ownership is intrinsic to an individual and that legal ownership is not necessary for psychological ownership (e.g., Reb & Connolly, 2007).

For most car users, the concept of FOD is relatively new, and up to this point, they have primarily experienced traditional car ownership as their reference point. Evaluating the fairness of the current exchange is heavily seen in contrast to consumers' previous marketplace experiences (Kahneman et al., 1986). In most cases, the concept of FOD is new to the car user, and their previous experiences in the marketplace involved traditional car ownership, in which consumers owned a car and all features inside it. Consequently, when they encounter FOD cars, which do not grant them ownership of all features as their reference point had led them to expect, they may feel betrayed.

These initial studies suggest that the pricing structure of FOD creates a sense of unfairness among consumers. This feeling seems to indicate that consumers do not consider that the use of features is financed either by a higher purchase price of the vehicle in the first place or by later payments. Car owners might perceive it as if they are “paying twice” (Garbas et al., 2023) when they encounter FOD and fail to consider that they did not originally acquire these features with their purchase.

Given the relatively unexplored nature of the FOD topic, this thesis seeks to be a pioneering study in testing behavioural mechanisms to enhance the acceptance of FOD. Considering that the automotive industry is shifting toward FOD cars, improving the acceptance of FOD holds crucial importance for car manufacturers.

Exploring Behavioural Mechanisms

First, this section provides insights into the Pilot study and literature related to the development of the Reference Price. Afterward, the conceptual framework of the Visual Trigger will be explained. To initiate the exploration of behavioural mechanisms aimed at enhancing FOD acceptance, we will review the literature that guided the design of the pilot study.

Prospect Theory and Reference Points

To comprehend the intricate evaluation of FOD by consumers, understanding the nuances of human decision-making is crucial. A significant contribution to decision-making was the prospect theory developed by Kahneman and Tversky (1979).

According to prospect theory, individuals don't evaluate outcomes in isolation; rather, they compare them to a reference point, e.g., other outcomes and/or our recent situation (Tversky & Kahneman, 1981). For instance, monetary gains are not assessed independently; they are evaluated relative to one's existing financial situation. Prospect theory also posits that losses exert a greater negative impact on utility than an equivalent monetary gain would positively influence it. This phenomenon leads to loss aversion, wherein individuals tend to experience losses with greater emotional impact than equivalent gains (Kahneman & Tversky, 1979). Thus, Prospect Theory's insights into how people assess gains and losses can be instrumental in understanding the consumer decision-making processes when being confronted with the concept of Features on Demand.

In their seminal paper, Tversky and Kahneman (1981) showcased the importance framing has on decision-making. Due to the presence of loss aversion and the influence of reference points, framing outcomes as gains or losses can result in preference reversals in decision-making (Tversky & Kahneman, 1981). This insight has actionable implications for business, as consumer's opinions of products and services are subject to framing effects. For example, Gazach and Karsahi (1995) showed that if people are communicated the disadvantages of not using their credit card as a loss, they are more likely to use the card again than those who were communicated the benefits of using it as a gain. This insight has actionable implications for business, as consumer opinions of products and services are subject to framing effects.

Framing often tries to change the reference points of individuals. Reference points are not an objective or static benchmark; they can be influenced by, for example, the individual's own unrealistic beliefs. Outcomes can be assessed positively or negatively depending on the reference point (Tversky & Kahneman, 1981). Meng and Weng (2018) demonstrated that both reference points and loss aversion play key roles in explaining investor behaviour, such as selling rising stocks prematurely while holding on to declining stocks too long. Studies indicated that consumers compare product prices to reference prices and adjust their willingness to pay related to the reference price (Kopalle et al., 1996). Dependent on the product, the situation, and the individual, reference prices might be a price for a similar product (context) or for the same product in the past (intertemporal) (Rajendran & Tellis, 1996).

Various authors from different disciplines have highlighted the importance of the reference point to which a product is compared. To gain initial insights into whether the reference point influences FOD perception, a pilot study was conducted.

The Pilot Study

To test whether loss aversion and reference points impact the FOD perception, the author and three other students designed an experimental survey as part of a seminar on applied behavioural economics within the Master of Economics and Business program at the Erasmus School of Economics, Rotterdam. For this thesis, the results will be used to develop the experiment described in this thesis.

The pilot survey was designed to investigate how gain-loss framing influences people's perception of FOD. The emphasis was placed on exploring the acceptance of FOD under the premise that it is not perceived as an added expense. Instead, it was framed as an opportunity to save money by not paying for features during the process of acquiring the vehicle.

Considering the rich literature stream on loss aversion and reference points (Kahneman & Tversky, 1979; Tversky & Kahneman, 1981), we expected that the "saving money" frame of FOD would result in higher acceptance of FOD compared to the normal presentation of FOD. To investigate our hypothesis, we conducted an online experiment in which participants were asked to imagine that they were buying a car and were then asked to equip it. One group was instructed to select either lifetime or monthly features for their car (opt-in). The other group started with a fully equipped car and were asked if they wanted to remove the lifetime subscriptions or replace them with monthly subscriptions to save money (saving money framing). Afterward, the participants were asked to state their interest level to install any of the features on their current car and to rate the fairness perception on Likert scales from 1 to 7.

The target group of the pilot study were car owners. In total, 161 participants accessed the study. 135 qualified as car owners. 23 participants did not answer the question regarding fairness perception. In total, there were 112 valid responses.

The average age in the sample was 34 years (S.D. 14 years), spanning a range from 19 to 72 years. 55 were male and 57 were female.

To examine the effect of framing, we compared Fairness Perception and interest to install features in current cars in both treatment groups. A Wilcoxon rank (N = 112) sum test indicated that Fairness Perception in the saving money framing (m = 3.6) increased compared to the control group (m = 3.1), at the 5% significance level (p = .043).

Using the Wilcoxon rank sum test (N = 112), we also compared the interest in FOD installation in current cars. The test strongly suggested that interest in installation in the current car in the

saving money framing (m = 4.8) increased compared to the control group (m = 3.6), at the 1% significance level (p = .002).

To control for sociodemographic and car bonding-related variables, we ran a Regression Analysis (N = 112) for the interest in installing features on the current car, R^2 = .22, $F(14, 97) = 1.94$, p = .031. We found that the saving money framing significantly improved the interest in installing the features in the current car by 1 point on a Likert scale from 1 to 7, $B = 1$, $p < 0.001$. This effect presents a medium effect size according to Cohen (2013) (Table 14, Row 1 (Appendix): R^2 = .097, Cohens d = .33).

In the case of fairness perception (N = 112), R^2 = .15, $F(14, 97) = 1.3$, p = .22, we measured that the saving money framing leads to 0.56 higher fairness perception on a Likert scale from 1 to 7, $B = 0.56$, p = .06). However, this effect is only significant with an alpha of 10% and is according to Cohen (2013) a small effect size (Table 14, Row 4 (Appendix): R^2 = .031, Cohens d = .18).

It is important to highlight that the current car variable might not accurately capture a specific intention to pay for FOD. Participants may have been primarily interested in the modern features, potentially not paying sufficient attention to the scenario description.

Our study revealed a noteworthy impact of the saving money framing on the perception of fairness, which is in line with the findings of Tversky and Kahneman (1979) and Kahneman et al., (1986). In essence, our findings suggest that when FOD are presented as an option to reduce the overall car purchase cost and therefore save money, they are perceived as fairer.

While the evidence for the direct impact of purchasing intention from our survey remains somewhat limited, our conclusions are supported by Schaefer et al. (2023). They confirmed a link between improved Fairness Perception and increased Purchasing Intention.

Based on our research and referring to the insights provided by prior papers, we conclude that the saving money framing could potentially have a positive influence on Purchasing Intention as well. However, even though the saving money framing activates the right mechanisms, this construct is only useful in a theoretical setting. Therefore, we strive to develop other mechanisms that improve FOD acceptance while incorporating the findings of the pilot study.

Hypothesis 1 & 2: Reference Price

One instrument used in retail to influence purchasing behaviour is an advertised reference price, which serves as a point of reference provided by the retailer. Advertised reference prices are a contrast against which the actual price is judged (Monroe, 1973; Compeau & Grewal, 1998).

The advertised reference prices often interact with internal reference prices, which are points of reference stored in consumers' memory (Biswas & Blair, 1991). The strongest determinant of the internal reference price is the consumer's most recently observed prices, which serve as anchors (Tversky & Kahneman, 1974; Briesch et al., 1997; Dickson and Sawyer, 1990).

Advertised reference prices that are often higher than the actual price, lead to higher-value consumer evaluations of the offer (Grewal, et al., 1998). Consumers react positively to the difference ("the savings") between the actual price and the advertised reference price (Liefeld & Heslop, 1985), even if the "claimed" savings are exaggerated (Urbany et al., 1988). In auctions, a high reserve price has been shown to increase the auction price more than a lower minimum bid (Kamins et al., 2004). Given these insights, leveraging the concept of changing the reference point while providing a reference price could indeed be a strategic approach to influence consumers' acceptance of FOD.

We conclude that the acceptance of FOD is likely influenced by an individual's reference point, which is likely traditional car ownership. This reference point can be influenced with the introduction of a reference price. We assume that people are more willing to accept FOD if they are reminded that they would have had to pay an additional amount to possess the feature at the time of the vehicle's purchase. It's important to underscore that, although they are currently paying a fee for activation, significant money was saved at the time of the car's initial purchase. The saved amount, which effectively represents the cost of the feature when the car was bought, will serve as the *Reference Price* to be tested. The Reference Price should highlight that, despite the necessity of a monthly fee or a one-time payment for feature activation, money was initially saved because the feature's price was not included in the cost of the car. We expect that this will result in higher perception of Fairness.

H1: *"Consumers have a higher Fairness Perception of FOD if they are given the Reference Price for the ownership cost of the FOD."*

According to studies by Schaefers et al. (2022) and Garbas et al. (2023), we assume that a higher fairness perception will furthermore increase consumers' purchasing intention.

H2: *"Consumers state a higher Purchasing Intention for FOD if they are given the Reference Price for the ownership cost of the FOD."*

Triggers for Behavioural Change

The *Fogg Behavior Model* (Fogg, 2009) serves as a framework for persuasive design. Even with modest levels of both, a well-timed trigger is necessary (Fogg, 2009). According to Fogg missing

motivation to perform a behaviour can be triggered by leveraging the dimensions: pleasure/pain, hope/fear, and social acceptance/rejection (Fogg, 2009). According to Fogg's model, missing motivation to purchase FOD could be triggered by strategically leveraging the pleasure dimension.

In the concept of behavioural triggers, the psychological aspect plays a significant role (Matsumura et al., 2015). One critical psychological aspect identified by Cialdini (2007) is liking by association. Drawing from this insight, we hypothesize that the acceptance of FOD could increase by linking it to pleasurable concepts.

Another psychological aspect is Gamification. Zichermann and Cunningham (2011) wrote a book about the power of "game mechanics" to influence human behaviour. These game mechanisms arouse the human need for status, achievement, reward, self-expression, competition, etc., through environments and interfaces that have elements of games (points, badges, levels, challenges, leaderboards, goods, quests, etc.). Thus, using game-like elements could be activated to make the use of FOD more pleasurable.

Considering these two possibilities to influence the acceptance of FOD, we suggest increasing the acceptance of FOD by linking it to car racing games. This connection is inherently relevant due to the substantial overlap in subject. Computer-based car racing games date back to the '70s (Wikipedia, 2023) and therefore are in the minds of the potential target group for FOD. Associating FOD with car racing games leverages the aspect of upgrading vehicles while acquiring new equipment—an integral component of racing games.

One way to trigger these aspects is a physical trigger (Matsumura et al., 2015). Because of visual stimuli or association with another symbol, people enjoy the interaction with the trigger and understand the benefits of the desired behaviour (Matsumura et al., 2015).

