The Role of Flight Shame in Air Travel Behaviour

How travellers adjust attitudes and behaviours to cope with cognitive dissonance towards flying: A comparative analysis between AFV owners and non-AFV owners in Denmark

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Abstract

The concern to preserve the environment has become a major topic globally, where numerous attempts have been made to reduce carbon emissions in the transportation sector. While previous researchers investigated the social and psychological drivers of cognitive dissonance towards flying as well as motivations for adopting alternative fuel vehicles (AFVs), academia lacks the link between everyday mobility and leisure mobility choices—namely in order to understand a potential relationship from the type of vehicle ownership and the influence of cognitive dissonance towards flying to flying frequency. Therefore, the purpose of this study is to uncover how everyday green mobility choices are related to flying frequency for leisure and holiday purposes. More specifically, it investigates the direct relationship between cognitive dissonance towards flying and flying frequency as well as the indirect relationship between these going through the mediators of behavioural adjustment and attitude adjustment. Finally, a comparison is made between owners of alternative fuel vehicles and non-AFVs respectively to test for differences between the two groups.

In a survey-based quantitative data collection (n=472) conducted in Denmark, respondents were asked about their flying behaviour and type of vehicle ownership. Using structural equation modelling (PLS-SEM), data were analysed to test the before-mentioned relationships. Findings revealed that AFV owners experience higher levels of cognitive dissonance towards flying and fly less frequently than owners of non-AFVs. It was also found that owners of AFVs experience higher levels of behavioural adjustment, albeit lower levels of attitude adjustment compared to non-AFV owners. However, no difference was found in the way that the two consumer groups adjust their behaviour and attitude in order to reduce cognitive dissonance towards flying. Theoretical and managerial implications are proposed, and limitations and suggestions for future research are presented.

Table of Contents

1. Introduction

> "The attitude-behaviour gap could be described as one of the greatest challenges facing the public climate change agenda – and is true of all attempts to influence individual behaviour, not only travel. Reducing the emissions of carbon from the transport sector will require far-reaching technological as well as behavioural shifts. However, the motivators of human behaviour and the barriers to behavioural change are extremely complex. In this regard, the real difficulty perhaps lies in our expectation that there should be a consistency between attitudes and behaviour (…). Equally important are the more subjective psychological factors that include: values, self-identify, locus of control (efficacy), awareness of the environmental consequences, moral norms, issues of trust and cognitive dissonance" (Anable, Lane & Kelay, 2006, pp. 62-63).

Environmental issues such as global warming, pollution level and depleting fossil fuel reserves are a constantly growing concern impacting different economic sectors and different stakeholders worldwide (Jansson, Marell & Nordlund, 2011; Ting, Hsieh, Chang & Chen, 2019). In the last decades, this concern has intensified among consumers since the protection of the natural environment has become progressively more prominent and has matured into a substantial social issue (Follows & Jobber, 2000; Paladino, 2005).

Green education has also worked as a significant source of awareness towards environmental behaviour, which has contributed to a better-informed society (Ballantyne & Packer, 2005; Butler, 2018; Novo-Corti, García-Álvarez & Varela-Candamio, 2017; Zareie & Navimipour, 2016) and consequently to a driver of 'green consumerism' (McDonald, Oates, Alevizou, Young & Hwang, 2012; Sachdeva, Jordan & Mazar, 2015). This trend has played an important role in providing knowledge to individuals on the environmental impact—namely on how consumers can translate their current behaviours into green practices (Asha & Rathiha, 2017). Empirical results from Yue, Sheng, She & Xu (2020) showed that ecological responsibility could stimulate environmental concern and enhance green consumer behaviours.

Although there is evidence that price, quality and convenience remain priorities in the purchase phase, consumers are getting more conscious about their adverse effect on the environment (Higham & Cohen, 2011; Khoo-Lattimore & Prideaux, 2013) and, therefore, their behaviour is being adapted in order to alleviate the harmful ecological impact (Choshaly, 2017; Divyapriyadharshini, Devayani, Agalya, & Gokulapriya, 2019; Paladino, 2005; Robinot & Giannelloni, 2010). Past studies reveal that consumers seek to mitigate the environmental footprint in what concerns to the restoration of ecological balance by accepting more eco-friendly products (Cherian & Jacob, 2012).

In order to tackle the current global sustainability challenge arises the necessity to embrace a greener mobility culture through the exploitation of new technologies and minimization of fossil fuel alternatives (Bekiaris, Tsami & Panou, 2017). To reduce fossil fuel alternatives, new vehicle technologies termed 'alternative fuel vehicles' (AFVs) have been promoted as securing the future of mobility (Deloitte, 2011) and considered less harmful to the environment (Hamilton & Terblanche-Smit, 2018). Jansson, Petterson, Mannberg, Brännlund & Lindgren (2017) define AFVs as "*vehicles that can be fuelled by alternatives to fossil gasoline and diesel in part or in full".* Additional research also indicated that early adopters, i.e. younger, well-educated, very high income-earners and environmentally aware car buyers, are the consumers that are most likely to purchase an AFV and many households are willing to pay premiums for better fuel economy and emission reduction (Campbell, Ryley & Thring, 2012; Chapin et al., 2013; Deloitte, 2010; Hackbarth & Madlener, 2013; Hidrue, Parsons, Kempton & Gardner, 2011; Li, Liu & Jia, 2019). Moreover, Jansson (2011) concluded that AFV owners demonstrate higher levels of environmental preoccupation in relation to personal and social norms compared to conventional car owners by showing pro attitudes towards environmentally friendly cars and by pursuing novelty while also assessing the purchase of an AFV as being a low-risk decision. Additionally, the author reinforced that *"adopters perceive that AFVs offer higher relative advantages compared to conventional vehicles and that AFVs are more compatible to their personal values"* (Jansson, 2011 in Azevedo, Brandenburg, Carvalho & Cruz-Machado, 2014, p. 7).

Following the environmental perspective, several researchers have investigated the discrepancy between consumers' beliefs and their actual behaviour in relation to flying (Alcock et al., 2017; Becken, 2007; Hares, Dickson & Wilkes, 2010; Juvan & Dolnicar, 2014; McDonald, Oates, Thyne, Timmis & Carlile, 2015; Young, Higham & Reis, 2014). Although tourism consumers generally show positive attitudes towards the environment and seek for the best sustainable practices when they travel for vacation purposes (Hanna & Adams, 2017; Higgins-Desbiolles, 2010; Juvan & Dolnicar, 2014; Orams, 1996; Wurzinger & Johansson, 2006), it is relevant to underline that "*awareness of the adverse effects of flying does not necessarily lead to flight renunciation*" (Schrems & Upham, 2020, p. 1). Transferring the green 'theoretical' mindset into practice can be problematic due to consumers' behaviour inconsistency. Academia entitles this paradox as an 'attitude-behaviour gap' (Anable, Lane & Kelay, 2006; Bamdad as cited in Staknov, Boemi, Attia, Kostopoulou & Mohareb, 2019; Barr, Shaw, Coles & Prillwitz, 2010; Becken, 2004; Davison, Littleford & Ryley, 2014; Hibbert, Dickinson, Gössling & Curtin, 2013; Higham, Cohen, Peeters & Gössling, 2013; Juvan & Dolnicar, 2014; Oates & McDonald, 2014; O'Rourke & Ringer 2015; Prillwitz & Barr, 2011). Previous studies employed theories to explore this gap, for instance, the theory of planned behaviour (Ajzen, 1985), the value-belief norm theory of environmentalism (Stern, 2000), cognitive dissonance theory (Festinger, 1957) and attribution theory (Heider, 1958). This study will focus on the latter two.

In parallel to the theory of cognitive dissonance, the concept of *flygskam* (noun in Swedish that literally means 'flight-shame') is currently being debated among environmental communities. Flygskam entails the feeling of climate guilt towards air transportation and encourages people to stop flying in order to diminish carbon emissions (Coffey, 2019; Hook, 2019). The term was first coined in Sweden in 2017 and generated an anti-flying movement that was rapidly supported by other climate activists and celebrities in the country (Orange, 2019). It resulted in a loss for airlines and, inversely, an increase in demand for train tickets (Hook, 2019) as they are an eco-friendlier mean of transportation. In contrast to regular tourism consumers, this cluster seeks coherence between their attitudes and behaviours, believing they are doing the 'right thing'. They believe so since they consider the *"climate crisis to be a moral issue* *and a matter of justice"* (Söderberg & Wormbs, 2019, p. VIII). According to Appel, Mughal, & Ashwort (as cited in Mkono, 2020), 'flight-shamers' opt to cease flying and take part in activism to persuade others to follow a similar path.

However, due to its novelty, the concept has not been operationalized in detail, and there is a lack of literature on the topic (current research is limited to Swedish case studies) as scientific evidence is missing to make appropriate judgements on air travel decisions (Mkono, 2020). The relevance of using 'flight-shame' in this thesis relies on being the most plausible reason for flying reduction among some groups of consumers, and this will be discussed in this investigation.

In summary, academia has been scrutinizing the relationship between values and various dimensions of consumers' attitudes and behaviours in different environmental contexts. Yet, it has investigated the processes that motivate AFV acquisition as well as cultural and socio-psychological drivers of air travel. Nonetheless, the literature lacks the context of green consumerism and mobility behaviour, linking ground mobility with air transport. Therefore, the purpose of this study is to fill this gap by investigating a potential relationship between 'cognitive dissonance towards flying' and 'flying frequency' with 'behavioural adjustment' and 'attitude adjustment' as mediators and eco-conscious everyday mobility choices, in the form of 'AFV ownership', as a moderator.

Based on the past literature and previous issues discussed, the main research question that this project aims to address is:

How do AFV owners adjust their behaviour and attitudes towards flying in order to reduce cognitive dissonance from flight-shame compared to the owners of non-AFVs in Denmark?

As an attempt to meticulously guide this study and properly answer the main research question, the problem is four folded into the following sub-questions:

- **RQ1**: Do AFV owners feel flight shame (cognitive dissonance towards flying) to a greater extent than owners of non-AFVs?
- **RQ2**: How often do AFV owners fly compared to owners of non-AFVs?
- **RQ3**: How do AFV owners adjust their flying-related behaviour due to flight shame compared to owners of non-AFVs?
- **RQ4**: How do AFV owners adjust their attitudes towards flying due to flight shame compared to owners of non-AFVs?

First, this study begins with a review of existing literature on ground mobility behaviour, followed by the flying habits of green consumers and an explanation of the theory of cognitive dissonance. The literature review will furthermore explore attribution theory linked to the tourism sector—with a particular emphasis on flying behaviour. Second, after reviewing literature and based on its findings, a conceptual model is constructed, which includes all preliminary hypotheses that connect AFV ownership and flying behaviour. Thereafter, the chapter on methodology is primarily concerned with the methods used to collect data. Then, hypotheses are tested using structural equation modelling (SEM) analysis, and the results are evaluated. In addition, theoretical and practical implications are discussed. As a final remark, the limitations entailed in this research are stated, and new perspectives suggested to guide future research.

2. Literature review

This chapter critically examines pertinent literature that helps to address this study's research question. The aim of this review is to provide an overview of theoretical frameworks discussed in past studies and to understand how they can be applied within the field of this study. This chapter also seeks to identify relevant constructs and causal relationships.

At first glance, it seems logical to assume that AFV owners adopt these relatively clean technologies because they, as consumers, are eco-concerned. Such reasoning should, therefore, result in fewer flights. However, there are several arguments that contradict this logically deducted relationship. In the light of cognitive dissonance theory and attribution theory, the following sections try to guide academia towards a potential correlation between pro-environmental thinking in the form of AFV ownership and awareness on the impact of flying.

2.1 AFVs and Everyday Mobility Behaviour

From a climate change perspective, a shift from combustion-powered to electric vehicles can be helpful in minimizing greenhouse gas emissions and purify the air (Degirmenci & Breitner, 2017). In reaction to traffic growth experienced over the past decades, one effective approach to reduce fuel emissions is to encourage consumers to acquire eco-friendly vehicles, such as AFVs, to fulfil their everyday mobility needs (Mabit & Fosgerau, 2011; Schuitema, Anable, Skippon & Kinnear, 2013). AFVs cover a wide variety of vehicles and the most common ones referred to in literature range from battery-electric, hybrids and plug-in hybrids to vehicles that can be fuelled by ethanol, biodiesel, biogas and hydrogen (Hamilton & Terblanche-Smit, 2018; Jansson et al., 2017; Krupa et al., 2014).

Jin & Slowik (2017) highlighted the importance of consumer knowledge and awareness of AFVs, indicating a high correlation between knowledge about these vehicles and the desire to adopt electric cars. Other studies reinforced that environmental knowledge and attitudes have noteworthy effects on both the likelihood to own and use an AFV (Flamm, 2009; O'Garra, Mourato & Pearson, 2005; van Rijnsoever, Farla & Dijst, 2009). More recent findings disclose that sales figures for AFVs are relatively low compared to conventional cars. However, consumers are aware of the climate change impact of car usage. Therefore, the number of AFVs available in the market have increased (Hamilton & Terblanche-Smit, 2018; Li et al., 2019).

Research from Rezvani, Jansson & Bodin (2015) clearly illustrates past work developed by different scholars towards the understanding of consumer's perceptions, attitudes, and behaviour in relation to AFV adoption. The authors presented a review of empirical research, where several topics were discussed. First, on the basis of 'behaviour influenced by attitudinal factors' (p. 129), it was argued that the high upfront costs of an AFV acquisition are barriers to purchase one for many individuals and households. However, the operational costs are lower compared to conventional cars, which is somehow a motivation to adopt (Caperello & Kurani, 2012; Chapin et al., 2013; Graham-Rowe et al., 2012; Jensen, Cherchi & Mabit, 2013; Lieven, Mühlmeier, Henkel & Waller, 2011). Yet, high-income earners are still the most frequent buyers of electric vehicles (Deloitte, 2011; Li et al., 2019). In Plötz & Gnann's (2013) words: *"The vehicles are expensive in purchase but cheaper in usage"* (p. 1073). This means that the users should drive a long distance within a year to reduce the payback times substantially. In that regard, Hamilton & Terblanche-Smit (2018) suggest that marketers accentuate the cost-benefit component of AFVs, including their practicalities as well as the lifetime costs of owning an AFV against conventional vehicles. In regards to AFV attributes, it was demonstrated that compatibility design and relative advantages compared to internal combustion vehicles shape consumers' attitudes towards AFVs, which consequently predicts consumers' adoption behaviour (Petschnig, Heidenreich & Spieth, 2014). Another aspect relies on consumers' acceptance in relation to government decisions, where Turcksin, Mairesse & Macharis (2013) stated that government incentives and regulations must be implemented to encourage AFV adoption. In this respect, Lane & Potter (2007) discovered that government regulations concerning the environment, fuel prices and financial incentives for buyers of green vehicles together with the expansion of fuel infrastructure are important drivers of adoption. Inversely, Hardman & Tall (2016) advocated that financial incentives do not affect consumers' adoption.

Second, it was mentioned that AFV adoption behaviour is connected to 'pro-environmental behaviour' (Rezvani et al., 2015, p. 130) where some consumers expressed: *"protecting the environment as a motivation for their choice of the car*" (Rezvani et al., 2015, p. 130). The preference in environmental attributes was also discussed in earlier and subsequent studies, where the ecological mindset was considered as one of the main aspects when buying an electric vehicle (Figenbaum, Kolbenstvedt & Elvebakk, 2014; Hardman & Tall, 2016; van Rijnsoever et al., 2009). Degirmenci & Breitner (2017) proved that the environmental performance of electric vehicles is a stronger indicator of purchase intention than price and driving range. Likewise, the survey conducted by Krupa et al. (2014) indicated that respondents who were more prone to reduce transportation energy consumption and to lower greenhouse gas emissions had larger chance to purchase a compact hybrid vehicle than those who were not as environmentally concerned. Nevertheless, in contrast to Hackbarth & Madlener's (2013) findings, Krupa et al.'s (2014) study disclosed that even among the consumers that are most likely to adopt hybrid vehicles, some respondents felt constrained financially due to the premium price imposed based on the green benefits of the vehicles. Similarly, other findings supported that environmental issues are not really prioritized for some consumers during the car purchase decision phase (Chapin et al., 2013; Graham-Rowe et al., 2012; Lane & Potter, 2007; Turcksin et al., 2013).

Third, from an "innovation adoption behaviour" (Rezvani et al., 2015, p. 131) perspective, Peters & Dütschke (2014) stressed the importance of perceived compatibility of AFVs with the daily routines of consumers as the main driver to purchase an electric vehicle. Similarly, Graham-Rowe et al. (2012) draw attention to the prioritization of personal mobility needs over environmental benefits as a relevant contributing factor for adopting such vehicles. The latter pointed out the issue of technological evolution, emphasizing that this is a purchase barrier when consumers are continuously expecting rapid technological improvements in the future that will ultimately make current products out-dated or obsolete (Graham-Rowe et al., 2012). Similarly, a report from Deloitte (2011) identified the consumers' willingness and interest in adopting electric vehicles. However, a divergence was found between consumer expectations on these vehicles capabilities and what the automotive industry was able to provide at that time.

Finally, it was found that the adoption of AFVs might be linked with ‘symbolic’ and ‘emotional’ rationales (Rezvani et al., 2015, pp. 131-133). In two quantitative studies, Schuitema et al. (2013) analysed environmentalist and car-authority identities in possible AFV adopters, and the results suggested that pro-environmental consumers perceive instrumental, hedonic, and symbolic attributes more positively than consumers, who do not possess such self-identity. Instrumental attributes relate to the utility stemmed from functions performed by new technologies (Dittmar, 1992; Voss et al., 2003, cited in Schuitema et al., 2013), while hedonic attributes involve the emotional pleasure derived from innovative products, i.e. the pleasure of driving (Dittmar, 1992; Roehrich, 2004; Voss et al., 2003 cited in Schuitema et al., 2013). Symbolic attributes refer to a degree of personal or social identification from the possession of new technologies (Dittmar, 1992; Roehrich, 2004 as cited in Schuitema et al., 2013). On the contrary, car-authority was weakly correlated with the perception of AFV attributes. Similarly, emotions and feelings play relevant roles in influencing attitudes and intentions towards adopting AFVs (Moons & De Pelsmacker, 2012; Schuitema et al., 2013). A positive perception of driving an AFV was found to be positively correlated with consumer attitudes and intentions to purchase an electric car (Moons & De Pelsmacker, 2012).

Through diffusion innovation theory (Rogers, 2003) and comparison of statistical models, Axsen, Mountain & Jaccard (2009) investigated the ‘neighbour effect’ in the adoption of new vehicles. The authors stated that when “*a new technology becomes more desirable as its adoption becomes more widespread in the market*” (p. 221). Jansson et al. (2017) evaluated innovation diffusion as a spatial process (Hägerstrand, 1967) and explored the neighbour influence in relation to acquiring AFVs. They concluded that adoption is more likely to happen if the neighbours have previously adopted. Additionally, the results showed a lower, but still significant, influence from co-workers and relatives towards AFV adoption.

Concerning the travel distance, it was found that the use of AFVs as an everyday mobility vehicle ranges from mere commuting devices to real alternatives in long-distance travelling. Past literature in consumer behaviour underpinned vehicle range as a very important factor in consumers' preferences and perceptions (Greene, 1985). In line with this, scholars tried to identify what a desirable vehicle range would be in order to meet consumers' everyday driving needs in the US. This was found to be anywhere between 88 km and 156 km in order to cover 95% of the household travel requirements (Deshpande, 1984 as cited in Greene, 1985; Hamilton, 1978; Schwartz, 1976). Decades later, Pearre, Kempton, Guensler & Elango (2011), concluded that even with limited range, electric vehicles could serve a portion of transportation needs in the U.S.

Moreover, despite technological benefits and other positive attributes associated with electric vehicles, AFVs have shown to be used more for short distances and durations compared to conventional vehicles (i.e. due to the limitations of batteries) making it difficult to satisfy all travel demands (Adnan, Nordin, Rahman, Vasant & Noor, 2017 as cited in Ianole, 2016; Li et al., 2019). Findings reveal that short driving ranges prevent diffusion of electric vehicles (Degirmenci & Breitner, 2017; Hidrue et al., 2011). In line with this, van Haaren (2011) detected feelings of 'range anxiety' by electric car buyers in the U.S due to the limited driving range that most of these cars are capable of. In this study, the author emphasized both freedom and comfort constraints as limitations to long-distance travelling. Furthermore, with the aim of analysing the differences of use of AFVs and conventional cars, Liu, Khatakk & Wang (2016) evaluated different behavioural patterns—namely trip frequencies and daily miles travelled. The study revealed that AFV drivers travel with the same frequency as conventional car drivers. However, the researchers pointed out a discrepant behaviour within the AFV group: Distances were shorter for battery-electric cars and plug-in hybrids and longer for hybrid electric and compressed natural gas vehicles. In terms of daily travel, it was observed that AFVs was used more for this than conventional vehicles.

2.2 Flying Habits of Green Consumers

"The general trend towards long-haul trips for shorter periods of time and the increase in air travel that has ensued are devastating for the environment" (Verbeek and Mommaas, 2008 as cited in Fuentes & Svingstedt, in James, Ren & Halkier, 2019, p. 10).

Past researches witnessed air transport as one of the largest contributors of the environmental impact mainly through greenhouse gas (GHG) and carbon dioxide (CO_2) emissions from combustion of aviation fuel in the atmosphere (Alcock et al., 2017; Becken, 2007; Gössling et al., 2007; Gössling et al., 2005; Hares, Dickinson & Wilkes, 2010; McDonald et al., 2015)

That awareness is growing rapidly, and climate concerns have triggered a public counterattack against flying (Conboye & Hook, 2019). Consequently, these happenings have created a big pro-environmental wave of activists ('flight-shamers') who continuously argue that plane trips must be completely replaced by eco-friendlier means of transportation. As mentioned in the introduction, this group involves consumers who actually act consonantly with their attitudes, and for that reason, they opt to not fly at all (Gerretsen, 2019). In the same vein, a recent article from BBC (Le Blond, 2020) explored how climate change is shaping the travel behaviour within the European countries—the article used Germany as a green example. It was acknowledged that citizens here fly less emphasizing the aim of reducing the short-haul flights and make air transport obsolete in the long-term. According to Gössling (in Le Blond, 2020), flight shame is the only reasonable explanation of these changes and the researcher advocates that the current situation entails a social norm change translating into a behaviour change.

In contrast, although air travel consumers that are aware of climate change issues look at flying from a more green perspective (Higham & Cohen, 2011; Khoo-Lattimore & Prideaux, 2013), a few studies evidenced that frequent (and green) flyers are unwilling to reduce their flights (Alcock et al., 2017; Barr et al., 2010; McDonald et al., 2015; Young, Higham & Reis, 2014). It is argued that they are not convinced enough based on pro-environmental arguments offered from scientists and academics, such as ‘transport taboos’ (Gössling & Cohen, 2014). Some travellers emphasize the importance of flying in their lives and claim that effective technology should be developed to make air transport environmentally accepted (Barr et al., 2010). When balancing the green behaviour with other factors, the consumers’ propensity to travel by aeroplane is irrefutable (Buckley, 2011) specifically when travelling for holiday and leisure purposes (Barr & Prillwitz, 2012; Hibbert et al., 2013). McDonald et al. (2012) evaluated different types of green consumers in their study. According to the authors, it can be inferred that ‘green flying consumers’ comprise the group of ‘selectors’ because they act selectively by being green on the ground (household behaviour) and grey in the air (flying behaviour), which is also described by Alcock et al. (2017). Through the lens of Cohen, Higham & Cavaliere (2011) and Young et al. (2014), flying is perceived as a compulsive form of consumption, which generates behavioural addiction among travellers. Echoing with these findings, other researchers identified a pattern in their analysis indicating that the longest and most frequent flights were taken by the greenest consumer cluster (Barr et al., 2010; Böhler, Grischkat, Haustein, & Hunecke, 2006). Similarly, the qualitative research from Randles & Mander (2009) reiterated that the most frequent ‘green credentials’ flyers embarked on four to eight return trips in the past twelve months.