The physical trigger by itself most of the time only has an indirect effect, since it activates a psychological trigger (Matsumura et al., 2015). These psychological triggers influence behaviour by invoking challenges, cognitive dissonance, positive/negative expectations, rewards, and self-esteem (individual context triggers) (Matsumura et al., 2015). An illustrative example of such a "shikake" trigger is the visualization of steps counted by a pedometer application. The act of visualizing progress, such as completing 7000 out of 10000 steps and needing only 3000 more to achieve the goal, triggers the psychological challenge element.

For example, a visible nudge that showed sugar content reduced unhealthy food consumption (Mikkelsen et al., 2021). An emotive logo which associated feelings with the purchasing decision

was shown to reduce incompatible purchases in a digital environment. (Esposito et al., 2017). Visual models/labels that are displaying bar charts have been shown to increase energy-efficient decisions (Newell et al., 2013).

Hypothesis 3 & 4: Visual Trigger

Considering the reviewed literature on behavioural change triggers, we conclude that a trigger might lead to higher acceptance of FOD. According to the boundaries of the online experiment, we designed a visual trigger considering the previously reviewed literature (Figure 1 Method section).

We assume that this visual trigger activates a psychological trigger in potential FOD customers. The trigger may evoke a "challenge" to "upgrade" their cars, leading to an association with computer car games (Cialdini, 2007; Zichermann & Cunningham, 2011; Matsumura et al., 2015). Also, possible is that they may feel a "dissonance" because their car contains unused potential (Matsumura et al., 2015). Apart from that, we aim for this visualization to emphasize that the car contains more value than was originally paid for, which might influence the ownership perception. Therefore, we want to state our next set of Hypotheses:

H3: *"Consumers have a higher Fairness Perception of FOD if they are exposed to the Visual Trigger."*

H4: *"Consumers state a higher Purchasing Intention for FOD if they are exposed to the Visual Trigger."*

Hypothesis 5 & 6: Interaction Effect

An area of considerable research interest is the potential interaction effect of combining both designed mechanisms. Interaction terms of mechanisms have been explored in previous research, such as the study by Van der Molen et al. (2021), which identified interaction effects when a nudge was combined with different pricing strategies. In the experiment by Newell et al. (2014), the addition of an energy star sign to an efficiency label positively increased energy efficiency measures compared to only the energy label. However, when controlled for the effect of the energy star, a negative interaction effect was found. Adding Co2 emission information to the label resulted in a positive interaction effect on energy efficiency measures.

The two designed mechanisms focus on different benefits of FOD. The strategic reference price underlines the fairness of FOD by highlighting that the price for the feature was not included in the original car purchase. The visual Trigger highlights that the car has unused technology potential and contains more value as the owner paid for it. We assume that when participants

are exposed to both mechanisms simultaneously, a more complete picture of the benefits of Features on Demand emerges (see Van der Molen et al., 2021). Consumers become more aware that they only legally purchased part of their car technology, but since they only own part of the technology, they did not pay as much for the car.

H5: *"If consumers are exposed to the reference price and to the Visual Trigger at the same time, an interaction effect on the Fairness perception will occur."*

H6: *"If consumers are exposed to the reference price and to the Visual Trigger at the same time, an interaction effect on the Purchasing Intention will occur."*

Methodology

To evaluate the impact of the Reference Price, the Visual Trigger or their combination on FOD acceptance, we executed an online experiment, approved by the Erasmus School of Economics' ethics board.

Experimental Design

We utilized a 2 (Visual Trigger vs. Control) x 2 (Reference Price vs. Control) between-subjects experimental design. Participants were randomly allocated into one of four groups: Control, Reference Price, Visual Nudge, and Interaction. We focused on variations in two dependent variables—Fairness Perception and Purchasing Intention—among participants who were exposed to the mechanisms and those who were not.

Table 1:

Visualisation of the two-by-two design

	No Reference Price	Reference Price
No Visual Trigger	Control Group	Visual Trigger
Visual Trigger	Reference Price	Interaction

Power Calculations

Using G*Power software, a sample size based on the pilot study's regression output, specifically its effect on fairness perception, was estimated. With an effect size of 0.18 (Cohen, 2013), an α error probability of 0.05, and a β error probability of 0.8, the calculation displayed a sample size of 245.

Participant Recruitment

Due to scheduling issues, it was not possible to use the online panel provided by the cooperation partner. Instead, participants were recruited from the author's social network via messaging apps. Eligibility criteria included being at least 18 years old and being a German-speaking car user in some capacity (ownership, leasing, sharing, etc.). The age criterion was due to ethical concerns when distributing surveys to minors. The criterion of car usage was selected to align the survey's target audience with potential FOD users. Distributing only to German speakers should avoid heterogeneity due to culture and translational wording differences.

Data Cleaning

Out of 191 accesses to the study, 13 observations did not state their car consumption type, another 44 exited the study before the item Fairness Perception. From the 134 remaining observations, one observation was excluded due to the participant stating they were underage. Furthermore, responses that didn't meet the minimum time requirement for survey completion were excluded, following the guideline by Grezki et al. (2015), who recommended removing observations needing less than 70% of the median participant's journey time. The median value of 207 seconds results in a threshold of 124 seconds. However, we opted for 120 seconds, which is a negligibly different value, that is better to communicate and based on which we will perform additional robustness checks. Thus, we excluded another 15 observations that rushed through the survey.

Our robustness checks, explore the sensitivity of our results to various time-based criteria. Specifically, we performed regression analyses to account for different minimum time requirements of 60, 90, 150, and 180 seconds. Additionally, we provide a full analysis of the dataset without any time minimum criteria in the appendix for comprehensive evaluation.

Descriptive Statistics

After data cleaning, 118 participants remained that stated their Fairness Perception and Purchasing Intention. 116 of them provided the full set of control variables. Descriptive statistics are provided in Table 2 and Table 3. We want to highlight that especially the distribution of age might not be very representative (Figure 7 in the Appendix). Especially, people between 30 and 50 are underrepresented (Statista, 2023b).

Table 2

Descriptive Statistics of continuous variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
Age	116	39.466	15.962	20	72
Car price	116	2.871	1.762	1	9

Table 3

Descriptive Statistics of the categorical variables

Variable	Group	Freq.	Percent	Cum.
Education	High school	33	28.45	28.45
	Academic	49	42.24	70.69
	Other	5	4.31	75.00
	Apprentice. + 1- or2- year course	6	5.17	80.17
	Secondary School	10	8.62	88.79
	Apprenticeship	13	11.21	100.00
Living Area	Rural Area	43	37.07	37.07
	City	56	48.28	85.34
	Suburbs	17	14.66	100.00
Living situation	Other	6	5.17	5.17
	Living Alone	35	30.17	35.34
	Flat share	16	13.79	49.14
	With Partner	24	20.69	69.83
	Partner and Children	14	12.07	81.90
	Registered/married Partner	21	18.10	100.00
Gender				
	male	71	61.21	61.21
	female	45	38.79	100.00
Car consumption type	Car sharing	10	8.47	8.47
	Friends Family Partner	21	17.80	26.27
	Company car	12	10.17	36.44
	New Car Owner	20	16.95	53.39
	Used Car Owner	49	41.53	94.92
	Leases a Car	6	5.08	100.00
Car usage in hours/week	7 or more	18	15.52	15.52
	4 till 7	39	33.62	49.14
	less than 4	59	50.86	100.00

To mitigate the risks of overfitting and insufficient sample size in our regression analysis, we derived new categorical variables. These include *City, Single* (living alone), *Partner* (living with registered/married or unregistered Partner)*, Family, Flat share, Apprentice* (highest education apprenticeship or apprenticeship + additional 1- or 2-year courses), *Academic,* and *High school,* where a value of 1 indicates the characteristic is true for the participant.

Our sample comprised roughly equal proportions across four groups: Control (28%), Reference Price (23%), Visual Trigger (23%), and a combination of Reference Price and Visual Trigger (26%). Due to the limited sample size, the issue of uneven randomization across the four groups demands further consideration for its potential impact on study outcomes.

The Kruskal-Wallis tests revealed no significant differences in age, $\chi 2(3, N = 116) = 0.71$, $p = .872$, and car price, $\chi 2(3, N = 116) = 5.38$, $p = .146$, across the treatment groups. There are no differences in the distribution of females, $\chi 2(3, N = 116) = 1.1176$, $p = 0.773$, City inhabitants, $\chi 2(3, N = 116) = 2.39$, $p = 0.5$), Partner $\chi 2(3, N = 116) = 1.64$, $p = 0.65$, Family $\chi 2(3, N = 116) = 4.99$, $p = 0.17$, and single household, $\chi 2(3, N = 116) = 2.7008$, $p = 0.44$, between the treatment groups. Academicians are distributed equally, $\chi 2(3, N = 116) = 2.1$, $p = 0.55$, as well as High school graduates, $\chi 2(3, N = 116) = 2.3245$, $p = 0.51$ and people who done an apprenticeship/ +additional coursesm, $\chi 2(3, N = 116) = 2.52$, $p = 0.47$, among the treatment groups. Furthermore, car usage is equally distributed, $\chi 2(6, N = 116) = 6.62$, $p = 0.36$) as well as car consumption type, $\chi 2(15, N = 116) = 17.04$, $p = 0.31$), across the treatment groups.

Table 3

Continuous variables: Differences between treatment groups

	Age	Car price
Control group	38.4	2.80
Interaction group	41.1	3.60
Reference price	38.4	2.40
Visual Trigger	40.2	2.70

Table 4

Sociodemographic variables: Distribution over treatment groups (in percent)

	Fem.	Part.	Fam.	Sgl.	Fl. S.	Acad.	High. S.	Appr.
Control gr.	40%	58%	18%	21%	15%	33%	27%	15%
Interaction gr.	30%	52%	4%	26%	11%	40%	37%	7%
Reference P.	41%	48%	19%	33%	11%	52%	18%	22%
Visual T.	42%	42%	7%	39%	16%	42%	29%	19%

Note. Row Names: Female, Partner, Family, Single (household), Flat Share, Academic, High School, Apprentice

Table 5

Car usage: Distribution over treatment groups

	7 or more	4 till 7	less than 4	Total
Control group	7	10	15	32
Reference Price	5	12	9	26
Visual Trigger	3	9	15	27
Interaction group	3	8	20	31
Total	18	39	59	116

Table 6

Car consumption: Distribution over treatment groups

	Carsh.	Social C.	Com. C.	New C.	Used C.	Leasing	Total
Control group	2	4	4	5	16	2	33
Reference Price	2	4	4	5	9	3	27
Visual Trigger	4	5	3	1	14	0	27
Interaction group	2	8	1	9	10	1	31
Total	10	21	12	20	49	6	118

Notes. Row Names: Car sharing, Using car of social circle (Friends/Family/Partner), Company car, New car owner, Used car owner, Leasing (private)

No statistically significant differences were observed among the four treatment groups. However, the significance criterion could be misleading due to the small number of observations per group and per category. Additionally, although no differences were found based on the observed variables tested, there may still be unobserved characteristics that are unevenly distributed among the groups. Consequently, while our results do not provide evidence to suggest that the randomization was unsuccessful, some reservations still persist.

Stimuli

We included an item to measure the car consumption type (e.g., owning first hand, owning second hand, leasing (private), company car, sharing car, using car of family/friend/partner; no car use at all). The answer “no car use at all” was used to exclude participants who did not fulfil the car consumption criterion.

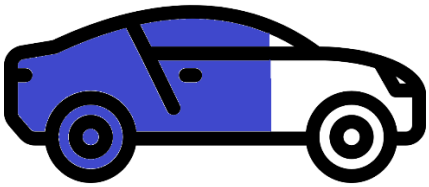
In a scenario description, the concept of FOD was explained and participants were asked to imagine that they bought a car for €25,000 two years ago. Further, they should consider if they would like to buy the battery extension feature that gives them an increased distance of 500km instead of 400km. For the scenario description, we especially focused on a short but sufficient

description of i.) the concept of Features on Demand and ii.) the situation that the participant should imagine (see. Schaefers et al., (2022)). We decided to choose the example of a battery extension as FOD, since the concept of a battery extension can be easily explained and due to its tangibility, we expect higher levels of reluctance (Schaefers et al., 2022).