Since it can be difficult, in some circumstances, to completely stop travelling by plane and if consumers are really willing to contribute to a greener planet, some airlines have included the option to add voluntary carbon-offsets to their ticket prices, where the extra fee is often used to support green projects, such as planting trees (Geiling, 2014). This initiative is mainly targeting frequent air travellers. It was concluded that planting a tree appeared as a symbolic gesture that neutralizes any behaviour that is detrimental to the environment (Becken, 2004). Van Birgelen, Semeijn & Behrens (2011) conclude that green air-travellers express severity, self-perception and importance to offset their carbon emissions. For instance, perceptions about behaving eco-friendly positively affect the willingness to compensate. Notwithstanding the popularity of these schemes over previous decades, green consumers showed limited interested in carbon-offsetting

(Gössling, Haglund, Kallgren, Revahl & Hultman, 2009) and some criticism on these voluntary programmes were presented (Vidal, 2019).

2.3 Cognitive Dissonance Theory

Cognition is defined as a process of thinking and knowing, which involves the flow of information from its reception, followed by transformation, storage, recovery to its use (Neisser, 1967). Cognition evaluates the mental processes underlying people's ability to perceive the world and how people adapt their behaviour accordingly (Andrade & May, 2004). In a similar perspective, Orams (1996) explains cognition as how people use information from their environment and their memories to make decisions about their actions. For Bayen (2019, in Bayen et al., 2019) the essential rationale behind cognition does not underlie on its actual meaning, but as an attempt to isolate relevant features in the core of cognitive phenomena. He views 'concepts' as one of those features and mentions that thinking, reasoning, perceiving, imagining and remembering are important cognitive processes to understand the use of such 'concepts'. In addition, neuroscientists also do not find it relevant to understand the conceptual definition of cognition, since they consider the recognition of its elements—flexibility, contingency and freedom from immediacy—more pertinent (Shadlen, 2019, in Bayen et al., 2019). Heyes (2019, in Bayen et al., 2019) indicates that cognition should be distinguished under a conservative view and a liberal view. Under the conservative perspective, the main cognitive process (more likely explanation for individuals' behaviour) is reasoning, involving "*beliefs, desires and other intentional mental states*" (p. 611). Also, it should be explicit what the agent needs to 'know' or 'understand'.

The cognitive dissonance theory (Festinger, 1957) has been studied through the lens of multiple scholars (Cooper & Carlsmith, 2015; Cummings & Venkatesan, 1976; Hardyck & Kardush, 1968; Kassarjian & Choen, 1965; Kenworthy, Miller, Collins, Read & Earlywine, 2011; Kim, Choi & Tanford, 2020; O'Neill & Palmer, 2004; Sherif, C. W., Sherif, M. & Nebergall, 1965; Soutar & Sweeney, 2003) where different knowledge has been acquired in terms of attitudes and beliefs, internalization of values, consequences of decisions among other psychological processes (Harmon-Jones & Mills, 2019). This theory illustrates the attitude-behaviour gap (Alcock et al., 2017; Anable et al., 2006; Bamdad as cited in Staknov et al., 2019; Bonini & Oppenheim, 2008; Juvan & Dolnicar, 2014; Oates & McDonald, 2014) when people experience psychological discomfort, which leads to an inconsistency between ''*cognitions (attitudes, beliefs, values, opinions, knowledge) about themselves, about their behaviour and about their surroundings*'' (Festinger, 1957 p. 9). McDonald et al. (2015) identify that people become uncomfortable and that dissonance exists when their actions are not aligned with their espoused beliefs. According to this theory, there are four main triggers of dissonance: (1) disagreement with others; (2) forced compliance; (3) decision making; and (4) exposure dissonant information (Orams, 1996).

Juvan & Dolnicar (2014) state that cognitive dissonance exists only if a person's intention is focused on reaching a specific outcome and must value that outcome. Likewise, Soutar & Sweeney (2003) indicate that cognitive dissonance occurs in some extent at different stages of the decision-making process, i.e. "*the greater the dissonance, the greater the intensity of the action to reduce the dissonance, and the greater the avoidance of situations that increase dissonance*" (as cited in Juvan & Dolnicar, 2014, p. 79). Individuals try to respond to cognitive dissonance by adjusting either beliefs or behaviours, such that ''*states of dissonance are transformed into states of consonance, and the inconsistencies are eliminated*'' (Kassarjian & Cohen, 1965, p. 56).

Although various approaches have been documented in social psychology about cognitive dissonance, fewer studies have focused on the process of dissonance reduction (McGrath, 2017). In this context, McGrath (2017) described different reduction strategies from past literature and suggested that a deeper understanding of how to manage those strategies should be considered. Hardyck & Kardush (1968) built a framework of dissonance reduction where different dissonance strategies were grouped in three main categories: "*(1) stopping thinking, (2) changing one element of the two that are in the dissonant relationship, and (3) restructuring*" (p. 685), which would enable predictions concerning preferred reduction modes. In addition, a fourth element—toleration—is presented, since people are more likely to tolerate instead of making an effort on minimizing dissonance levels. According to their investigation, ‘forgetting’ was the best reduction mode since it does not demand the same effort as change or restructuring (Hardyck & Kardush, 1968; McGrath, 2017).

Furthermore, researchers identified a critical dynamic between beliefs and actions, highlighting the struggle for consistency between internal and external lives (Kenworthy et al., 2011). In accordance with these authors, cognitive dissonance theory contributed to the development of knowledge in regards to human cognition and motivation, leading to the conclusion that human reasoning is full of incongruities. Cooper & Carlsmith (2015) determine that cognitions are dissonant when “one follows the obverse of the other” (p. 76) having also observed a positive relationship between the resulting motivation to minimize dissonance and the magnitude of the contradictory cognitions as well as a negative correlation between motivation and the magnitude of consistent cognitions.

According to O’ Neill & Palmer (2004), “*dissonance theory remains under-researched and the effects of the construct misunderstood, in the field of consumer marketing*” (p. 435). Souter & Sweeney (2003) emphasise that in the current era of customer empowerment, namely among the young segment, customers expect high-quality services which lead them to experience dissonance during the decision-making process. In regards to purchase decisions, consumers try to change previous behaviours, including cancelling or refunding the purchase to look for another alternative (Festinger, 1957; Mitchell & Boustani, 1994). By using this strategy, consumers protect themselves from feeling guilty or frustrated as a result of purchase regret (Kim et al., 2020).

Some criticism is pointed out to cognitive dissonance theory in the field of consumer behaviour, although it is relevant to mention that the evidence pro applicability of dissonance theory is larger and slightly more considerable than the evidence against (Cummings & Venkatesan, 1976). Sherif et al. (1965) argue that at some point new dissonant information will be of such magnitude that the consumer will no longer adjust its behaviour or belief but rather reject the new information by discounting or rationalising it in order to make it consonant with the consumer’s current beliefs or behaviours.

Within tourism research, some academics explore the paradox between attitude and behaviour arguing that tourists behave in a dissonant manner as they are less likely to adopt sustainable practices when they are on vacation versus at home (Baker, Davis, & Weaver 2014; Barr & Prillwitz, 2012; Dolnicar & Leisch, 2008; Hibbert et al., 2013; Higgins-Desbiolles, 2010). This contradiction was also verified by Alcock et al. (2017), who identified no *"association between individuals' environmental attitudes, concern over climate change, or their routine pro-environmental household behaviours, and either their propensity to take non-work-related flights"* (p. 136).

Orams (1996) highlights that eco-based tourism practice should be fostered, and pinpointed issues of the effects of the tourism sector. The author advocates different management responses to pressure touristic activity taking place in natural environments. It was found that tourists experience cognitive dissonance in their pre-contact with nature (Forestell & Kaufman, 1990). Contradictory, in Moutinho (1982, in Decrop, 2006) vacation behaviour model, the cognitive dissonance appears in the post-purchase phase, where the outcome is labelled as 'dissatisfaction' (negative feedback) or 'satisfaction' (positive feedback), which guides consumers for future purchase intentions. In case of dissatisfaction, tourists are likely to change behaviour (e.g. choose other destinations) while in case of satisfaction, it usually results in loyalty (e.g. repeat the same destination). In a more detailed evaluation of the dissatisfaction-related phenomena, Decrop (2006) indicates that consumers express "*post-decision or post-experience regret*" (p. 138), and consequently, they use attributions (see attribution theory section) to diminish dissonance.

Theoretically, 'sustainable tourism' should be associated with sustainable mobility (Høyer, 2000) and ought to enhance more sustainable tourism practices. However, it still entails non-green forms of transportation, namely in long-haul flights (Gössling et al., 2007; Hall, Scott, & Gössling, 2013). This anomaly converges to cognitive dissonance within consumers of tourism (Miller, Rathouse, Scarles, Holmes, & Tribe, 2010) where flyers face a dilemma in which their self-identity, as an environmentally responsible consumer, conflicts with their frequent air travel behaviour (Young, Higham & Reis, 2014). Referring back to Festinger's (1957) conceptual work on cognitive dissonance, human responses can modify their behaviour to reduce such dissonance, for instance, by stopping flying long haul. However, most of the times, it involves the less arduous alternative of changing attitudes and values in order to avoid dissonance (Cooper, 2012; Hanna & Adams, 2017).

Relating to the travel mode preferences, De vos (2018) studied the relationship travel mode choice and travel satisfaction based on four factors: (1) A lack of travel-related skills; (2) A lack of travel options; (3) the presence of travel barriers; and (4) the presence of travel habits and concluded that the respondents expressed a higher level of satisfaction when they travel with preferred mode (consonant travellers) compared to travellers who use non-preferred transportation modes (dissonant travellers). However, it is worth noting that roughly half of the respondents experienced dissonance because they do not use the preferred mode.

Furthermore, Hares, Dickinson, and Wilkes (2010), as well as Barr & Prillwitz (2012), found that people do not alter their vacation behaviour based on climate change. The former realized that those consumers have probably "*aligned their attitudes towards holidays and climate change to be consistent with their behaviour*'' (Hares et al., 2010, p. 472). Findings from Stankov et al. (2019) also accentuate the existent gap between pro-environmental experts' attitude and their behaviour when they travel on vacations and, besides the evident gap, the presence of cognitive dissonance was clear because most of the participants openly acknowledged feeling the tension. Likewise, Miller et al. (2010) concluded that eco-travellers experience emotional dissonance and report feeling bad. Schrems & Upham (2020) investigated the degree of cognitive dissonance among sustainable-concerned scientists, and they also concluded that most of the interviewees expressed feelings of dissonance—namely guilt and frustration towards flying. Guilt was considered the largest emotional driver of dissonance reduction (Kenworthy et al., 2011; McGrath, 2017), but the negative effect of frustration results in strong efforts to make a final decision leading to sadness and hopelessness (Carver & Scheier, 2008). The analysis of the self-identified origins of these feelings illustrates that is not only consumers' flying behaviour that contradicts a pro-environmental attitude, but also social norms for flying contributes to feelings of dissonance which is more challenging to solve (Schrems & Upham, 2020).

Miller et al. (2010) noticed that tourists are reducing dissonance by discarding knowledge about the negative sustainable impact of their activities. A recent study from Uildriks (2019) argues that people take two different approaches when managing cognitive dissonance: Either they change their current unsustainable routines—which is very difficult—or they underestimate their behaviour as a mean of personal justification. Gössling, Bredberg, Randow, Sandström & Svensson's (2006) study demonstrates that the knowledge, as the most significant antecedent for action (O'Connor, Bord & Fisher, 1999), on the environmental impact of air travel should not be taken as a worldwide assumption since a large proportion of tourists surveyed were not fully conscious of the negative consequences of flying. In contrast to previous researches, their article indicates that a small portion of high-frequent air travellers is responsible for a substantial environmental impact.

In addition, Becken (2007) highlights that many tourists expressed interest in access to more information since this would raise their awareness when engaging in future travel-related decisions, which might subsequently lead to more pro-environmental choices. Similarly, a survey conducted from McKinsey & Company (2007 as cited in Bonini & Oppenheim, 2008) showed a lack of awareness from 'want-to-be-green-consumers' towards greening, where less than 15% of the respondents did not perceive flight reduction as one of the most effective decisions to mitigate the global warming (Bonini & Oppenheim, 2008).

In an attempt to close the attitude-behaviour gap and understand the relevance of the flow of knowledge among green tourists, Anable, Lane & Kelay (2006) presented two opposite consumer groups: (1) Consumers who actually believe that detailed knowledge is essential for their behavioural change and therefore act accordingly; and (2) consumers who value the relevance of new information but think it is not a sufficient driver to encourage an individual change.

2.4 Attribution Theory

The roots of attribution theory are mainly drawn upon Heider's (1958) work and his conception of attribution as a "*psychological construct referring to the cognitive processes through which an individual infers the cause of an actor's behaviour*" (Calder & Burnkrant, 1977, p. 29). In general terms, this theory aims to explain the rationales and justifications posed by people to make sense of their discrepancy (Eckhardt, Belk & Devinney, 2010). Heider (1958) revealed that positive outcome attributions are more likely to create a bigger willingness to engage in similar activities in the future compared to negative outcome attributions. Attribution theory explains the outcome of the intrinsic desire of understanding why unpredictable or bad things happen by describing how people create causal explanations and what type of information they use to deal with it (Tamborini et al., 2018). This theory has been explored and has created a range of predictions due to its "*interrelated constructs, including cognitions, emotions, and behaviours*" (Weiner 2019, p. 604).

Heider (1985) mentions that people are naive psychologists who determine the causes of positive and negative outcomes and find different ways of justifying the causes of their behaviour as well as any occurrences that influence them (Juvan & Dolnicar, 2014; Martinko, Harvey & Douglas, 2007). The theory has been constructed along a three-dimensional framework involving *locus causality*, *controllability* and *stability*. The *locus causality* considers that beliefs can be described as internal or external to a person (Harvey & Martinko, 2010). Internal attribution states that the subject considers itself as a cause and are often associated with self-focused negative emotions like guilt and shame (Söderberg & Wormbs, 2019). For external attribution, people identify external parties or other reasons as the main cause and are frequently associated with negative emotions such as anger and resentment (Harvey & Martinko, 2009; Weiner, 2019). Similarly, Kelley (1967) argues that whether an individual blames itself or external circumstances depends on factors, such as "*one's personal goals, the type of information available and one's beliefs and desires*" (Woodside, 2005 in *Decrop, 2006*, p. XIV). The *controllability* dimension relates to the extent of influence that consumers and firms have on the market price, i.e. how much consumers are willing to pay and what firms are asking for its products and services. The *stability* dimension relates to the likelihood of product issues or successes to repeat in the future (Chang, 2008).

Harvey & Weary (1984) introduce their focus review centred on Kelley & Michela's (1980) conceptual model underlining that both 'attribution theories' and 'attributional theories' have their basis on causal attributions. In line with this model, attribution theories link *antecedents* (information, believes and motivation) with *attributions* (perceived causes) whereas attributional theories bridge *attributions* with *consequences*, i.e. behaviour, affect and expectancy (Kelly & Michela, 1980).

Nevertheless, some authors are sceptical regarding the relevance of the attribution theory by emphasizing its little impact on the field of consumer behaviour (Folkes, 1988). In line with the latter, causal inferences to personal disposition have played a key role in attribution research; however, their contribution to consumer behaviour was limited. A second limitation is that some studies assessing consumer behaviour "*present themselves as testing attributional principles*" (Folkes, 1988, p. 561) and they do not clearly explain their importance to consumer behaviour. Concerning the nature of attribution, Buss (1978) provides a conceptual critique about *causes* and *reasons* in attribution theory, stressing out that both concepts have not been properly differentiated. The author states that *causes* "*represent the necessary and sufficient conditions for behaviour and reasons represent the purposes or goals of a behaviour*" (Harvey & Weary, 1984, p. 32). In his perspective, this misunderstanding of cause-reason should be considered, and a more accurate framework for using these terms should be proposed. In the same vein, Malle (1999, p. 24) also criticizes this unclear conceptual distinction by explaining that intentional behaviour (reason explanations) rely on "*agent's reasons for acting that way*" and unintentional behaviour (causal explanations) is based on "*causes that brought about the behaviour*".

In the context of tourism research, attribution theory has been employed to understand to whom tourists attribute their travelling experiences (Dickinson, Robbins & Lumsdon, 2010; Jackson, White & Schmierer, 1996) and how they manage dissonance reduction through denial, justification or blame (Stankov et al., 2019). It offers a foundation for academia since tourism consumers attribute the cause of climate change and other negative outcomes of tourism activities by blaming themselves or third parties. In the latter case, people do not perceive themselves as the main problem and for that reason; they do not feel obliged to modify anything in their behaviour. In this view, consumers think no one is responsible for harming the environment, and consequently, there is no behavioural change from their side in order to solve the problem (Juvan & Dolnicar, 2014).

The structural equation model from Breitsohl & Garrod (2016) pinpoints that tourists experience a three-step process (cognition -> emotion -> behaviour) when faced with unethical incidents at a destination of their choice. The likelihood of developing hostile emotions towards a destination is bigger if the incidents are more severe, and consumers highly attribute responsibility to agencies. Larsen (2007) found a link between past touristic activities and causal attribution towards future preferences. Jackson (2019) underpins the cognitive bias (self-serving bias), also described by other researchers where people internally attribute positive outcomes for self-enhancement purposes (Miller & Ross, 1975) and use external attributions to justify negative results to safeguard themselves (Jones & Nisbett, 1972).

Narrowing this review to air travel research, McDonald et al. (2015) investigated why green consumers keep flying and tried to understand the rationale behind the development of specific justifications for not changing their behaviour. The first attribution relies on travel product where the respondents assumed to experience dissonance in their attitude-behaviour to the environment by showing some guilt in their final choice. Nonetheless, they justified their flying decision in favour of saving time and costs (Hares et al., 2010; Randles & Mander, 2009). The second attribution involves a group of respondents who justified their air travel decision by expressing a strong desire to take a flight to visit family and friends (Moscardo, Pearce, Morrison, Green & O'Leary, 2000). This green consumer cluster uses external attribution to rationalize their dissonance (McDonald et al., 2015). The third attribution is linked to personal identity as the main reason for their transportation choice. Here, the participants valued their social identity benefits of the repetitive experiences of taking various flights (McDonald et al., 2015).

Moreover, Schrems & Upham (2020) also specify different justifications from the traveller point of view, namely denial of control and rejection of responsibility as well as comparisons and compensations through benefits. Dickinson et al. (2010) uncovered that holiday travellers use arguments of 'politics preventing progress', 'scientific scepticism' and 'green credentials' in other contexts of their life to justify their flying frequency. These sets of excuses have led to polemic discussions among consumer behaviour academics, creating social and value issues which contribute to the development of incoherent perspectives from air travel consumers to a level of "*almost guilty pleasure, apology and, at its extremes, defiance*" (Randles & Mander, 2009, p. 93). In parallel, Young, Higham & Reis (2014) found that frequent flying might represent behavioural addiction, which generates feelings of suppression and refusal. In this paper, the authors explored attributions on the basis of transferring blame to pathologised individuals.

Combining the results from the studies of *Air travel and environmental attitude* from Lassen (2010) and *Sociological barriers to developing sustainable discretionary air travel* from Cohen, Higham & Reis (2013), most consumers justify their choices with convenience-related arguments by attributing time, money and comfort as the core factors when selecting their means of transportation. Although most of the people surveyed are aware of the climate change issues, their air travel behaviour does not alter, confirming the existent attitude-behaviour gap. Likewise, Barr's et al. (2010) results described that individuals are conscious and able to practice diverse ways of sustainable tourism and it was also mentioned in the study that tourists recognize the harmful environmental impact of the air travel and for that reason, they accept to support carbon offsetting schemes (Becken, 2004; Gössling et al., 2007); they show a willingness to pay for green products in related to air travel, like organic on-board food (Hinnen, Hille & Wittmer, 2015); and they pay taxes to lessen the carbon footprint. However, they are not willing to change their flying habits considerably (Barr et al., 2010).

Stoll-Kleemann, O'Riordan & Jaeger (2001) define people's attributions in relation to their preferences of air travel as "psychology of denial" (in Gössling & Peeters, 2007, p. 402), where individuals view a potential behavioural shift as irrelevant to the society.

Aligned with these findings, the need for personal comfort; the belief in technological solutions; personal contributions to mitigation; and a reasonable explanation for the relationship between personal costs and social benefits are a set of justifications that cause non-action from the individual at a consumer level. In a similar perspective, Buckley (2011) verified that among 50 long haul air travellers in Australia, 70% prefer to afford flight tickets and plan to keep flying regardless of environmental consequences. These interviewees provide a wide range of arguments involving social obligations when visiting family or spending vacation with partner or children.

3. Conceptual Model and Hypotheses

In order to help answer the research question of this paper, a range of hypotheses were developed, which will be tested later in the results section. The hypotheses were developed based on theories from past literature and are concerned with (1) the hypothesized relationships between the constructs presented, and (2) the hypothesized differences between the two groups of car owners, i.e. AFV owners and non-AFV owners, for each of the constructs. More specifically, the conceptual model developed for this paper seeks to present an overview of the hypothesized influence of cognitive dissonance towards flying on flying frequency—both directly and indirectly through the mediators of behavioural adjustment and attitude adjustment respectively. The analysis will also test hypothesized differences in construct scores between the two groups based on past literature. Testing these hypotheses will help explain whether AFV owners (1) experience higher or lower levels of cognitive dissonance towards flying than non-AFV owners; (2) are more likely to eliminate cognitive dissonance by adjusting behaviour or attitude in comparison with non-AFV owners; (3) fly more or less than non-AFV owners.

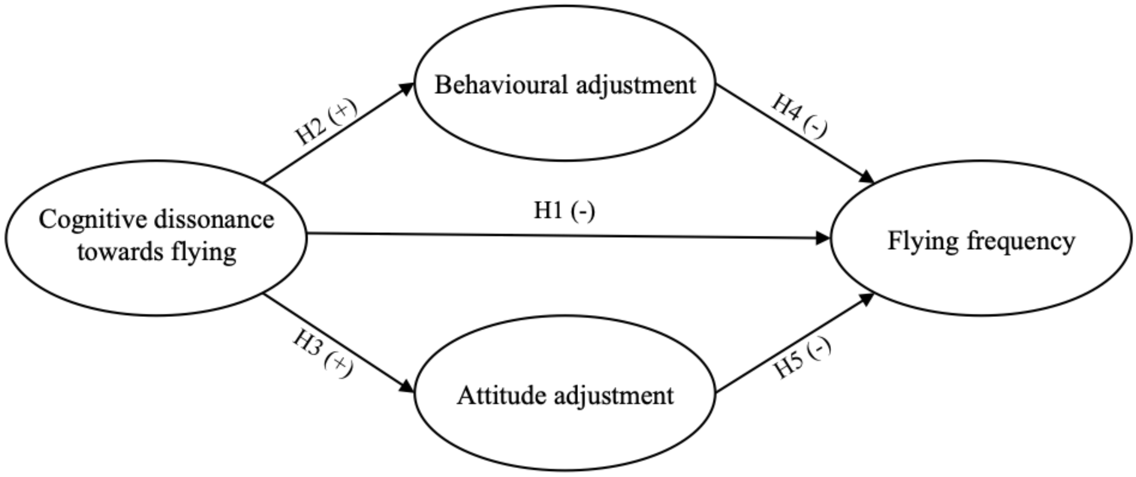

Figure 1: Proposed conceptual model.

3.1 Cognitive Dissonance Towards Flying

According to cognitive dissonance theory, people will try to avoid a state of cognitive dissonance by either adjusting their beliefs to align with their behaviour or by adjusting their behaviour to align with their beliefs (Juvan & Dolnicar, 2014). Although some literature suggests that green consumers still fly despite a feeling of cognitive dissonance (Juvan & Dolnicar, 2014), the level of counter attitudinal behaviour in relation to this has not been investigated. Therefore, it is hypothesized that high levels of cognitive dissonance towards flying will result in consumers flying less frequently. Furthermore, it is hypothesized that high levels of cognitive dissonance towards flying will result in higher levels of behavioural adjustment (i.e. that consumers have actively reduced the number of flights in the past 12 months, or that they have carbon offset more in the past 12 months compared to the time period before).

> *H1.* Cognitive dissonance towards flying will be negatively related to flying frequency.