The scenario description was followed by either the Visual Trigger (Figure 1) or the sketch of the car which was used to design the trigger (Figure 2). The visual Trigger has the contours of a car. This car is 75% filled with blue, indicating incompleteness. Below the car is a text "You are using 75% of the technology potential of your car". We included the sketch to avoid that the picture of the car by itself might bias the results.

Figure 1

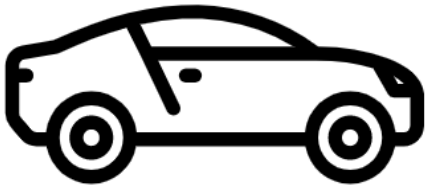
Visual Trigger



You are using 75% of the technology potential of your car

Figure 2

Control Condition(Visual Trigger)



Afterward, participants either received the price of the feature with (Figure 3) or without (Figure 4) the Reference Price. To stay as close to reality as possible, we choose an authentic pricing provided by the cooperating automotive company.

Figure 3

Reference Price

Battery extension (+100km range) *

Monthly: 49€
Lifelong subscription: 2500€

*This equipment was not chosen when the car was purchased, and would have costed an additional €2500 at the time.

Figure 4

Control Condition (Reference Price)

Battery extension (+100 km range)

Monthly: 49€
Lifelong subscription: 2500€

Following exposure to either the treatment or control conditions, participants were prompted to report their Purchasing Intention and Fairness Perception using Likert scales that ranged from 1 to 7.

Purchasing Intention was measured using a single item. Participants were asked to assess their likelihood of buying the battery extension on a 1-to-7-point Likert scale, ranging from "very unlikely" to "very likely" (Hussain & Ali, 2015). The utilization of a three-item approach (Chattopadhyay and Basu, 1990; Vogt, 2020; Schaefers et al., 2023) was not feasible due to software limitations preventing the design of a matrix table (See Figure 10 in the Appendix). A preliminary pilot test (n=5) was performed to evaluate survey comprehensibility and dependent variable measurement. Participants indicated that the three items, when translated into German and presented individually (instead of being presented in matrix format), were perceived as identical.

In constructing Fairness Perception, we adhered to guidelines established by Campbell (2007), Schaefers et al. (2023), and Vogt (2020). Like the Purchasing Intention measure, software limitations precluded the replication of the matrix used by Schaefers et al. (2022). Based on feedback from a preliminary pilot test highlighting translational similarities, we chose to include descriptive labels in a vertical arrangement and eliminated one item ("wrong/right"). Participants were asked to rate their opinion on Fairness of Distribution (FOD) using descriptors such as "very unfair/very fair" for Fairness Perception and "very unreasonable/very reasonable" for Reasonable Perception. Subsequently, we derived two items: fairness perception (single) and reasonable perception, which were closely correlated with a Spearman's correlation of 0.63. Given the strong correlation between these two items, we constructed the measure Fairness Perception, calculated as the average of the two individual scores.

Participants were asked to disclose their age, gender (options included male, female, and other), and area of residence (categorized as city, suburbs, or rural areas). In alignment with previous research suggesting that educational level influences the acceptance of access-based consumption models (Lawson et al., 2016), we included an educational variable with five predefined categories and the option "other". These categories—secondary school degree, High School, apprenticeships, apprenticeships with additional 1- or 2-year courses, and completed academic degrees (Bachelor, Master, PhD)—were tailored to reflect the German educational system.

Given the pilot study's findings, we also assessed participants' living situations, offering five predefined categories (single mother, flat share, single, partnered, and registered/married partner with or without children) along with the option "other".

The emphasis on car identification, as highlighted by Garbas et al. (2023), informed the creation of variables related to car bonding. We measured car usage in terms of hours per week to capture participants' psychological ownership of their vehicles (see Pierce et al.,2003). Car usage was segmented into three categories: low (less than 4 hours per week), medium (4 to 7 hours per week), and high (more than 7 hours per week), based on data distribution observed in our pilot study. Additionally, we evaluated another variable related to car bonding—willingness to pay for a car. Participants indicated their price range for a potential car purchase, using predefined monetary brackets set at € 10,000 intervals (up to € 100.000)

Procedure:

Participants entered the survey using a QR code. After an instruction and the question to confirm the willingness to participate in this experiment (i.e., informed consent), they were asked to state their type of car consumption. If they indicated that they do not use a car at all, they were debriefed. Those who confirmed using a car were presented with a scenario followed by two randomly assigned treatments: either a car icon or a visual nudge. Next, participants were shown the prices for battery extension for either permanent activation or monthly. Part of the participants saw the prices in combination with the Reference Price, and part of the participants saw the price without the Reference Price. Afterward, participants stated their Purchasing Intention and Fairness Perception. Before debriefing, sociodemographic and car bonding questions were answered. At the end of the experiment, participants were debriefed and told that the collected data is used on a group level to gain insights into the perception of FOD conditional on different marketing instruments (Full survey in the Appendix).

Analysis:

To test our hypotheses, we analysed the influence of the mechanisms and their interaction effects on Fairness Perception and Purchasing Intention. We began by examining descriptive statistics for each treatment group, and then used ANOVA to assess mean differences among the groups. Additionally, we conducted multiple regression analyses to model the relationships between dependent variables, treatment groups, sociodemographic factors, and car bonding variables.

For the ANOVA, four assumptions need to be satisfied—1. Normality of data distribution, 2. Similar variance in the groups, 3. Independence from each other, and 4. The data needs to be interval or nominal. The normality assumption that ANOVA requires is seen as fulfilled given the sufficient sample size (Norman, 2010). The Levene's test indicated that the variance among the groups was not statistically significant, both for purchasing intention and fairness perception. For purchasing intention, the results were as follows, Mean $F(3, 114) = 0.53$, $p = .66$, and Median $F(3, 114) = 0.42$, $p = .74$. For fairness perception, the corresponding values were: Mean $F(3, 114) = 0.35$, $p = .79$, and Median $F(3, 114) = 0.39$, p = .76. Independence is satisfied since we conducted a between-subjects design and, furthermore, the Likert scales satisfy interval data.

Additional assumptions checked for the multiple regression analysis include no homoscedasticity and no (perfect) multicollinearity. The assumption of homoscedasticity of the error term is addressed using robust standard errors in the regression models. Pearson correlation (Table 15 in the Appendix)) reveals no correlation over 0.5.

Transparency in model choice is an important aspect of this paper. Therefore, we provide additionally to the main model (Row 3, in the respective tables), which includes sociodemographic variables (12 variables) and car bonding (7 variables), a model without car bonding variables (Row 2), and a model just including the variables reference price, visual nudge, and the interaction of those (Row 1). In the appendix in Tables 16 and 19 we also display the results without the interaction term to check if the Interaction group has significant results compared to the Control group.

The same tables were also used to show why we decided to include an interaction term of age and car price. The absolute price that someone would spend on a car needs to be seen in a sociodemographic context. Because older people have more money at their disposal, we argue that the same stated purchase price for 30 or 50-year-old participants represents a different importance of cars in the lives of the 20-year-old respondents. Since adding the interaction term improves the goodness of fit and the interaction term is significant at the 5% level, we decided to include the interaction term.

Results

Fairness Perception

First, we will create a general overview of the Fairness perception in the 4 treatment groups, before we proceed to hypotheses testing. Table 7 presents Fairness Perception across the different treatment groups and Figure 5 presents a Box plot diagram. The Reference price (*M* =

4.4) and the interaction group (*M* = 4.2) have higher means and medians compared to the control group (*M* = 3.6). Meanwhile, the Visual Trigger group (*M* = 3.6) has only little difference compared to the control group.

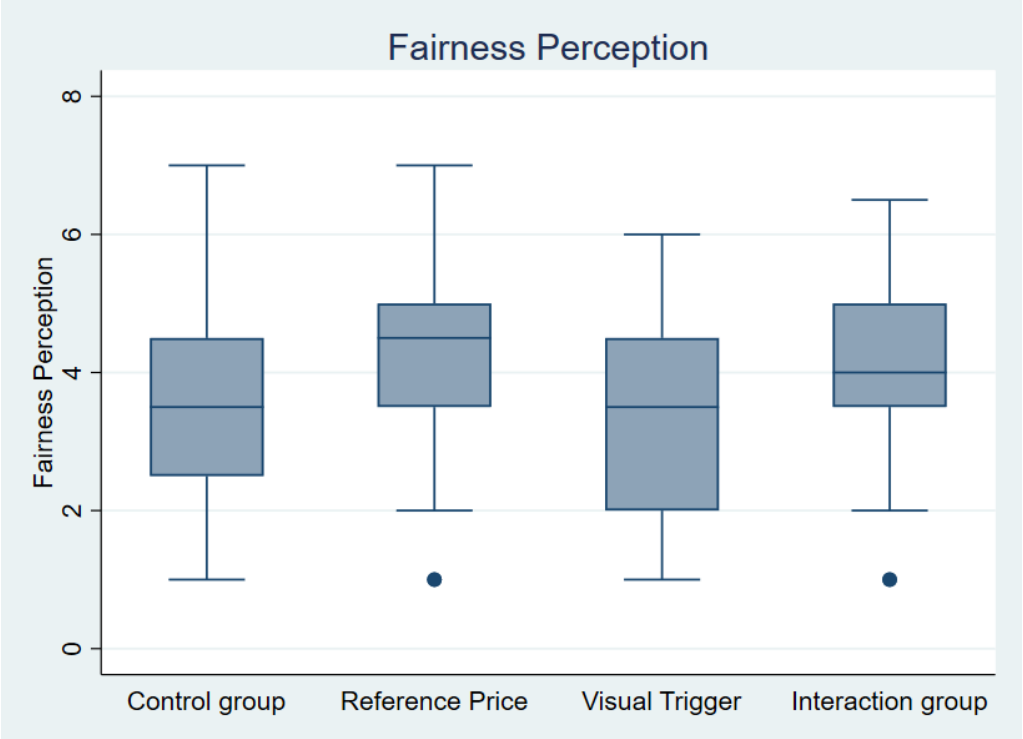
Table 7

Fairness Perception across treatment groups

	N	Mean	SD	Median	Min	Max
Control group	33	3.545	1.476	3.5	1	7
Interaction group	31	4.226	1.296	4	1	6.5
Reference Price	27	4.37	1.411	4.5	1	7
Visual Trigger	27	3.574	1.485	3.5	1	6

Figure 5

Box plot for Fairness Perception.



Note. The box plot illustrates the distribution of Fairness Perception across treatment groups. The line inside each box represents the median score. The upper and lower borders of the box correspond to the 75th and 25th percentiles. The "whiskers" reach down to the minimum and up to the maximum values within 1.5 times the interquartile range. Outliers beyond this range are depicted as individual data points.

A factorial ANOVA (*N* = 118) was conducted to compare the main effects of Reference price and Visual Trigger and the interaction effect on stated Fairness perception (Likert scale from 1 to 7). The model effect was significant $F(3, 1) = 2.69$, $p = .0496$), indicating that at least one of the independent variables has an impact on fairness perception. The proportion of variance explained by the model (R^2) is 0.0661. Afterward we calculated a Regression Analysis (*N* = 116), $R^2 = .36$, $F(22, 93) = 3{,}67$, $p < .000$, using all relevant control variables as post hoc analysis (Table 8, Row 3).

Table 8

Regression Analysis for Fairness Perception

	(1) Fairness P.	(2) Fairness P.	(3) Fairness P.
Ref. Price	.825**	.893**	1.029***
	(.374)	(.397)	(.365)
Visual Trigger	.029	-.176	-.16
	(.384)	(.374)	(.345)
Interaction effect	-.173	-.021	-.003
_cons	3.545***	3.355***	6.253***
	(.257)	(.519)	(1.038)
Observations	118	116	116
R-squared	.066	.208	.359
Adj. R-squared	.042	.098	.207
AIC	421.2	415.5	407
BIC	432.3	456.8	470.3

Note. Robust standard errors are in parentheses: *** p<.01, ** p<.05, * p<.1
Shortened version of the Table, for Full version see Table 17 in the Appendix.