> *H2.* Cognitive dissonance towards flying will be positively related to behavioural adjustment.

Past studies revealed that consumers, who are aware of the environmental impact of air travel, experience cognitive dissonance when they opt to fly (Alcock et al., 2017; McDonald et al., 2015; Young et al., 2014). However, they keep finding justifications to reduce such dissonance through an attitude adjustment. Therefore, it is hypothesized that high levels of cognitive dissonance towards flying will result in higher levels of attitude adjustment.

> *H3.* Cognitive dissonance towards flying will be positively related to attitude adjustment.

3.2 Behavioural Adjustment

There does not seem to be much existing literature or research investigating this particular relationship. However, it seems likely that consumers, who have actively tried to reduce their amount of flights in the past 12 months, will have a lower flying frequency in the past 12 months than those who did not actively do so. Therefore, the following has been hypothesized.

> *H4.* Behaviour adjustment will be negatively related to flying frequency.

3.3 Attitude Adjustment

Attitude adjustment relies on the principles of attribution theory, indicating that consumers are continuously justifying their actions by blaming themselves or external reasons. As mentioned previously, the principle of defensive attribution says that consumers are likely to blame others or outside events for failures (Schiffman, Kanuk & Hansen, 2008). If they blame others or outside events, it seems reasonable to assume that consumers are then less likely to take responsibility for the impact of their behaviour and actively seek to change it. On the other hand, if consumers blame themselves for their behaviour, it is assumed that they might be more likely to actively avoid flying more than necessary. Therefore, the following is hypothesized.

H5. Attitude adjustment will be negatively related to flying frequency.

3.4 AFV Ownership

Hackbarth and Madlener (2013) found that younger, well-educated and environmentally aware car buyers are the consumers that are most likely to adopt AFVs. If these consumers are also the consumers that are most likely to actually own AFVs (i.e. that a larger share of AFV owners are in fact more environmentally concerned than non-AFV owners), the following can be hypothesized.

H6. Owners of AFVs will experience higher levels of cognitive dissonance towards flying than owners of non-AFVs.

Based on the hypothesized relationships between cognitive dissonance towards flying and flying frequency (H1), cognitive dissonance towards flying and behavioural adjustment (H2) and cognitive dissonance towards flying and attitude adjustment (H3), it is expected that AFV owners will differ from non-AFV owners by scoring lower in flying frequency, higher in behavioural adjustment and higher in attitude adjustment. Therefore, the following can be hypothesized.

H7. Owners of AFVs will fly less frequently than owners of non-AFVs.

H8. Owners of AFVs will experience higher levels of behavioural adjustment than owners of non-AFVs.

H9. Owners of AFVs will experience higher levels of attitude adjustment than owners of non-AFVs.

4. Methodology

The preliminary part of this section introduces the fundamental research philosophy involved in this study as well as the selected research design. Thereafter, techniques pertaining to operationalization, data collection, statistical measurements and sampling are explained.

4.1 Philosophy of Science

Philosophy of science—or research philosophy—is a branch of philosophy concerned with an overall set of assumptions, methods, foundations and implications of science (Myers, 2013) regarding the development of knowledge (Saunders, Lewis & Thornhill, 2016). This subject has a wide range of application, namely when scientific outcomes include the study of truth, either in social sciences (as in this research) and in natural sciences such as in physics, biology and chemistry (Audi, 1999).

Before identifying the philosophy of science in this study, it is crucial to distinguish the assumptions involved. Ontology explains a particular world view, detailing the nature of reality and how the researcher perceive and study the research objects whereas epistemology refers to a methodological stance describing how this particular world can be studied, entailing assumptions about knowledge in terms of its acceptability, validity, legitimacy and how it should be communicated to others. Axiology refers to the "*role of values and ethics within the research process*" and tries to explain the relationship between researchers' values and participants' values (Saunders et al., 2016, p.128).

Considering the consumer behaviour focus and the methods used (explained along the section), it can be concluded that this thesis encompasses a positivist research perspective, although with a few nuances. Ontologically, this approach argues for one existent and external reality whereas, in terms of epistemology, it includes an observable social reality aimed to achieve generalisations as close to theory as possible, involving the treatment of reliable data to achieve clear and accurate knowledge (Crotty, 1998 in Saunders et al., 2016). Additionally, it can be argued that scientific knowledge in this research is reached through falsification based on Karl Popper's theory of critical rationalism (Mouritzen, 2011). In terms of axiology, the researchers try to follow a 'value-free' approach meaning that they are neutral and distant from data collected in order to avoid biased results (Crotty, 1998 in Saunders et al., 2016). However, in this case, there is an interference from the researches with social reality and since part of the survey questions concerns consumers' flying behaviour; the bias effect is inevitable as stated in a post-positivist stance (Henderson, 2011). Therefore, this study does not entail a fully 'value-free' approach.

Moreover, under this research philosophy, positivists usually resort to highly structured, and large data samples and quantitative analytical methods are applied.

4.2 Research Design

The research design consists of a blueprint for conducting research projects and helps investigators answering their research questions (Saunders et al., 2016). It specifies the procedures for obtaining essential information in order to effectively structure or solve research problems. Knowing that a theoretical approach has already been presented, research design delves into operationalization (Malhotra & Birks, 2007). A clear step-by-step operationalization process is illustrated in Figure 2.

The hypotheses were formulated based on academic literature with an emphasis on two existing theories of consumer behaviour, i.e. cognitive dissonance theory and attribution theory. Furthermore, the research design was modelled in order to validate those theories. Therefore, the deductive method is the most suitable approach to be employed in this study. This method can be summarized in four main steps: (1) Infer hypothesis from theory; (2) specify hypotheses in operational terms; (3) test the operational hypotheses, and (4) evaluate the outcome by accepting or rejecting the hypotheses. Implementing a deductive method means developing constructs and hypotheses in a way that enables quantitative data collection in order to test a theory. For the sake of statistical generalization, the sample should be significantly large, as demonstrated in the ‘sampling’ section (Saunders et al., 2016).

The research question, as the main driver of any investigation, should be constructed in a way so that the answer clearly explains the purpose of the research. This purpose can be exploratory, descriptive, explanatory, evaluative or a combination of these. Once this study seeks to explain the correlation between two variables, it is named as explanatory. The purpose is clearly stated in the research question, where it is asked how AFV owners modify their behaviour and attitude towards flying. Here, AFV ownership acts as a moderator variable on the overall conceptual model, which consists of cognitive dissonance towards flying as the independent variable; flying frequency as the dependent variable, and behavioural adjustment and attitude adjustment as the mediating variables.

Additionally, during the data collection, respondents were mostly asked how-questions, where the authors intended to obtain explanatory responses. Nevertheless, the flying attitude and behaviour of AFV owners versus conventional car owners were not well defined. Neither was the relationship between dependent and independent variables when the research questions were formulated. For that reason, exploratory research was also conducted as part of the literature review in order to identify a theoretical background to support the attitude-behaviour gap and consequently define key variables before identifying the main goal of this study.

Following a quantitative research design, a mono method study was considered as the most appropriate due to time constraints to complete the data collection. In this sense, a cross-sectional survey was conducted as a source of data collection. The reason behind this choice involves not only the timesaving advantage in preparing the information for respondents compared to a multi-method study but also its cost-free accessibility and easiness to share online in multiple platforms to reach a higher number of respondents. Therefore, a self-administered internet-based questionnaire was constructed and shared on different Facebook car-related groups as well as on the authors’ LinkedIn profiles in order to gather a larger enough sample to be able to generalize according to the positivist school of thought. Additionally, the survey was found to be the most suitable form to collect quantitative data since it allows the use of statistics to compute potential correlations between variables.

Another reason to opt for a self-administered online questionnaire rather than other methods (e.g. interviews or focus groups), where the interviewers play an important role, is that it decreases the likelihood of respondents to give socially desirable responses. According to Grimm (2010), the "*tendency of research subjects to give socially desirable responses instead of choosing responses that are reflective of their true feelings"* (p. 517) is defined as *social desirability bias*. This type of bias is likely to occur when respondents are faced with sensitive topics, such as an environmental attitude-behaviour gap as in this case (Fisher, 1993; Grimm, 2010). This unfortunate propensity is relevant to underpin in this research since most eco-friendly travellers might not be keen to admit that they often act against their beliefs.

In order to provide an accurate assessment and a reliable hypothesis testing as well as to understand the consistency, comprehensibility and validity of the questionnaire design, some scholars recommend a preliminary analysis of the survey items (Bell & Waters, 2014; Fink, 2013; Malhotra & Birks, 2007; Saunders et al. 2016; Schmidt & Hollensen, 2010). Hence, it was decided to run a pilot test with ten individuals from the target group, who provided fruitful insights and relevant feedback to be used in the final version of the survey. The pilot test was adapted based on the respondents' feedback and allowed the authors to evaluate the 'face validity' of the survey and remove unclear or ambiguous questions/statements before sending out the final version (Saunders et al. 2016).

Figure 2: Step-by-step operationalization process (authors' own work)

4.3 Measurements

Marketing research literature describes 'measurements' as "*assigning numbers or other symbols to characteristics of objects according to certain pre-specified rules*" (Malhotra & Birks, 2007, p. 336). The variables to be measured in this research are divided into four categories: (1) Independent variables; (2) mediating variables; (3) moderating variables, and (4) dependent variables. For the sake of consistency, the structure of this subsection follows a similar order as in the conceptual model of a mediator effect from Bennett (2000, p. 416) (showcased in Figure 3). In the following, scales and measurement techniques employed will be presented and justified (see the 'Survey Design' section).

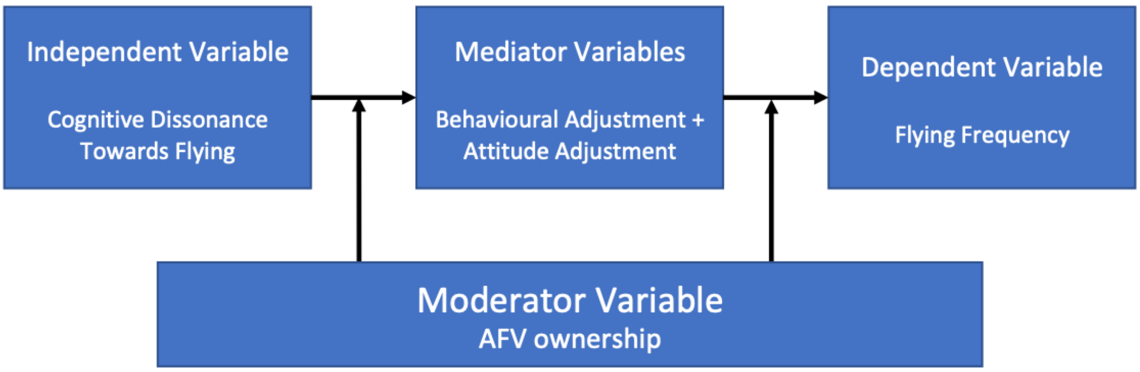

Figure 3: Types of variables (authors' own work inspired by Bennet (2000)

4.3.1 Independent Variable

The independent variables involve a set of constructs whose values influence the behaviour of other variables (Malhotra & Birks, 2007).

4.3.1.1 Flight shame as cognitive dissonance

The independent variable in this study is 'cognitive dissonance towards flying'. To measure cognitive dissonance towards flying, a scale consisting of six items was used to assess the prospective feelings of regret and guilt, when consumers decide to fly for leisure or holidays. Items involved: "Maybe I should have chosen an alternative form of transportation to my flight" (CD_1); "I am not completely certain about my decision about flying to the destinations” (CD_2); “I feel discomfort when I think about my decision to fly to the destinations” (CD_3); “I do not know if flying was the right thing to do” (CD_4); “Now, after having flown, I feel uneasy because of my decision” (CD_5); “I regret my decision to fly” (CD_6). The scale was ranked on a 7-step Likert scale (1= strongly disagree, and 7 = strongly agree).