H1: The main effect of the Reference price was significant, $F(1, 1) = 7.94$, $p = .006$. We reject the Null Hypothesis and confirm the Alternative Hypothesis that there is an effect of the Reference price on Fairness perception. Using the Regression Analysis as a post hoc test, we found that the Reference price has a statistically significant effect at 1% ($B = 1$, $p = .006$), resulting in a one-point increase in Fairness perception. According to Cohen (2013), this demonstrates a medium effect size (Table 17, 18 and Equation 1 & 2, Cohen's $f^2 = .152$). The influence of the Reference price on fairness perception remains robust even when excluding car bonding-related variables from the regression model (Row 2) and further excluding sociodemographic variables (Row 1). Thus, we conclude that car users who have been exposed to the Reference price perceive FOD fairer.

H3: There is no significant main effect of the Visual Trigger on Fairness Perception, *F(1*, 1) = 0.05, *p* = .8253. We fail to reject the Null Hypothesis. The Regression Analysis revealed a non-significant negative effect of the Visual Trigger on Fairness Perception, *B* = 0.16, *p* = .65. We conclude that the Visual Trigger has no effect on Fairness Perception.

H5: The interaction between the independent variables Reference price and Visual Trigger also showed no significant effect, *F*(1, 1) = 0.11, *p* = 0.742). Therefore, we fail to reject the Null Hypothesis. Even though the being in the interaction group results in a higher Fairness Perception, *B* = 0.87, p = .012, compared to the control group (Table 16 in the Appendix), we do not find an interaction effect when controlling for the effects of the Reference Price and the Visual Trigger, *B* = 0.003, *p* = .995.

Purchasing Intention

In table 9, statistics for Purchasing Intention over the treatment groups are presented. The Visual Trigger (*M* = 4.2) and the interaction group (*M* = 3.9) yield higher means as the control group (*M* = 3.8). The Reference price (*M* = 3.6) has a lower mean compared to the control group.

Table 9

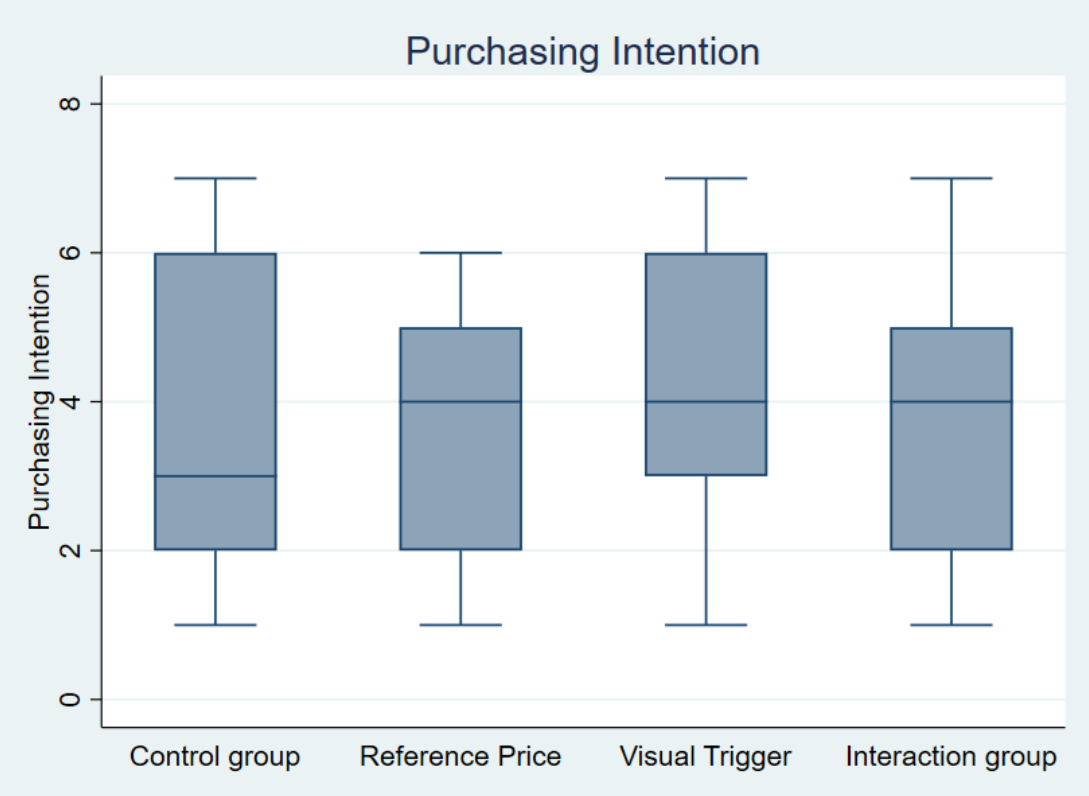
Purchasing Intention across treatment groups

	N	Mean	SD	Median	Min	Max
Control group	33	3.788	2.103	3	1	7
Interaction group	31	3.871	1.928	4	1	7
Reference Price	27	3.556	1.805	4	1	6
Visual Trigger	27	4.185	1.902	4	1	7

A visualisation of the distribution of Data is given in Figure 3. We want to highlight that the median values of all treated groups are higher than in the control group.

Figure 6

Box plot for Purchasing Intention



Note. The box plot illustrates the distribution of Purchasing Intention scores across the treatment conditions. The line inside each box represents the median score. The upper and lower borders of the box correspond to the 75th and 25th percentiles. The "whiskers" extend down to the minimum and up to the maximum values within 1.5 times the interquartile range. Outliers beyond this range are depicted as individual data points.

A factorial ANOVA (N = 118) was conducted to compare the main effects of Reference Price and Visual Trigger and the interaction effect on the stated Purchasing Intention (Likert scale 1 to 7). The model effect was non-significant $F(3, 1) = 0.44$, $p = .72$, displaying that none of the treatments had an effect on Purchasing Intention. The proportion of variance explained by the model (R^2) is .0115. Afterward, we calculated a Regression Analysis (N = 116), $R^2 = .29$, $F(22, 93) = 3.04$, $p < .000$ using all relevant control variables as post hoc analysis (Table 10, Row 3).

Table 10

Regression table Purchasing Intention

	(1) P. Int.	(2) P. Int.	(3) P. Int.
Reference Price	-.232	-.245	-.02
	(.505)	(.514)	(.445)
Visual Trigger	.397	.472	.55
	(.518)	(.486)	(.472)
Interaction effect	-.082	-.075	.003
	(.713)	(.723)	(.679)
Constant	3.788***	5.009***	7.111***
	(.367)	(.837)	(1.475)
Observations	118	116	116
R-squared	.013	.128	.291
Ad. R-squared	-.013	.007	.123
AIC	459.9	494.1	486.1
BIC	507	535.4	549.4

Note.

Robust standard errors are in parentheses *** p<.01, ** p<.05, * p<.1
Shortened version of the table, for the full version see Table 20 in the Appendix.

H2: There is no significant main effect of Reference Price, $F(1, 1) = 0.38$, $p = .54$. We fail to reject the Null Hypothesis. Using the Regression Analysis as a post hoc test, we found that the Reference price has a negative statistically significant effect of $B = -0.002$ ($p = .96$). Thus, stating that there is no effect of the Reference Price on Purchasing Intention.

H4: The independent variable Visual Trigger did not exhibit a significant effect, $F(1, 1) = 1.03$, $p = .31$). We fail to reject the Null Hypothesis. The Regression Analysis revealed a non-significant positive effect of the Visual Trigger on fairness perception of $B = 0.55$ ($p = .25$). Even though the effect stays robust to the changes in control variables, there is not enough evidence of a positive effect of the Visual Trigger on Purchasing Intention.

H6: The interaction between the independent variables Reference Price and Visual Trigger also showed no significant effect, $F(1, 1) = 0.01$, $p = .91$. Therefore, we fail to reject the Null Hypothesis. The Regression Analysis (Main Model, Row 3) displayed no interaction effect when controlling for the effects of Reference price and Visual Trigger, $B = 0.003$, $p = .99$. Worth mentioning is the coefficient size for the Interaction group which is, $B = 0.53$, $p = .306$, compared to the control group (Table 19, Row 5, in the Appendix).

Robustness Checks

For our analysis, we made specific decisions, such as setting a minimum time criterion and constructing the Fairness Perception variable from two individual items. In this section, we show how our results change when we use alternative decisions and modify our data accordingly.

As mentioned in the cleaning section, we opted to analyse observations from participants who spent at least 2 minutes completing the survey. The lead researcher estimates that completing the survey should reasonably take between 2 and 3 minutes. The amount of time that participants spend on the survey is crucial for the validity of their responses. Participants who rush through the survey may not read the scenario description or even notice the small print of the Reference Price. In such cases, their answers on the dependent variables might be random, which could introduce statistical noise and bias into our analysis.

To address this potential bias due to insufficient engagement with the survey content, we examine how the effects of the treatment and the model fit change when we modify the minimum time requirement for each participant. Tables 11 and 12 present the variations in effect sizes and model fit parameters upon adjusting the minimum time requirement, utilizing the main regression model that includes all relevant controls. The time minimum criterions are set to 60, 90, 120 (default), 150 and 180 seconds.

Table 11

Regression results for Fairness Perception with different time minimum requirements

	(1) Fair P.- 60 seconds	(2) Fair P.- 90 seconds	(3) Fair P.- 120 seconds	(4) Fair P.- 150 seconds	(5) Fair P.- 180 seconds
Ref. Price	.902**	1.027***	1.029***	1.122***	1.09**
	(.378)	(.368)	(.365)	(.376)	(.466)
Visual Trigger	-.027	-.009	-.16	-.064	-.029
	(.342)	(.336)	(.345)	(.365)	(.497)
Interaction effect	.073	-.094	-.003	-.443	-.426
	(.504)	(.501)	(.515)	(.514)	(.659)
Constant	5.858***	6.259***	6.253***	4.637***	4.497***
	(.92)	(.987)	(1.038)	(.954)	(1.282)
Observations	127	125	116	103	79
R-squared	.312	.349	.359	.396	.41
adj.R-sq	0.167	0.208	0.207	0.230	0.178
AIC	450.9	437.6	407.0	349.5	285.5
BIC	516.4	502.6	470.3	410.1	340.0

Note. Robust standard errors are in parentheses: *** p<.01, ** p<.05, * p<.1
Shortened version of the Main Regression, including all relevant controls.

For the dependent variable Fairness Perception, there is no clear trend over time regarding the model fit (measured by R^2 and adjusted R^2). However, the positive effect of the Reference Price

on Fairness Perception is consistent and significant. The significance and inconsistency of the coefficients for Visual Trigger and the interaction effect align with the rejection of the related Null Hypotheses.

When we apply these minimum time requirements to the dependent variable Purchasing Intention, we observe time trends in Table 12. The model fit improves as the time minimum requirement increases. The effect direction of the Reference Price on Purchasing Intention reverses from negative to positive and increases in magnitude over time. Similarly, there is a trend for the effect of the Visual Trigger on Purchasing Intention. The effect size increases, and the significance increases, reaching a level of, $B = 0.81$, $p = .125$ with a 150-second time threshold and achieving statistical significance at the 5% level ($B = 1.4$, $p = .035$) with a 180-second threshold. Additionally, there is a substantial change in the sign and magnitude of the interaction effect.

Table 12

Regression results for Purchasing Intention with different time minimum requirements

	(1) P.I.– 60 seconds	(2) P. I.– 90 seconds	(3) P. I.– 120 seconds	(4) P. I.– 150 seconds	(5) P. I.- 180 seconds
Ref. Price	-.225	-.116	-.02	.062	.426
	(.45)	(.461)	(.445)	(.465)	(.563)
Visual Trigger	.425	.413	.55	.806	1.437**
	(.466)	(.471)	(.472)	(.521)	(.667)
Interaction effect	.448	.298	.003	-.666	-1.038
	(.66)	(.677)	(.679)	(.711)	(.837)
Constant	7.344***	7.309***	7.111***	5.419***	4.71**
	(1.37)	(1.421)	(1.475)	(1.561)	(2.088)
Observations	127	125	116	103	79
R-squared	.272	.265	.291	.335	.41
adj.R-sq	0.118	0.106	0.123	0.152	0.178
AIC	530.2	522.3	486.1	425.7	331.0
BIC	595.6	587.3	549.4	486.3	385.5

Note. Robust standard errors are in parentheses: *** p<.01, ** p<.05, * p<.1
Shortened version of the Main Regression, including all relevant controls.