4.3.2 Mediators

Mediators are defined in literature as the variables that create the ‘bridge’ between the independent variables and dependent variables (Baron & Kenny, 1986; Bennett, 2000; MacKinnon, Coxe & Baraldi, 2012; StatisticsSolution, 2020). In other words, mediators work as variables representing the “*generative mechanism through which the focal independent variable is able to influence the dependent variable of interest*” (Baron & Kenny, 1986, p. 1173). In order to explain the relationship between cognitive dissonance towards flying and flying frequency, this study considers behavioural adjustment and attitude adjustment as mediators. In theoretical terms, since these two variables serve as both dependent and independent variables and are measured from statistical inference, each of the following two constructs is defined as *endogenous latent variables* (Hair, Hult, Ringle & Sarstedt, 2016). The scale used is a Likert scale, which indicates the level of agreement or disagreement with the statements presented (Malhotra & Birks, 2007).

4.3.2.1 Behavioural Adjustment

To measure behavioural adjustment, two statements were used to understand the actions taken towards flying (a definition of ‘carbon-offsetting’ was included). The statements were: “In the past 12 months, I have carbon offset more flights than before” (BA_1); and “I have reduced my number of flights in the past 12 months compared to the year before” (BA_2). The scale was ranked on a 7-step Likert scale (1= strongly disagree, and 7 = strongly agree).

4.3.2.2 Attitude Adjustment

To measure attitude adjustment, a scale of four items was considered to understand how respondents justify their behaviours towards flying. The items were: “I feel personally responsible for how often I have flown in the past 12 months” (AA_1); “I feel that friends, family and/or my partner have/has a big influence on how often I have flown in the past 12 months” (AA_2); “I would have liked to fly less in the past 12 months, but there were no better alternatives to flying” (AA_3); and “When I go on vacation, it is okay to fly” (AA_4). The scales were ranked on a 7-step Likert scale (1= strongly disagree, and 7 = strongly agree).

4.3.3 Moderator

While mediators try to find the reason why a certain relationship exists between two variables, the moderator affects the strength of this relationship (Bennet, 2000).

4.3.3.1 AFV ownership

The moderating variable in this study is ‘AFV ownership’, which was observed initially in the survey, where participants were directly asked about their vehicle ownership through two closed questions: “Do you own or lease a car?” (Q0) followed by: “Do you own an electric car, a hybrid or similar that does not run exclusively on gasoline or diesel?” (Q1). To distinguish conventional car owners from AFV owners, a binary scale was used (0 = conventional car owners and 1 = AFV owners). The binary format is deemed to be more favoured because it is objective and takes less time to complete, namely when a survey involves multiple questions (Dolnicar, 2003).

4.3.4 Dependent Variable

The dependent variables entail a set of constructs whose values are impacted by the effect of independent variables through the influence of mediators in between (Malhotra & Birks, 2007).

4.3.4.1 Flying frequency

The dependent variable in this study is ‘flying frequency’. In order to extract such information from respondents within the past year, three straightforward questions were posed regarding their travel habits: “How many domestic flights (to destinations within Denmark) did you have in the past 12 months?” (FF_1); “How many flights did you have to destinations within Europe in the past 12 months?” (FF_2); and “How many flights did you have to destinations outside of Europe in the past 12 months?” (FF_3). It was stated that business trips should be excluded from the answers. Only trips with vacation or leisure purposes as well as visiting family and friends were to be included. This construct was directly measured by observing the number of flights the respondents inserted in the form.

4.4 Survey Design

The validity and reliability of the data collection depend on the survey design and how structured and rigorous the questions are built. The survey is valid if it can ensure truthful data that allows for accurate measurement of the concepts discussed. Additionally, it is reliable if this data is collected consistently (Saunders et al., 2016). Thus, due to the limited alternatives provided from surveys, through fixed-response questions, data consistency is usually not affected (Malhotra & Birks, 2007).

Foddy (1994) argues that there must be no discrepancies between the way that the question is perceived by the respondent and the way that the researchers interpret the answer. The choice of a survey language either for groups or individuals, can strongly influence the sample structure and survey evaluations. Consequently, the logic for that choice must be pondered, consistently implemented and fully supported (Johnson, Pennell, Stoop & Dorer, 2019). For the sake of overall comprehension (for non-Danish speakers), it would have been easier to create the entire survey in English. However, considering that the majority of the target group was located in Denmark with Danish as their native language, it was agreed to build the survey in Danish to minimize any potential linguistic barriers and to increase the incentive to participate.

The survey started with brief information about the authors, followed by a short explanation of the purpose of the questionnaire. Then, respondents were asked to read all the questions carefully and to answer as honestly as possible. Considering that some individuals may feel pressure to respond when they are not anonymous, it was decided to create an anonymous survey to reduce such perceived pressure (Fuller, 1974). The anonymity was emphasized in the caption of all posts on social media. In addition, it was also agreed not to disclose in detail the goal of this study in order to avoid *method bias*. In the light of Podsakoff, P. M., MacKenzie & Podsakoff, N. P.'s (2011) findings: "*method biases can significantly influence item validities and reliabilities as well as the covariation between latent constructs"* (p. 565). The internal consistency and validity of the items will be assessed in the Results' section.

To maximize the response rate, the survey was structured in a way to ensure easiness to read involving a straightforward language without complex scientific terminology. This was also done in order to guarantee that data analysis would not be affected by avoiding ambiguity. In line with Roszkowski & Bean (1990), longer surveys have lower response rates. In order to maximize the response rate, the final survey was relatively short (covering 19 closed questions and statements). Timewise, it was verified that the entire questionnaire did not take more than five minutes to complete.

The questions were divided into three main parts. The first part was focused on car ownership and began with forced-choice questions (Q0-Q4). The second part of the questionnaire also comprised of closed questions related to the flying frequency of participants, when they travel for vacation, leisure, or to visit family and friends (FF_1-FF_3). This type of multiple choice-based questions was found to be appropriate to ask in this questionnaire. They are generally easier and quicker to reply to since they do not require further explanations. Therefore, the respondent saves time (Saunders et al., 2016). Regarding the assessment of cognitive dissonance theory (CD_1-CD_6), behavioural adjustment (BA_1 and BA_2) and attitude adjustment (AA_1-AA_4), the reason behind the choice of a 7-step Likert scale relies on its easiness to construct and administer, while also being relatively easy to comprehend for respondents (Malhotra & Birks, 2007).

Finally, if something was not clear, or if respondents would like to add additional comments, they had the option to write it in a comment box at the end of the questionnaire.

4.5 Sampling

Given the relatively short time to conduct the survey and the lack of financial means to do so, it was not possible to survey the entire population of car owners in Denmark. Therefore, a convenience sampling method was used. Convenience sampling is a nonprobability sampling method, where people are sampled out of convenience (Battaglia, 2011).

In this case, the respondents were sampled from various Facebook groups for owners of certain car brands or types of cars (see the full list in Table 1). This was certainly a convenient way of sampling respondents for the survey. However, these groups do not fully represent all classes of vehicles and seem to be overrepresented by fairly small cars. There can be several issues with this, two of which is: (1) Given that most groups are for owners of fairly small class cars, there might already be a larger share of environmentally conscious consumers relative to the actual share of the entire population, which could potentially bias the results of the study; (2) Even groups with several thousand members often only represent a fairly small share of the total group of owners of that particular car model, brand or type of vehicle. In line with point 1, it is not unlikely that these groups attract consumers with common interests and traits that do not necessarily align with the consumer group as a whole, i.e. that the consumers in these groups might respond differently to the survey than would have been the case for the entire population.

Facebook group (AFV)	**# of members**	**Facebook group (non-AFV)**	**# of members**
Tesla Owners Club Danmark	4,800	Ford Klub Danmark	11,700
Elbilforeningen FDEL – åben for alle	4,500	Skoda Society Denmark	5,000
Tesla Owner Denmark	1,400	French Car Society in Denmark	2,100
Nissan Elbiler Danmark	1,200	Cars in Denmark	2,000
Hyundai Elbiler Danmark	900	Ford Focus Owners Club Denmark	1,500
VW e-Golf Danmark	700	Toyota Aygo Klub Danmark	1,500

Table 1: List of Facebook groups that the survey was distributed in.

The survey was created using Qualtrics. It was then distributed to potential respondents in various Facebook groups for car owners (Table 1). This resulted in a total of 681 recorded responses out of which 615 actually replied that they own a car. From the 615 car owners, 508 completed the survey. In the third part of the questionnaire, respondents are presented with the "not relevant" option and are instructed to only choose this option, if they replied that they did not fly within the past 12 months—in which case the third party related to cognitive dissonance towards flying was deemed irrelevant. However, some respondents would complete the survey—stating that they had indeed flown within the past 12 months—and select "not relevant" for one or more of the statements in the third part of the questionnaire. These responses were therefore completely removed from the dataset. This resulted in a final sample size of n=472.

The number of owners of non-AFVs amounted to 219 (46.4%), while there were 253 (53.6%) AFV owners in the final sample. Given that this study seeks to compare the two groups of car owners from a behavioural perspective rather than trying to describe for instance the market in relative terms, a 50/50 distribution between the two groups was the goal for the sampling process.

The respondents stating that they own an AFV were asked two additional questions related to the range of their vehicles and when they bought their vehicles respectively. In terms of the range of the AFVs, 24.1% (n=61) of the AFV owners identified the range as being less than 200 km; 42.3% (n=107) said between 200 and 399 km; 30.8% (n=78) said between 400 and 599 km, and only 2.8% (n=7) said that the range of their AFV is 600 or more km.

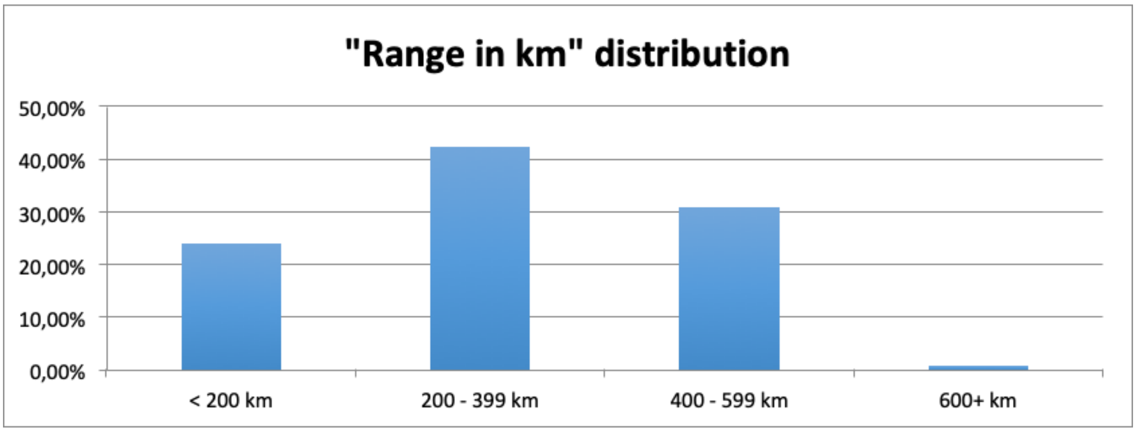

Figure 4: Distribution of responses ("Range in km").

As for when the AFV owners acquired their vehicle, they were asked to identify this on a binary scale with the two options being: (1) Within the past 12 months and (2) more than 12 months ago. This was in order to identify if the respondents are new to this type of vehicle and if there might be some sort of difference between these two groups in terms of flying habits as well. Among the 253 AFV owners, 54.2% (n=137) had acquired their car within the past 12 months, while the remaining 45.8% (n=116) had acquired their AFVs more than 12 months before responding to the survey, i.e. two fairly equal groups in terms of size.

All respondents were required to answer the following question related to the distance they each live from the nearest airport with international departures. Collectively, 32.6% (n=154) of all respondents live within 25 km from the nearest airport; 27.3% (n=129) live between 25 and 49 km from an airport; 22% (n=104) between 50 to 74 km away; 8.5% (n=40) between 75 to 99 km away; and 9.5% (n=45) live 100 km or more from the nearest airport with international departures. For AFV owners, 25.7% (n=65) live within 25 km from an airport; 31.6% (n=80) between 25 and 49 km away; 23.3% (n=59) between 50 and 74 km; 8.7% (n=22) between 75 and 99 km away; and 10.7% (n=27) live 100 km or more from the nearest airport. For non-AFV owners; 40.6% (n=89) live less than 25 km from an airport; 22.4% (n=49) between 25 and 49 km away;

20.5% (n=45) between 50 and 74 km away; 8.2% (n=18) between 75 and 99 km away; and 8.2% (n=18) live 100 km or more from the nearest airport.

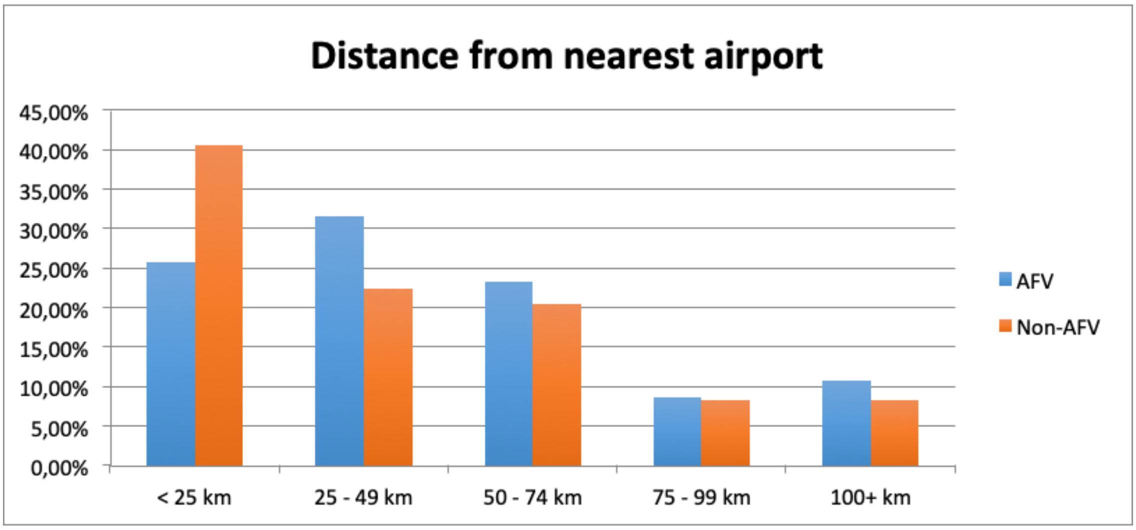

Figure 5: Distribution of responses ("Distance from nearest airport").

In summation, the sample may not be representative of the entire population in question, likely due to the convenience sampling method. Therefore, the results from the analysis based on this data cannot be generalized and said to be true for the entire population. However, it might still give an indication of certain differences between owners of these kinds of vehicles, which can be confirmed or disconfirmed in later research with access to a larger proportion of the population. However, the sample size itself makes it suitable for SEM-analysis and is therefore deemed useful for the purpose of this study.

5. Results

5.1 Partial Least Squares Structural Equation Modelling

For this study, the statistical method of analysis chosen is partial least squares structural modelling (PLS-SEM). Structural equation modelling (SEM) is a statistical modelling technique that is commonly used in behavioural sciences (Hox & Bechger, 1999). SEM is a second-generation multivariate analysis tool that combines factor analysis and regression, making it possible for researchers to simultaneously analyse the relationship between multiple variables (Hair, Hult, Ringle & Sarstedt, 2016). This study is testing five relationships between four different variables as well as testing for mean differences within the variables between the two groups of AFV owners and non-AFV owners, respectively. SEM's ability to compute multiple regression equations simultaneously and SPSS' ability to perform mean comparison is therefore highly useful.

SEM can be used to assess both the measurement theory and the structural theory (Hair et al., 2016; Hair, Sarstedt, Ringle & Mena, 2012). Measurement theory refers to the outer model and covers the relationships between measured variables and latent variables at the observation level. Structural theory refers to the inner model and covers the relationships between latent variables at a theoretical level (Hair et al., 2012). According to Hair et al. (2016), SEM is also particularly useful when variables serve as both independent and dependent variables. In this study, the construct of cognitive dissonance towards flying act as a dependent variable (in relation to AFV ownership) and an independent variable (in relation to behaviour adjustment, attitude adjustment and flying frequency). Similarly, both behaviour adjustment and attitude adjustment act as dependent variables (in relation to cognitive dissonance) and independent variables (in relation to flying frequency). Based on such advantages, SEM was considered an appropriate method for testing the proposed conceptual model in this study.

Two common types of SEM are covariance-based SEM (CB-SEM) and partial least squares SEM (PLS-SEM), which is used in this study. Both types have their advantages and disadvantages. CB-SEM is maximum-likelihood-based and estimates model parameters in order to minimize the discrepancy between the estimated and sample covariance matrices (Hair et al., 2012). This also means that it requires some level of normality to the data distribution (Hair et al., 2016). PLS-SEM, on the other hand, generally has no requirements to the data distribution, i.e. the can be non-normally distributed and still show significant results (Hair et al., 2016; Hair et al., 2012). The authors of this study could already visually see a high level of skewness on most of the measured items before analysing the data. The ability of the SEM to handle non-normally distributed data was therefore deemed important from an early stage. PLS-SEM is based on ordinary least squares (OLS) regressions, which serves to minimize the error term of the endogenous latent variables as well as estimating coefficients that maximize the R^2 values of those variables (Hair et al., 2016; Hair et al., 2012). PLS-SEM is therefore also better at handling small sample sizes, while still showing high levels of statistical power (Hair et al., 2012). Due to this, using PLS-SEM instead of CB-SEM—especially with small sample sizes—is said to decrease the risk of Type II errors (Hair et al., 2016).

PLS-SEM also handles single-item variables in a model, such as flying frequency and AFV ownership, although there are some downsides. One downside is that it will likely result in lower predictive validity (Diamantopoulos, Sarsted, Fuchs, Wilczynski & Kaiser, 2012; Hair et al., 2016). The construct of behaviour adjustment includes only two items, which might also have an effect of the predictive validity. However, the fact that it only has two items also speaks for using PLS-SEM rather than CB-SEM. In some obvious cases, single-item variables are appropriate; for instance when they are used to measure observable characteristics, such as the number of flights in the past year (flying frequency) or type of car that a respondent owns (AFV ownership) (Hair et al., 2016).

For running PLS-SEM, the software SmartPLS was used in its latest version (v. 3.2.9) (Ringle, Wende & Becker, 2015). For this study, Qualtrics was used to collect responses to the survey. The data was then exported from Qualtrics and inspected in Excel. The purpose of the inspection was to remove unusable data from the dataset. This includes responses from people who do not own any car and incomplete responses. See more about this in the sampling section of this study. Finally, the cleaned dataset was imported into SmartPLS as a .csv file.

At the initial import, SmartPLS identifies the distribution of the data. According to Hair et al. (2016), the data is generally considered nonnormally distributed if it does not meet the following criteria: the value for skewness should be between -1 and +1. If the kurtosis value is greater than +1, the distribution is usually considered to be too peaked to be considered normally distributed. If the kurtosis value is less than -1, the distribution is too flat. Among the 12 indicators for the model's latent variables, only two indicators can be considered somewhat normally distributed. These are BA_2: "I have reduced my number of flights in the past 12 months compared to the year before" (skewness: 0.828; kurtosis: -0.775) and AA_4: "When I go on vacation, it is okay to fly" (skewness: 0.762; kurtosis: -0.404). All the remaining indicators experience skewness and/or kurtosis values outside of the -1 to +1 range.

A couple of indicators experienced relatively high kurtosis values as well as slightly higher skewness values compared to the rest of the indicators. Both of these were related to the cognitive dissonance construct; CD_5: "Now, after having flown, I feel uneasy because of my decision" (skewness: 2.031; kurtosis: 4.071) and CD_6: "I regret my decision to fly" (skewness: 2.186; kurtosis: 5.501). These values must be compared to the remaining indicators of the cognitive dissonance. All of these (CD_1-CD_4) experience skewness values within the range of 1.156 to 1.449 as well as kurtosis values within the range of 0.453 to 1.344. The means of CD_5 and CD_6 are also slightly lower than the CD_1-CD_4 indicators at 1.790 and 1.630 respectively, therefore also closer to the absolute minimum of 1 on the scale. For CD_1-CD_4, all indicators have a mean value between 2.170 and 2.344. Given that these six items are covering feelings of regret (CD_1 and CD_6), ambivalence (CD_2 and CD_4) and shame (CD_3 and CD_5), one would assume that the mean, skewness and kurtosis values of CD_5 and CD_6 would be closer to CD_3 and CD_1 respectively. See a full list of the indicators skewness and kurtosis values in Appendix A.

5.2 Evaluation Criteria

When defining the relationships between indicators and latent variables in SmartPLS, one has the option to choose between formative and reflective variables (Ringle, Wende & Becker, 2015). Knowing which one to choose is important as the evaluation criteria of the variables will be different depending on whether they are formative or reflective (Finn & Wang, 2014; Hair et al., 2016). In formative measurement models, the directional arrows of the model will be pointing form the indicators to the latent variable indicating a causal relationship from the indicator to the variable (Hair et al., 2016). In the reflective model, the direction of the arrows will be pointing from the latent variable to its indicators to reflect that the construct causes the measurement of the latent variable's indicators (Hair et al., 2016). This study estimates the relationships between several reflective latent variables, which will, therefore, be the focus in this results section.

In order to evaluate the PLS-SEM results, Hair et al. (2016) suggest a systematic approach to evaluating the reflective measurement model by determining (1) the internal consistency (or reliability), (2) convergent validity and (3) discriminant validity. For the structural, or inner, model, Hair et al. (2016) suggest evaluating the model based on R^2 (explained variance) as well as the size and statistical significance of the structural path coefficients between the model's variables. Furthermore, it is advised by the authors that the measurement model is first evaluated and then adjusted if necessary, before moving on to the evaluation of the structural model.

5.2.1 Evaluation of the Outer Model

5.2.1.1 Evaluation criteria for the outer model

Hence, the first step of the evaluation process is to determine the internal consistency of each latent variable. In traditional internal consistency reliability tests, the criterion used is Cronbach's alpha, which estimates the intercorrelations between observed indicator variables (Hair et al., 2016). However, Cronbach's alpha is generally quite sensitive to the number of indicators for a variable and will often underestimate the internal consistency reliability. Therefore, composite reliability may be a better criterion for reliability as it is less sensitive to the number of items. However, composite reliability tends to overestimate the internal consistency reliability. The real reliability estimate will likely be somewhere between that of Cronbach’s alpha and composite reliability (Hair et al., 2016). The two measures are interpreted in a similar way. For composite reliability, a value between 0.70 and 0.90 are generally acceptable and indicates a satisfactory level of internal consistency reliability. Values between 0.60 and 0.70 are acceptable for explorative research. Values above 0.90 (and certainly above 0.95) will generally indicate that the items are all measuring more or less the same phenomenon, meaning that the items might not fully measure the construct they intend to (Hair et al., 2016). For this study, composite reliability and/or Cronbach’s alpha values between 0.70 and 0.90 will be accepted. However, if other validity measures fall within their respective limits, values between 0.60 and 0.95 can be accepted.

Convergent validity determines to which extent indicators correlate positively with other indicators from the same construct (Hair et al., 2016). This is evaluated by looking at the indicators’ outer loadings as well as the average variance extracted (AVE). The outer loadings should be significant and, and will commonly need standardized outer loadings of 0.708 or more—although 0.70 is considered good enough in most cases (Hair et al., 2016). However, according to Hair et al. (2016), indicators with outer loadings between 0.40 and 0.70 should only be considered for removal, if it increases the composite reliability value and/or Cronbach’s alpha value. All indicators with loadings below 0.40 should be removed.

The criterion average variance extracted (AVE) is the mean value of the squared loadings of the indicators related to the construct in question (Hair et al., 2016). An AVE of 0.50 or more indicates that the indicators are able to explain more than half of the variance of the construct. The AVE should, therefore, be 0.50 or more for each multi-item construct.

The last step in evaluating the reflective measurement model is determining discriminant validity. Discriminant validity helps by indicating whether each construct is, in fact, distinct from other constructs of the model (Hair et al., 2016). A traditional discriminant validity test usually evaluates (1) cross-loadings and (2) the Fornell-Larcker criterion (Hair et al., 2016; Hair et al., 2012). However, Henseler, Ringle & Sarstedt (2015) challenge the traditional approach by arguing that neither the cross-loadings nor the Fornell-Larcker criterion will help researchers determine the discriminant validity of their measures. For cross-loadings, this happens when two constructs are perfectly correlated, and for the Fornell-Larcker criterion when the indicator loadings for constructs differ only slightly (e.g. when all the loadings are between 0.60 and 0.80) (Hair et al., 2016; Henseler et al., 2015). Instead, Henseler et al. (2015) suggest using the heterotrait-monotrait ratio of correlations (HTMT) as a measure for discriminant validity. This study will, therefore, include both the traditional cross-loadings, the Fornell-Larcker criterion and the HTMT in order to determine the discriminant validity of the constructs of this study.