The redefinition of the minimum time requirement showed that our results are robust. Overall, there is a trend of the more time participants spend doing the journey, the higher the model fit and the effect sizes. Even when we include participants who spend only 60 seconds doing the survey, the effect of the Reference Price on Fairness Perception is robust. Furthermore, a minimum time requirement of 180 seconds displayed a positive and significant effect of the Visual Trigger on Purchasing Intention. The results of the ANOVA and Regression Analysis,

spanning data from participants who completed the journey in as little as 42 seconds (Table 21 in the Appendix), are available in the Appendix (Tables 22, 23, and 24).

Another Robustness check referred to the construction of Fairness Perception. Fairness Perception was constructed by averaging two individual items: *fairness perception* (single item) and *reasonability perception*. This choice was based on relevant literature, and we argue that it provides a good measure for assessing how people rate the fairness of Features on Demand (FOD), and under what conditions they are more likely to accept and ultimately purchase FOD. To demonstrate the robustness of our dependent variable against different compositions, we present the regression table for the single item Fairness Perception. The main regression (N = 116) model, R^2 = .42, $F(22, 93) = 5.54$, $p < .00$, is outlined in Table 13, Column 3. The effect of the Reference Price in the single item definition of the Fairness perception (B = 1.41, $p < .000$) increase in magnitude and significance compared to the two-item definition of Fairness perception (B = 1, p = .006). Additionally, the absence of effect of the Visual Trigger and the interaction term are supported by the one-item definition of Fairness perception as well. We interpret this alternative operationalization of Fairness Perception as corroborative evidence supporting the notion that the Reference Price positively influences the Fairness Perception of Features on Demand.

Table 13

Regression table Fairness perception (single item)

	(1) Fairness P.	(2) Fairness P.	(3) Fairness P.
Reference Price	1.071**	1.215***	1.412***
	(.424)	(.45)	(.386)
Visual Trigger	.071	-.137	-.139
	(.437)	(.436)	(.392)
Interaction effect	-.207	-.033	-.061
	(.599)	(.604)	(.554)
Constant	3.485***	3.555***	7.753***
	(.286)	(.652)	(1.111)
Observations	118	116	116
R-squared	.086	.214	.416
Adj. R-squared	.062	.105	.278
AIC	451.8	447.8	429.4
BIC	462.7	489.1	492.7

Note. Robust standard errors are in parentheses: *** p<.01, ** p<.05, * p<.1
Shortened version of the Main Regression, including all relevant controls.

Discussion

In the current research, we aimed to test if behavioural mechanisms can be used to increase FOD acceptance among car users. We developed two mechanisms to improve the acceptance of FOD and examined their effects on Fairness Perception and Purchasing Intention.

The Findings display that the Reference Price improves the Fairness Perception of FOD, while at the same time it did not affect Purchasing Intention. Even though there is some evidence that the Visual Trigger might improve the Purchasing Intention, Fairness Perception is not influenced. The data suggest that there is no interaction effect of both mechanisms on either Fairness Perception or Purchasing Intention.

Discussion of the Main Findings

Reference Price Increases Fairness Perception

The finding that the Reference Price positively influences Fairness Perception aligns with Prospect Theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1981). According to this theory, gains and losses are contextualized and evaluated in relation to a reference point, rather than in isolation. We hypothesize that, in the absence of the Reference Price, participants compare the current situation to their previous car purchases where they only paid the purchase price (Kahneman et al., 1986). In doing so, they may overlook that outright ownership of the feature would have incurred an additional expense at the time of the car's purchase.

This finding also corroborates the pilot study by Bosbach et al. (2023), which discovered an effect on Fairness Perception through the "saving money framing" of FOD. Although the saving money framing in the pilot study differs from the Reference Price, both treatments employ the same underlying mechanism: they clarify to the consumer that they are not being charged twice for the same feature.

Moreover, our results are consistent with existing literature on reference prices (e.g., Kamins et al., 2004). Both our study and previous research suggest that providing a reference point can effectively enhance Fairness Perception.

Reference Price Does not Affect Purchasing Intention

The observation that the Reference Price does not influence Purchasing Intention is not in line with the findings in the pilot study (Bosbach et al., 2023). The result that a similar treatment significantly influences Fairness Perception, but has no notable impact on Purchasing Intention, diverges from our pilot study's findings. Apart from the differences in the mechanisms and the independent variables, both studies had another major disparity.

Unlike the pilot, which explored multiple intangible features (e.g., digital radio, parking assistance), this study focused solely on a tangible feature: battery extension. Earlier research indicates that tangible features face higher consumer resistance (Schaefers et al., 2022; Garbas et al., 2023). This difference in the tangibility perception of the feature might explain the deviation in findings.

Furthermore, Chandrashekaran and Grewal (2003) found that reference prices are less influential when consumers are highly engaged with a product. This might explain why, despite finding the FOD fairer, consumers who are deeply attached to their cars and react strong to the feature tangibility did not display increased Purchasing Intention.

Our findings diverge from those of Schaefers et al. (2022) and Garbas et al. (2023), who identified Fairness Perception as a strong mediator of Purchasing Intention. The divergence between the results of their studies and ours may be attributed to their focus on FOD perception rather than on improving perception. Additionally, their use of check questions and a more homogeneous target group could account for reduced heterogeneity.

In a broader academic context, the theory of planned behaviour (Ajzen, 1991) suggests that the attitude (e.g., fairness perception) towards a behaviour, along with subjective norms, determines intentions. Experimental evidence by Pei et al. (2014), displayed that a higher fairness perception directly and indirectly - mediated by higher trust- affects purchasing intention. Suggesting that adequately with a more positive fairness perception, the intention to subscribe to FOD should increase as well.

Furthermore, enhanced fairness perception as well as trust influences customer loyalty (Kaura et al., 2025). In a context of FOD, this could imply that with more favourable fairness perception, customers might be more likely to repurchase a car from the same brand.

The discrepancy between Fairness Perception and Purchasing Intention raises an important question: which is a better predictor of actual purchasing behaviour for FOD? Research has already explored that there is a gap between stated intention and performed behaviour (Sheeran & Webb, 2016). Studies have separately found predictive effects of Fairness Perception (Daskalopoulou, 2008) and Purchasing Intention (Morrison, 1979; Wee et al., 2014) on purchasing outcomes. However, we did not find literature that compares the predictive power of attitude (e.g., Fairness Perception) and intention measures.

It's important to note that while existing literature doesn't adequately explain the discrepancy between Fairness Perception and Purchasing Intention, our data provide valuable insights.

Although the average score is lower for the Reference Price group than for the Control group, the median value is larger. This suggests that while more participants in the Reference Price group gave positive responses, extreme votes skewed the mean higher in the Control group. Additionally, the effect size and model fit increase with the amount of time participants spend on the survey. This leads to the conclusion that both the Reference Price and Control groups likely included participants who rushed through the survey and stated extreme opinions that have biased the results.

The Visual Trigger Does not Affect Fairness Perception and Purchasing Intention

There was no evidence of an effect of the Visual Trigger on Fairness Perception. The lack of impact we observed doesn't really support or contradict what researchers like Fogg (2009) and Matsumura et al. (2009) have said in their studies. According to their definition, triggers are not designed to influence Purchasing Intention while increasing Fairness Perception but designed to trigger actual behaviour. Especially the trigger methodology designed by Fogg (2009) seems to not particularly stimulate the fairness aspect of the triggered behaviour, but focus on pain/pleasure, fear/hope, and rejection/social acceptance.

In other contexts, Visual Triggers have been effective to change behaviour. A visible nudge that showed the sugar content in each menu was proven to reduce unhealthy food consumption (Mikkelsen et al., 2021). A visual emotive logo which associated feelings with the purchasing decision was shown to reduce incompatible purchases in a digital environment. (Esposito et al., 2017). Similarly, visual labels featuring bar charts have been shown to encourage energy-efficient decisions (Newell et al., 2013).

In this study, while the evidence for the Visual Trigger's impact on Purchasing Intention was not compelling, the data did hint at a non-significant, but consistent positive effect. Especially if the analyses focus on participants who spend at least 3 Minutes completing the survey, there is a significant effect of the Visual Trigger on Purchasing Intention. We hypothesize that a larger sample size could potentially display a significant effect of the Visual Trigger on Purchasing Intention.

No Interaction Effects Found for Both Mechanisms

Our study found no interaction effects on either Fairness Perception or Purchasing Intention. This is partially consistent with research by Newell et al. (2014), who also found no interaction effects between visual and text elements in their study on energy efficiency measures. They did, however, observe interactions between different types of visual elements, such as bar charts and efficiency stars.

While we didn't find any interaction effects, we did observe a cumulative positive impact when both mechanisms were applied together. Specifically, the combination of both treatments led to a significant positive effect on Fairness Perception and a non-significant but consistent positive impact on Purchasing Intention.

Limitations & Future Research

Insufficient Sample Size

Since the distribution of the survey using an online panel was not possible, the necessary sample size of 245 participants was not met. The consequence of this insufficient sample size may be that marginal effects, like the effect of the Visual Trigger on Purchasing Intention, could have been significant with larger sample sizes. Future research could replicate this experiment with a sufficient sample size.

Lack of Subgroup Analysis

The small sample size prevented subgroup analysis, especially across age groups, limits the understanding of how the mechanisms work among different age groups. Notably, Hauslbauer et al. (2022) found that the effect of nudges on public transport subscription differentiated among age groups. Unfortunately, adults between 30 and 50 years—potential car buyers with high purchasing power—were underrepresented in our survey.

Randomization Efficacy and Unobserved Heterogeneity

Related to the small sample size per group is the questionability of successful randomization of subjects among the different treatment groups. There were no significant differences in observed heterogeneity among the participants in the different groups. However, the low cell counts in our chi-square tests for group differences might make the significance criterion unreliable. High differences in observed characteristics were noted, and there is reason to question whether observed heterogeneity is a good indicator for unobserved heterogeneity.

To decrease unit heterogeneity further, Schaefers et al. (2022) employed specific measures to gauge preferences for feature tangibility and aversion to technology. Our study was grounded in economic theory, so we opted for more objective measures and used car bonding variables. Future research will identify more control variables, which can then be used to decrease unobserved heterogeneity in FOD-related research or to perform a stratified randomization.

No Check Questions to Avoid Rushing through the Survey

Using the minimum time requirement was a valid approach to reduce the impact of participants who rushed through the survey. However, additional check questions that

ask details about the scenario description could have been incorporated into the study design to test if participants have noticed crucial information.

One item Measurement of Purchasing Intention

The use of a single-item measure for assessing purchasing intention may not have been sufficiently engaging to motivate subjects to a decision-making process that is close to real-life purchasing behaviour. This choice was made based on problems with the survey design and translational similarities of the three items used by Schaeffer et al. (2022). Future research could either replicate the three-item matrix table or, if survey content is in German, use a different German measurement of Purchasing Intention to avoid translational compromises.

Feature Selection Bias

Using the battery extension as an example feature was based on its simple explanation. Because the feature was tangible, higher levels of reluctance were expected. These higher levels of reluctance might have also created more heterogeneity in Fairness Perception and Purchasing Intention.

Furthermore, three participants responded after participating in the experiment and mentioned their ecological concerns related to this particular feature. Participants replied that it is a waste of energy and not sustainable to drive around with a heavy battery that is limited in its capacity. The tangible nature and perceived unsustainability of the battery extension feature should be noted. Future research could explore whether more intangible features, such as a parking assistant, generate less polarized opinions and different treatment effects.

Constraints in Design Methodology

The Visual Trigger was designed while also referring to Gamification (Zichermann & Cunningham, 2011) and “liking by association” (Cialdini, 2007). In the scope of this online survey, we were limited to developing an interactive design that is likely to associate FOD purchasing with the upgrading of cars as one knows it from car racing games. One example of interactive design could be a level upgrade, visualised with an increase in the level bar chart or a badge. However, if car manufacturers apply those mechanisms when designing a virtual interface, they might be able to test whether such an interactive interface would result in higher purchasing behaviour of FOD.

Conclusion

Behavioural mechanisms have the potential to increase car users' acceptance of Features on demand. The online experiment yielded evidence that the Reference Price, which highlights that money was saved in the purchasing process of the car, had a positive and economic relevant effect on the Fairness perception of Features on Demand. While our study found a positive impact of the Reference Price on fairness perception toward Features on Demand, it surprisingly did not boost purchasing intentions, contrasting with clear findings from prior research. Literature furthermore suggested that a behavioural trigger, with Gamification and Association elements, have the potential to trigger behavioural change. However, the developed Visual Trigger that was designed to build up on a challenging Game element and should link Features on Demand to car racing game did not influence Fairness perception. Even though there is some evidence that with a higher sample size there could have been a positive effect on Purchasing Intention, this work, does not found enough evidence to make a statement. Lastly, the group that had been confronted with both mechanisms, was different in fairness perception compared to the control group; however, no interaction effect was found.

This research was among the first to investigate how the new trend in the automotive industry are perceived from a consumer's perspective. There have already been a few studies that analysed what the essential foundations of the decision-making process are, but as far as we know, no study that tried to improve FOD perception. When considering the novelty of this field and the associated science, our study has helped to shed some light on understanding the reluctance towards Features on Demand and how it can be addressed. Since, the general shift of consumption and especially in the automotive industries towards subscription-based business models are developing with rapid speed, this pioneer work might be a clue for future research that addresses this shift.

This work also provides valuable insights for car manufacturers. One important finding is the importance of transparency in pricing. Indicating that the cost of the feature is not included in the original vehicle price can eliminate the sense of betrayal that arises from the feeling of "paying twice". A simple notice clarifying this, presented alongside the terms of the feature subscription, can greatly improve the perception of fairness. This simple concept of transparency in pricing requires minimal effort, but can have a significant impact on customer relations. In addition, car manufacturers can also develop and test interactive designs for the interface of FOD vehicles. This interface could be inspired by car racing games, for example, by treating FOD

purchases like level upgrades or by accompanying the entry into the software with characteristic visual or acoustic elements.

In conclusion, the potential for Features on Demand (FOD) research is extensive and promising. The limitations outlined in this study are not obstacles, but opportunities that point the way for future scientific work and practical applications. We encourage both the automotive industry and the academic community to build on our findings through field trials. By randomly incorporating these mechanisms into user interfaces, we can better understand their impact on consumer buying behaviour. As the automotive landscape shifts towards FOD, behavioural scientists have a unique opportunity to explore the mechanics of human decision-making. In this, our study is just a small candle lighting a small area; the work of future research will explore this unknown field.

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Appendix

Table 14

Pilot study: Regression table Current car & Fairness perception

	(1) Current C.	(2) Current C.	(3) Current C.	(4) Fair	(5) Fair	(6) Fair
Saving M. Framing	1.133***	1.126***	1.029***	.549*	.526*	.57*
	(.33)	(.326)	(.344)	(.29)	(.289)	(.303)
Academic		-.055	-.037		.241	.287
		(.438)	(.448)		(.388)	(.395)
Age		-.03*	-.032**		-.02	-.019
		(.015)	(.016)		(.013)	(.014)
Female		-.33	-.263		.648**	.684**
		(.336)	(.36)		(.298)	(.317)
Single Paarent		-2.289	-2.367		-.544	-.306
		(1.793)	(1.84)		(1.587)	(1.622)
Couple		.373	.394		-.345	-.448
		(.48)	(.495)		(.425)	(.436)
Couple wi. children		1.007*	1.042*		.577	.529
		(.592)	(.603)		(.524)	(.532)
Other		-.341	-.328		-.43	-.543
		(.449)	(.468)		(.398)	(.413)
Suburbs		-.725*	-.674*		-.252	-.252
		(.377)	(.39)		(.334)	(.343)
Rural		-.253	-.245		-.024	.036
		(.593)	(.619)		(.525)	(.545)
Car Pr. 20-50tsd €			-.358			.463
			(.418)			(.368)
Car Pr. 50-70tsd €			-.054			.093
			(.57)			(.502)
Car Pr. > 70tsd €			-.156			-.015
			(.511)			(.45)
Car use hour/week			.023			.01
			(.033)			(.029)
Const.	3.617***	5.326***	5.301***	3.067***	2.801***	2.472***
	(.225)	(.801)	(.906)	(.198)	(.709)	(.799)
Observations	112	112	112	112	112	112
R-squared	.097	.208	.219	.031	.139	.158
Adj. R-sq	0.089	0.129	0.106	0.023	0.053	0.036
AIC	444.2	447.5	454.0	415.3	420.2	425.7
BIC	449.6	477.4	494.8	420.8	450.1	466.5

Note. Standard errors are in parentheses: *** p<.01, ** p<.05, * p<.1
Row 1 & 4 basic Model with no controls, Row 2 & 5 Model with sociodemographic control variables, Row 3 and Row 6 Main Model including sociodemographic and car bonding variables. Variables in the constant (Male, Single Household, City and car price < 20 tsd. €)

Figure 7

Histogram Age

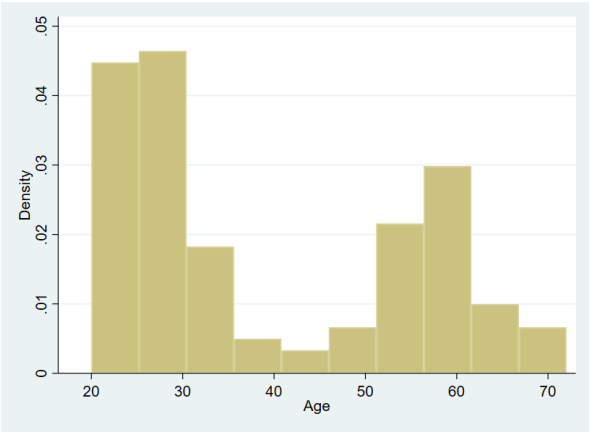

Figure 8

Histogram Fairness Perception

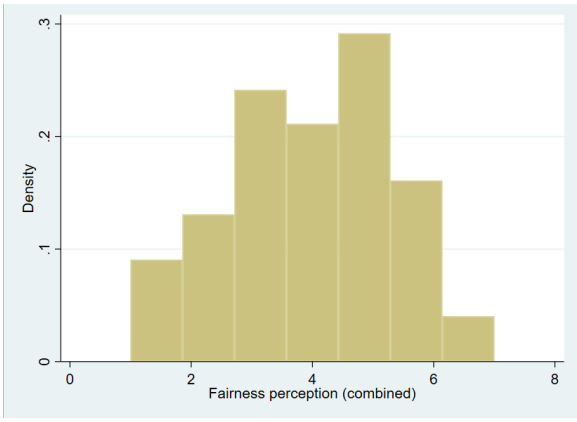

Figure 9

Histogram Purchasing intention

Figure 10

Variable Operationalisation Purchasing Intention (Vogt, 2020)

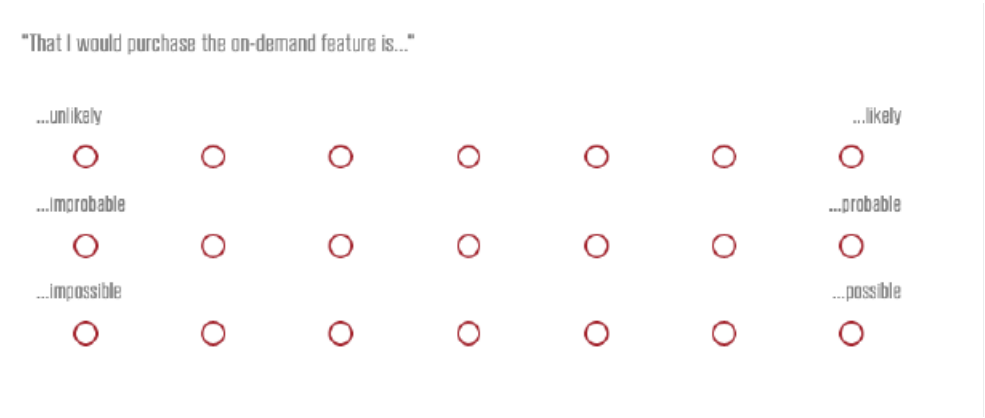

Table 15

ANOVA Table

ANOVA Results for Different Models

Dep. Variable	Model	Partial SS	df	MS	F	Prob>F	R-squared
Fairness P.	Model 1	16.235.848	3	54.119.494	2.69	0.0496	0.0661
	Reference P.	15.958.482	1	15.958.482	7.94	0.0057	
	Visual Trigger	0.09838683	1	0.09838683	0.05	0.8253	
	Interaction	0.21950795	1	0.21950795	0.11	0.7417	
Fairness P. (single Item)	Model 2	27.867.381	3	92.891.269	3.56	0.0164	0.0857
	Reference P.	27.389.104	1	27.389.104	10.51	0.0016	
	Visual Trigger	0.03139322	1	0.03139322	0.01	0.9128	
	Interaction	0.31332221	1	0.31332221	0.12	0.7294	
Purchasing Int.	Model 3	39.200.498	3	13.066.833	0.44	0.7225	0.0115
	Reference P.	11.326.562	1	11.326.562	0.38	0.5366	
	Visual Trigger	30.319.673	1	30.319.673	1.03	0.3126	
	Interaction	0.03603017	1	0.03603017	0.01	0.9122	

Table 16

Fairness Perception Model Comparisons

	(1) Fair. P.	(2) Fair. P.	(3) Fair. P.	(4) Fair. P.	(5) Fair. P.	(6) Fair. P.
Reference Price	.825**	.843**	.893**	.987**	1.029***	.864**
	(.374)	(.404)	(.397)	(.384)	(.365)	(.378)
Visual Trigger	.029	-.207	-.176	-.194	-.16	-.24
	(.384)	(.377)	(.374)	(.357)	(.345)	(.363)
Interaction group	.68*	.747**	.696*	.861**	.866**	.684*
	(.347)	(.364)	(.356)	(.348)	(.336)	(.346)
Age		.013	.012	-.023	-.031	.014
		(.013)	(.011)	(.022)	(.02)	(.011)
Female		.48	.491	.575*	.601*	.507
		(.314)	(.317)	(.318)	(.321)	(.319)
City		-.149	-.046	-.425	-.367	-.264
		(.308)	(.313)	(.303)	(.291)	(.316)
Suburbs		-.798	-.727	-.917*	-.878*	-.891*
		(.502)	(.493)	(.478)	(.476)	(.46)
Living Alone		-.876*		-.289		
		(.48)		(.454)		
Flatshare		-1.124***		-.58		
		(.417)		(.478)		
With Partner		-.68		-.368		
		(.496)		(.482)		
Partner and Children		-.115		.536		
		(.589)		(.579)		
Reg./married Partner		-.699		-.395		
		(.611)		(.612)		
Academic		.176		.051		
		(.373)		(.334)		
Other		.221		-.054		
		(.822)		(.733)		
Apprenticeship and further 1-or-2 year courses		-.941		-.366		
		(.581)		(.553)		
Secondary School		-.595		-.705		
		(.466)		(.507)		
Apprenticeship		.395		.36		
		(.405)		(.422)		
Single (household)			-.798*		-.183	-.444
			(.464)		(.434)	(.481)
(Living with) Partner			-.646		-.334	-.404
			(.48)		(.457)	(.524)
Family			.676		1.03***	.809*
			(.433)		(.38)	(.414)
Flatshare			-1.09**		-.51	-.591
			(.443)		(.49)	(.515)
Apprentice			.304		.606	.637
			(.424)		(.408)	(.459)
Academic			.475		.523	.489
			(.425)		(.415)	(.458)
Highschool			.356		.501	.537
			(.483)		(.472)	(.497)

Car Usage (Hours/Week)				-.459**	-.472**	-.508**
				(.221)	(.205)	(.218)
Using car of Friends/Partner/Family				-.454	-.41	-.138
				(.535)	(.537)	(.515)
Company car				-.883	-.833	-.858
				(.654)	(.666)	(.697)
New Car Owner				-.883	-.855	-.718
				(.649)	(.667)	(.667)
Used Car Owner				-1.079**	-1.01**	-.913*
				(.481)	(.492)	(.477)
Leases a Car				-2.025**	-2.006**	-1.811**
				(.77)	(.791)	(.812)
Car Price				-.417	-.489*	.049
				(.267)	(.25)	(.115)
Car Price*Age				.012*	.014**	
				(.007)	(.006)	
_cons	3.545***	3.768***	3.355***	6.64***	6.253***	4.789***
	(.257)	(.534)	(.519)	(1.058)	(1.038)	(.962)
Observations	118	116	116	116	116	116
R-squared	.066	.246	.208	.371	.359	.303
Adj. R-Squared	0.042	.115	.098	.197	.207	.147
AIC	421.3	415.8	415.5	410.7	407	414.8
BIC	432.3	465.3	456.8	482.3	470.3	475.3

Note. Robust standard errors are in parentheses. *** p<.01, ** p<.05, * p<.1
This table is displayed to give insights in our Model decision. Based on Model fit criteria's we decided to choose the constructed set of categorical variables (Model 3, Model 5, Model 6 over Model 2 and Model 4) and we decided to choose the Model including the interaction term (Model 5 over Model 6). In further Regression tables, Model 1, Model 3 and Model 5 (Model 5 is the Model referred to as Main Model) will be displayed.

Table 17

Final Fairness perception Regression table (Full Version)

	(1) Fair. P.	(2) Fair. P.	(3) Fair. P.
Reference P.	.825**	.893**	1.029***
	(.374)	(.397)	(.365)
Visual trigger	.029	-.176	-.16
	(.384)	(.374)	(.345)
Interaction effect	-.173	-.021	-.003
	(.525)	(.525)	(.515)
Age		.012	-.031
		(.011)	(.02)
Female		.491	.601*
		(.317)	(.321)
City		-.046	-.367
		(.313)	(.291)
Suburbs		-.727	-.878*
		(.493)	(.476)
Single (household)		-.798*	-.183
		(.464)	(.434)
(Living with) Partner		-.646	-.334

		(.48)	(.457)
Family		.676	1.03***
		(.433)	(.38)
Flatshare		-1.09**	-.51
		(.443)	(.49)
Apprentice		.304	.606
		(.424)	(.408)
Academic		.475	.523
		(.425)	(.415)
Highschool		.356	.501
		(.483)	(.472)
Car Usage (Hours/Week)			-.472**
			(.205)
Using car of Friends/Family/P.			-.41
			(.537)
Company car			-.833
			(.666)
New Car Owner			-.855
			(.667)
Used Car Owner			-1.01**
			(.492)
Leases a Car			-2.006**
			(.791)
Car Price			-.489*
			(.25)
Car Price*Age			.014**
			(.006)
_cons	3.545***	3.355***	6.253***
	(.257)	(.519)	(1.038)
Observations	118	116	116
R-squared	.066	.208	.359
Adj. R-squared	.042	.098	.207
AIC	421.2	415.5	407
BIC	432.3	456.8	470.3

Note. Robust standard errors are in parentheses. *** p<.01, ** p<.05, * p<.1

Table 18

Main Model excluding Reference Price (shortened)

	(1) Fair. P.
Visual Trigger	-.062
	(.25)
Constant	5.614***
	(1.13)
Observations	116
R-squared	.261

Note. Robust standard errors are in parentheses. *** p<.01, ** p<.05, * p<.1

Equation 1

Effect size Formula Cohen (2013)

$$f^2 = \frac{R^2_{\text{included}} - R^2_{\text{excluded}}}{1 - R^2_{\text{included}}}$$

Note. Table 17 Row 3 = R^2included, Table 18 = R^2excluded

Equation 2

Effect size (Cohen, 1998)

$$f^2 = \frac{.359 - .261}{1 - .359} = 0{,}152$$

Table 19

Purchasing Intention Model Comparisons

	(1)	(2)	(3)	(4)	(5)	(6)
	Purchasing Intention	Purchasing Intention	Purchasing Intention	Purchasing Intention	Purchasing Intention	Purchasing Intention
Reference Price	-.232	-.378	-.245	-.135	-.02	-.27
	(.505)	(.521)	(.514)	(.478)	(.445)	(.493)
Visual Trigger	.397	.342	.472	.415	.55	.429
	(.518)	(.515)	(.486)	(.5)	(.472)	(.487)
Interaction group	.083	.165	.152	.485	.533	.258
	(.505)	(.526)	(.525)	(.524)	(.518)	(.549)
Age		-.019	-.03**	-.087***	-.104***	-.036**
		(.016)	(.015)	(.028)	(.023)	(.014)
Female		-.089	.016	.28	.387	.244
		(.396)	(.402)	(.417)	(.404)	(.413)
City		-.404	-.06	-.389	-.178	-.021
		(.471)	(.449)	(.485)	(.458)	(.459)
Suburbs		.129	.456	.199	.407	.386
		(.574)	(.582)	(.581)	(.596)	(.593)
Living Alone		-1.105*		-.968		
		(.661)		(.702)		
Flatshare		-.514		-.496		
		(.627)		(.661)		
With Partner		-.042		-.12		
		(.659)		(.666)		
Partner and Children		-.657		-.163		
		(.888)		(.943)		
Reg./married Partner		-.976		-.694		
		(.826)		(.897)		
Academic		-.413		-.635		
		(.531)		(.519)		
Other		.215		-.605		
		(1.151)		(1.139)		
Apprenticeship + c.		-1.816**		-1.583**		
		(.859)		(.705)		
Secondary school		-1.063		-1.086		
		(.822)		(.861)		
Apprenticeship		-.165		-.369		
		(.66)		(.587)		
Single (household)			-.831		-.718	-1.114*
			(.625)		(.672)	(.627)
(Living with) Partner			-.105		-.156	-.263
			(.641)		(.655)	(.625)
Family			.042		.433	.099
			(.651)		(.619)	(.666)
Flat share			-.392		-.393	-.515
			(.597)		(.665)	(.598)
Apprentice			-.055		.147	.194
			(.722)		(.662)	(.702)
Academic			.14		.228	.176
			(.665)		(.615)	(.653)
Highschool			.805		1.03	1.084
			(.725)		(.678)	(.696)

Car Usage (H./Week)				.288	.257	.202
				(.296)	(.284)	(.296)
Using car of Social E.				-1.915**	-1.918***	-1.505**
				(.745)	(.718)	(.739)
Company car				-.817	-.804	-.842
				(.864)	(.82)	(.865)
New Car Owner				-1.309	-1.33	-1.124
				(.844)	(.81)	(.878)
Used Car Owner				-.992	-.936	-.789
				(.67)	(.639)	(.642)
Leases a Car				-2.317**	-2.338**	-2.042
				(1.105)	(1.103)	(1.233)
Car Price				-.457	-.54*	.276**
				(.306)	(.283)	(.124)
Car Price*Age				.018**	.021***	
				(.008)	(.006)	
Constant	3.788***	5.83***	5.009***	7.895***	7.111***	4.892***
	(.367)	(.799)	(.837)	(1.365)	(1.475)	(1.323)
Observations	118	116	116	116	116	116
R-squared	.013	.179	.128	.309	.291	.219
Adj. R-Squared	-0.013	0.037	0.007	0.117	0.123	0.044
AIC	495.9	493	494.1	489.1	486.1	495.3
BIC	507	542	535.4	560.7	549.4	555.9

Note. Robust standard errors are in parentheses. *** p<.01, ** p<.05, * p<.1
This table is displayed to provide insights in our Model decision. Based on Model fit criteria's we decided to choose the constructed set of categorical variables (Model 3, Model 5, Model 6 over Model 2 and Model 4) and we decided to choose the Model including the interaction term (Model 5 over Model 6). In further Regression tables, Model 1, Model 3, and Model 5 (Model 5 is the Model referred to as Main Model) will be displayed.

Table 20

Final Regression table Purchasing Intention (Full Version)

	(1)	(2)	(3)
	P. Int.	P. Int.	P. Int.
Reference Price	-.232	-.245	-.02
	(.505)	(.514)	(.445)
Visual Trigger	.397	.472	.55
	(.518)	(.486)	(.472)
Interaction effect	-.082	-.075	.003
	(.713)	(.723)	(.679)
Age		-.03**	-.104***
		(.015)	(.023)
Female		.016	.387
		(.402)	(.404)
City		-.06	-.178
		(.449)	(.458)
Suburbs		.456	.407
		(.582)	(.596)
Single (household)		-.831	-.718
		(.625)	(.672)
(Living with) Partner		-.105	-.156

		(.641)	(.655)
Family		.042	.433
		(.651)	(.619)
Flatshare		-.392	-.393
		(.597)	(.665)
Apprentice		-.055	.147
		(.722)	(.662)
Academic		.14	.228
		(.665)	(.615)
Highschool		.805	1.03
		(.725)	(.678)
Car Usage (Hours/Week)			.257
			(.284)
Using car Friends/Fam/Partner			-1.918***
			(.718)
Company car			-.804
			(.82)
New Car Owner			-1.33
			(.81)
Used Car Owner			-.936
			(.639)
Leases a Car			-2.338**
			(1.103)
Car Price			-.54*
			(.283)
Car Price*Age			.021***
			(.006)
_cons	3.788***	5.009***	7.111***
	(.367)	(.837)	(1.475)
Observations	118	116	116
R-squared	.013	.128	.291
Ad. R-squared	-.013	.007	.123
AIC	459.9	494.1	486.1
BIC	507	535.4	549.4

Note. Robust standard errors are in parentheses. *** p<.01, ** p<.05, * p<.1

Table 21

Participation in Seconds details without no minimum requirement

Variables	Obs.	Mean	Std. Dev.	Min	Max	p1	p99	Skew.	Kurt.
Duration (in s.)	133	477.0	1555.4	42	13584	49	11291	7.214	56.53

Table 22

ANOVA with no minimum time requirement

Dep. Variable	Model	Partial SS	df	MS	F	Prob>F	R-squared
Fairness P.	Model 1	12.74	3	4.25	1.97	0.122	0.044
	Reference Price	12.15	1	12.15	5.64	0.019	
	Visual Trigger	0.25	1	0.25	0.12	0.734	
	Interaction	0.24	1	0.24	0.11	0.741	
Purchasing I.	Model 2	10.23	3	3.41	0.91	0.436	0.021
	Reference Price	3.60	1	3.60	0.96	0.328	
	Visual Trigger	6.63	1	6.63	1.78	0.185	
	Interaction	0.26	1	0.26	0.07	0.793	

Note. The significant effect of the Reference Price on Fairness perception is robust *(p* = 0.019*)*

Table 23

Regression Analysis Fairness Perception (no minimum time requirement)

	(1) Fairness P.	(2) Fairness P.	(3) Fairness P.
Reference Price	.52	.575	.578
	(.372)	(.392)	(.399)
Visual Trigger	.002	-.144	-.04
	(.361)	(.362)	(.342)
Interaction effect	.169	.216	.236
	(.51)	(.519)	(.518)
	(.251)	(.683)	(1.069)
Observations	133	131	131
R-squared	.044	.164	.267

Note. Robust standard errors are in parentheses. *** p<.01, ** p<.05, * p<.1

Table 24

Regression Analysis Purchasing Intention (no minimum time requirement)

	(1) Purchasing I.	(2) Purchasing I.	(3) Purchasing I.
Reference price	-.417	-.564	-.435
	(.484)	(.491)	(.475)
Visual Trigger	.358	.288	.369
	(.48)	(.477)	(.467)
Interaction effect	.177	.393	.557
	(.669)	(.687)	(.664)
Observations	133	131	131
R-squared	.021	.117	.252

Note. Robust standard errors are in parentheses. *** p<.01, ** p<.05, * p<.1

Statement

With no minimum time requirement, the effects of the mechanisms are biased. The ANOVA still yields a significant main effect for the Reference Price on Fairness Perception, so we can reject the Null Hypothesis and confirm H1. However, regression result does not display significant results anymore.

The results for the Visual Trigger and the Interaction effect stay in line with previously discussed results.

Survey

Start of Block: Opening

JS

Q11 Sehr geehrte Teilnehmerinnen und Teilnehmer, vielen Dank für Ihre Teilnahme an dieser 3-minütigen Umfrage zu den Präferenzen von Autofahrern.

Page Break

Q48 Die **Informationen**, die Sie uns durch Ihre Teilnahme an dieser Umfrage mitteilen, **werden absolut vertraulich behandelt**. Die Antworten werden anonym ausgewertet und können nicht auf Einzelpersonen zurückgeführt werden. **Sie müssen mindestens 18 Jahre alt sein**, um an dieser Umfrage teilnehmen zu können. Sie können die Umfrage jederzeit beenden, wenn Sie dies wünschen. Bei Fragen zu dieser Umfrage wenden Sie sich bitte an Laurin Bosbach (665385lb@eur.nl). Sind Sie damit einverstanden, an der Umfrage teilzunehmen?

- ○ Ja (1)
- ○ Nein (2)

End of Block: Opening

Start of Block: Nature of car use

Q1 Was beschreibt Ihren Autogebrauch am besten?

- ○ Ich besitze ein Neuwagen (1)
- ○ Ich besitze einen Gebrauchtwagen (3)
- ○ Ich benutze einen Firmenwagen (4)
- ○ Ich lease ein Auto (5)
- ○ Ich benutze das Auto von Freunden/Familie/Partner (6)
- ○ Ich benutze Carsharing- oder Autovermietungsplattformen (7)
- ○ Ich benutze kein Auto (8)

End of Block: Nature of car use

Start of Block: Controlgroup

Q25 Features on Demand ist ein neuer Trend in der Automobilbranche. Früher entschied sich der Käufer beim Kauf eines Neuwagens, mit welchen Funktionen (Digitalradio, Sitzheizung) das Auto ausgerüstet werden soll. Bei Feature on Demand Autos sind auch Funktionen, welcher der Kunde nicht beim Kauf ausgewählt und gekauft hatte, im Auto eingebaut und können nachträglich entsperrt werden. Sobald der Besitzer des Autos diese Features über eine App dazubucht, werden die Features umgehend aktiviert.

Stellen Sie sich vor, Sie haben vor zwei Jahren ein neues Elektroauto gekauft. Sie haben 25.000 € für das Auto bezahlt, und es ist mit den von Ihnen gewählten Funktionen ausgestattet (Digitalradio, Klimaanlage, ...). Das Auto ist außerdem mit Feature on Demand Funktionen ausgestattet.

Weil sie vor 2 Jahren andere finanzielle und soziale Lebensumstände hatten, sind Sie vielleicht nun daran interessiert, neue Funktionen ihres Autos zu aktivieren. Ein angebotenes Feature on Demand ist eine Batterieerweiterung. Ihr Auto kann 400 km ohne Nachladen fahren, mit der erweiterten Batterie würde es 500 km weit fahren. Sie können die Batterieerweiterung dauerhaft oder durch ein monatliches und kündbares Abonnement aktivieren.

Q24 .

Q16 .

Q96 Basierend auf der beschriebenen Situation: Würden Sie die Batterieerweiterung buchen? Bitte geben Sie ihre Neigung an.

Dass ich die Batterieerweiterung buchen würde (Dauerhaft oder Monatlich) ist...

	sehr unwahrscheinlich (1)	unwahrscheinlich (2)	eher unwahrscheinlich (3)	neutral (4)	eher wahrscheinlich (8)	wahrscheinlich (9)	sehr wahrscheinlich (10)
wahrscheinlich-unwahrscheinlich (4)	○	○	○	○	○	○	○

End of Block: Controlgroup

Start of Block: Refprice + Visual Nudge

Q154 Features on Demand ist ein neuer Trend in der Automobilbranche. Früher entschied sich der Käufer beim Kauf eines Neuwagens, mit welchen Funktionen (Digitalradio, Sitzheizung) das Auto ausgerüstet werden soll. Bei Feature on Demand Autos sind auch Funktionen, welcher der Kunde nicht beim Kauf ausgewählt und gekauft hatte, im Auto eingebaut und können nachträglich entsperrt werden. Sobald der Besitzer des Autos diese Features über eine App dazubucht, werden die Features umgehend aktiviert.

Stellen Sie sich vor, Sie haben vor zwei Jahren ein neues Elektroauto gekauft. Sie haben 25.000 € für das Auto bezahlt, und es ist mit den von Ihnen gewählten Funktionen ausgestattet (Digitalradio, Klimaanlage, ...). Das Auto ist außerdem mit Feature on Demand Funktionen ausgestattet.

Weil sie vor 2 Jahren andere finanzielle und soziale Lebensumstände hatten, sind Sie vielleicht nun daran interessiert, neue Funktionen ihres Autos zu aktivieren. Ein angebotenes Feature on Demand ist eine Batterieerweiterung. Ihr Auto kann 400 km ohne Nachladen fahren, mit der erweiterten Batterie würde es 500 km weit fahren. Sie können die Batterieerweiterung dauerhaft oder durch ein monatliches und kündbares Abonnement aktivieren.

Q155 .

Q156 .

Q36 Basierend auf der beschriebenen Situation: Würden Sie die Batterieerweiterung buchen? Bitte geben Sie ihre Neigung an.

Dass ich die Batterieerweiterung buchen würde (Dauerhaft oder Monatlich) ist...

	sehr unwahrscheinlich (1)	unwahrscheinlich (2)	eher unwahrscheinlich (3)	neutral (4)	eher wahrscheinlich (8)	wahrscheinlich (9)	sehr wahrscheinlich (10)
wahrscheinlich-unwahrscheinlich (4)	○	○	○	○	○	○	○

End of Block: Refprice + Visual Nudge

Start of Block: Visual Nudge

Q149 Features on Demand ist ein neuer Trend in der Automobilbranche. Früher entschied sich der Käufer beim Kauf eines Neuwagens, mit welchen Funktionen (Digitalradio, Sitzheizung) das Auto ausgerüstet werden soll. Bei Feature on Demand Autos sind auch Funktionen, welcher der Kunde nicht beim Kauf ausgewählt und gekauft hatte, im Auto eingebaut und können nachträglich entsperrt werden. Sobald der Besitzer des Autos diese Features über eine App dazubucht, werden die Features umgehend aktiviert.

Stellen Sie sich vor, Sie haben vor zwei Jahren ein neues Elektroauto gekauft. Sie haben 25.000 € für das Auto bezahlt, und es ist mit den von Ihnen gewählten Funktionen ausgestattet (Digitalradio, Klimaanlage, ...). Das Auto ist außerdem mit Feature on Demand Funktionen ausgestattet.

Weil sie vor 2 Jahren andere finanzielle und soziale Lebensumstände hatten, sind Sie vielleicht nun daran interessiert, neue Funktionen ihres Autos zu aktivieren. Ein angebotenes Feature on Demand ist eine Batterieerweiterung. Ihr Auto kann 400 km ohne Nachladen fahren, mit der erweiterten Batterie würde es 500 km weit fahren. Sie können die Batterieerweiterung dauerhaft oder durch ein monatliches und kündbares Abonnement aktivieren.

Q150 .

Q151 .

Q97 Basierend auf der beschriebenen Situation: Würden Sie die Batterieerweiterung buchen? Bitte geben Sie ihre Neigung an.

Dass ich die Batterieerweiterung buchen würde (Dauerhaft oder Monatlich) ist...

	sehr unwahrscheinlich (1)	unwahrscheinlich (2)	eher unwahrscheinlich (3)	neutral (4)	eher wahrscheinlich (8)	wahrscheinlich (9)	sehr wahrscheinlich (10)
wahrscheinlich-unwahrscheinlich (4)	○	○	○	○	○	○	○

End of Block: Visual Nudge

Start of Block: Ref Price

Q144 Features on Demand ist ein neuer Trend in der Automobilbranche. Früher entschied sich der Käufer beim Kauf eines Neuwagens, mit welchen Funktionen (Digitalradio, Sitzheizung) das Auto ausgerüstet werden soll. Bei Feature on Demand Autos sind auch Funktionen, welcher der Kunde nicht beim Kauf ausgewählt und gekauft hatte, im Auto eingebaut und können nachträglich entsperrt werden. Sobald der Besitzer des Autos diese Features über eine App dazubucht, werden die Features umgehend aktiviert.

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Q145 .

Q146 .

Q95 Basierend auf der beschriebenen Situation: Würden Sie die Batterieerweiterung buchen? Bitte geben Sie ihre Neigung an.

Dass ich die Batterieerweiterung buchen würde (Dauerhaft oder Monatlich) ist...

	sehr unwahrscheinlich (1)	unwahrscheinlich (2)	eher unwahrscheinlich (3)	neutral (4)	eher wahrscheinlich (8)	wahrscheinlich (9)	sehr wahrscheinlich (10)
wahrscheinlich-unwahrscheinlich (4)	○	○	○	○	○	○	○

End of Block: Ref Price

Start of Block: Block 8

Q27 Was halten Sie davon, dass Automobilhersteller Autos mit Features on Demand ausrüsten und es Funktionen in ihrem Auto gibt, die Sie nachträglich freischalten müssen, wenn Sie diese benutzen wollen?

Bitte beschreiben Sie ihre Meinung zu Features on Demand mithilfe der nächsten 2 Fragen.

Ich denke Features on Demand sind...

	sehr unfair (1)	unfair (2)	eher unfair (4)	neutral (8)	eher fair (5)	fair (6)	sehr fair (7)
fair-unfair (4)	○	○	○	○	○	○	○

Q46 Ich denke Features on Demand sind...

	sehr unvernünftig (1)	unvernünftig (2)	eher unvernünftig (4)	neutral (8)	eher vernünftig (5)	vernünftig (6)	sehr vernünftig (7)
vernünftig-unvernünftig (4)	○	○	○	○	○	○	○

End of Block: Block 8

Start of Block: Age

Q63 Geben Sie bitte ihr Alter an.

_____

End of Block: Age

Start of Block: Default Question Block

Page Break

Q8 Bitte geben Sie ihr Geschlecht an

- ○ Männlich (1)
- ○ Weiblich (2)
- ○ Anderes (3)

Q9 In was für einer Gegend wohnen Sie?

- ○ Stadt (1)
- ○ Vorstadt (2)
- ○ Land (3)

Q36 Was ist ihr höchster abgeschlossener Bildungsweg?

- ○ Haupt-/Realschulabschluss (1)
- ○ (Fach-)Abitur (6)
- ○ Nicht-akademische Berufsausbildung (Berufsausbilding) (2)
- ○ Berufsausbildung und 1- oder 2-jährige Weiterbildung (5)
- ○ Akademischer Abschluss (abgeschlosserner Bachelor, Master, Dr.) (3)
- ○ Andere (4)

Q32 Welche der aufgeführten Möglichkeiten beschreibt ihre Wohnsituation am besten?

- ○ Single Haushalt (1)
- ○ Wohn Gemeinschaft (7)
- ○ Alleinerziehende(r) (2)
- ○ Zusammenleben mit Partner (3)
- ○ Zusammenleben mit registrierten/verheiraten Partner (6)
- ○ Zusammenleben mit Partner und Kind/er (4)
- ○ Andere (5)

Q39 Wie viele Stunden verbringen Sie im Durchschnitt wöchentlich im Auto?

- ○ weniger als 4 Stunden (1)
- ○ Zwischen 4 und 7 Stunden (3)
- ○ 7 oder mehr Stunden (4)

Q18 Wenn Sie ein Auto kaufen würden, in welcher Preiskategorie würden Sie suchen?

▼ €0-€9,999 (3) ... €100,000+ (11)

End of Block: Default Question Block