For cross-loadings, an indicator's outer loading on the associated construct should be higher than the same indicator's outer loading on any other construct (Hair et al., 2016; Hair et al., 2012).

When using the Fornell-Larcker criterion to assess the discriminant validity, the researcher will compare the square root of the AVE values with the correlations of the latent variables (Hair et al., 2016). Specifically, "each construct's AVE should be higher than its squared correlation with any other construct" (Hair et al., 2012, p. 430).

The HTMT approach will technically estimate what the correlation between constructs would be if they were perfectly reliable. If this correlation between two constructs gets close to 1, it is an indication of a lack of discriminant validity (Hair et al., 2016; Henseler et al., 2015). Henseler et al. (2015) argue that any value above 0.90 is a sign of a lack of discriminant validity, but that this value is also a liberal one. They present 0.85 as a more conservative estimate.

For running the analyses in SmartPLS, most of the default settings are kept for both the PLS algorithm (path weighting scheme and stop criterion of 10^{-7}) and the bootstrapping, which will be used to calculate a confidence interval for the HTMT (Bias-Corrected and Accelerated (BCa) Bootstrap and a two-tailed significance test at the 0.05 level).

Criterion	*Measure*	*Rule of thumb*	*References*
Internal consistency reliability	Composite reliability & Cronbach's alpha	0.70 ≤ alpha / composite reliability < 0.90	Hair et al., 2016
Convergent validity			
- Outer loadings	Squared standardized outer loadings	Outer loadings ≥ 0.7	Hair et al., 2016
- Average Variance Extracted (AVE)	AVE	AVE ≥ 0.50	Hair et al., 2016
Discriminant validity			
- Cross loadings	Cross loadings matrix	Each indicator's outer loading should be the highest on its associated construct	Hair et al., 2016; Hair et al., 2012
- Fornell-Larcker criterion	Fornell-Larcker criterion matrix	Each construct's AVE should be higher than its squared correlation with any other construct	Hair et al., 2016; Hair et al., 2012
- Heterotrait-Monotrait ratio	HTMT ratios	HTMT < 0.85 (< 0.90)	Hair et al., 2016; Henseler et al., 2015

Table 2: Criteria for evaluating the outer model (source: authors' own work)

However, for the PLS algorithm, the number of maximum iterations have been raised to 1,000 from 300 in order to avoid that the algorithm does not stop because of hitting the maximum number of iterations allowed but due to the stop criterion (Ringle et al., 2015). Similarly, for the bootstrapping analysis, the number of subsamples was raised from 500 to 1,000 to ensure a higher stability of the results from the analysis (Ringle et al., 2015).

5.2.1.2 Initial evaluation of the outer model

After running an initial PLS algorithm and bootstrapping calculation for the outer model, the two latent variables cognitive dissonance (CD) and behavioural adjustment (BA) showed satisfactory results in terms of internal consistency reliability, convergent validity and discriminant validity (see Appendix B). However, attitude adjustment (AA) showed unsatisfactory results for internal consistency reliability, convergent reliability and discriminant validity. Two of the construct's indicators showed weak loadings on the construct. AA_4 even had a negative outer loading, which shows that this indicator likely does not help explain this construct.

	AA
	Outer loadings
AA_1	0.815
AA_2	0.661
AA_3	0.772
AA_4	-0.155

Table 3: Outer loadings for AA.

With an AVE value of 0.431 (see Table 4), the AA construct also does not meet this second convergent validity criteria.

In terms of discriminant validity, the AA construct showed satisfactory results according to the Fornell-Larcker criterion (see Appendix B). For the HTMT ratio criterion, the BA/AA pair showed a ratio value of 0.852 (see Appendix B), which is slightly above the conservative limit of 0.85, but still lower than the liberal limit of 0.90. It is, therefore deemed acceptable. However, looking at the confidence interval for HTMT of BA -> AA revealed that the value of 1.001 was included (see Appendix B). Therefore, discriminant validity between the BA and AA constructs could not be established.

5.2.1.3 Handling discriminant validity issue

According to Henseler et al. (2015), one way of approaching discriminant validity issues is to first try to "establish discriminant validity while keeping the problematic constructs" (p. 130). This can be done by eliminating items that correlate highly with items from the other construct or by reassigning the item to the other construct if this makes sense from a theoretical perspective.

In this case, the item AA_4 seems to be an issue. Specifically, this item was related to people feeling that flying on vacation is okay, for instance, because they do not often travel because they act environmentally friendly the rest of the year or because they carbon offset their flights. While the remaining three AA items are related to people's actual behaviour in the past 12 months, the AA_4 item is more related to people's general feeling as to whether or not flying is okay. Removing the item, therefore, does not seem to conflict with existing theory. AA_2 is also below the threshold of 0.70. A PLS algorithm calculation showed that removing this item would slightly increase the composite reliability of the construct while slightly decreasing the Cronbach's alpha value meaning that the criterion for removal of items with outer loading between 0.40 and 0.70 is met. However, the item is covering the influence of relationships on people's flying behaviour, which is not covered by the remaining two items of the construct. The item will, therefore, be kept as an indicator for the construct.

After removal of AA_2, all the constructs show high levels of internal consistency reliability (see Table 4).

	Composite reliability	Cronbach's alpha	AVE	Composite reliability *(new)*	Cronbach's alpha *(new)*	AVE *(new)*
CD	0.931	0.910	0.692	0.931	0.910	0.692
BA	0.818	0.559	0.692	0.818	0.559	0.692
AA	0.658	0.468	0.431	0.803	0.636	0.578

Table 4: Internal consistency reliability computation for CD, BA and AA (First + Second Run).

All the constructs also show satisfactory results in terms of convergent and discriminant validity (see Appendix C).

5.2.1.4 Handling excessive internal consistency reliability issue

Although all three constructs show high internal consistency reliability based on the composite reliability value, the CD construct actually scores higher than the maximum rule of thumb value of 0.90 for both composite reliability and Cronbach's alpha, which is generally not desirable, since it might be an indication that semantically redundant items have been used, i.e. slight rephrases of the same statements (Hair et al., 2016).

As mentioned earlier, the six CD items are basically three pairs of similar statements covering feelings of regret (CD_1 and CD_6), ambivalence (CD_2 and CD_4) and shame (CD_3 and CD_5).

Therefore, in order to decrease the internal consistency reliability value for the CD construct to an acceptable level, redundant items were removed. This would be done by removing the item with the weakest outer loading from each of the three pairs of statements. This way, the construct will still cover the three elements of regret, ambivalence and shame. The three items with the weakest outer loadings were CD_1, CD_2 and CD_3 (see Appendix C). After the removal of these items, the construct showed a slightly higher composite reliability value of 0.932. However, the more conservative measure of Cronbach's alpha dropped below the threshold of 0.90 (see Table 5). At the same time, the AVE rose from 0.692 to 0.821 after removal of the three items.

	Composite reliability	Cronbach's alpha	AVE
CD	0.932	0.890	0.821
BA	0.817	0.559	0.692
AA	0.803	0.636	0.578

Table 5: Internal consistency reliability computation for CD, BA and AA (after removal of CD_1, CD_2 and CD_3).

In terms of convergent reliability, all items for all three constructs showed satisfactory levels of outer loadings (see Appendix D). Only AA_2 was below 0.70 with a value of 0.667. However, as discussed earlier, this item covers an aspect of the construct that the other items do not cover. Hence, it is kept as an indicator for the AA construct despite its outer loading being below the threshold. As is seen from Table 5, all constructs show AVE scores above 0.50. Convergent validity is therefore established.

The cross loadings matrix showed that all items loaded most strongly on their related constructs (see Appendix D). The Fornell-Larcker criterion was also met (see appendix XYZ), and so was the HTMT ratios criterion (BA -> AA: 0.771; CD -> AA: 0.690; and CD -> BA: 0.677). Furthermore, the bootstrapping run showed that the 95% confidence interval for all the HTMT ratios did not include the value of 1 (see Appendix D). Hence, discriminant validity was established.

The final measurement model therefore includes CD (CD_4, CD_5 and CD_6), BA (BA_1 and BA_2) and AA (AA_1, AA_2 and AA_3). It is depicted in Figure 6.

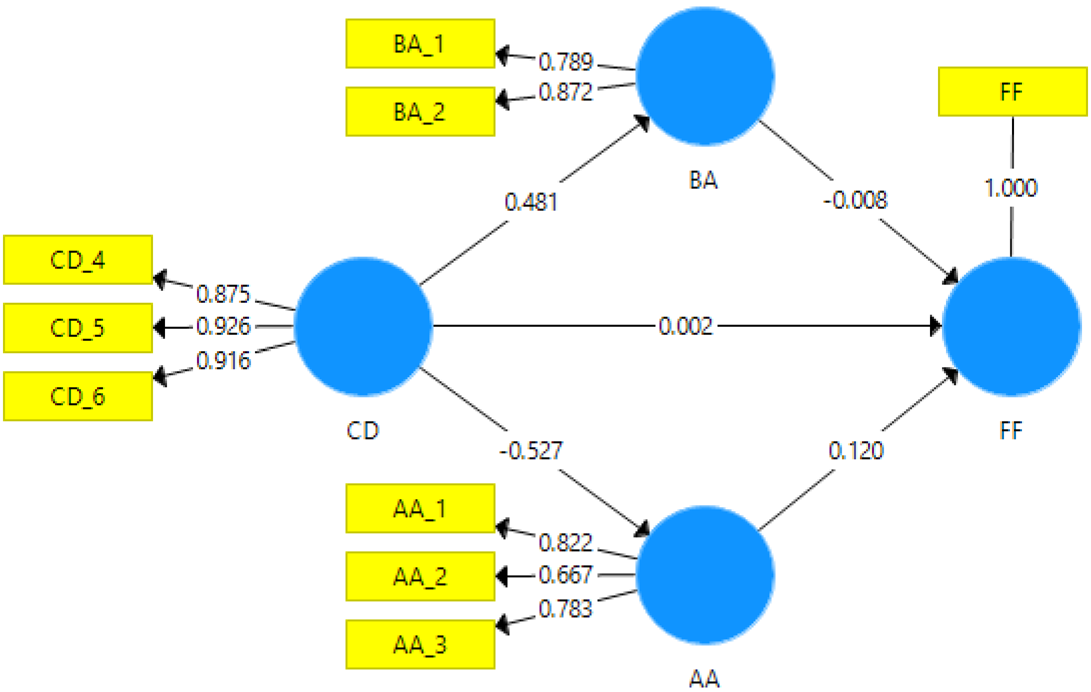

Figure 6: Final measurement model showing outer loadings and path coefficients (output from SmartPLS).

5.2.2 Evaluation of the Inner Model

5.2.2.1 Evaluation criteria for the inner model

The evaluation of the inner, or structural, model can be done in a three-step process. The three steps: (1) Assessment of inner model for collinearity; (2) Assessment of the significance and relevance of the inner model's relationships; (3) Assessing the level of R^2 (Hair et al., 2016).

In order to assess collinearity, each set of predictor variables need to be defined first (Hair et al., 2016). In the conceptual model presented in this study, the variable of flying frequency is the only variable with multiple predictor variables. These are (1) cognitive dissonance towards flying, (2) behavioural adjustment and (3) attitude adjustment. An assessment of potential collinearity issues between these variables is therefore needed. The level of collinearity is determined by the computed tolerance (TOL) or variance inflation factor (VIF) (Hair et al., 2016; Hair et al., 2012). However, these two are directly linked—that is VIF = 1/TOL—and since SmartPLS already outputs the VIF value, this criterion will be used to determine the level of collinearity. Here, a critical level of VIF is anything above 5. If such a level of collinearity is present, the removal of a construct should be considered, since 80% of the variance of flying frequency is already explained by the remaining indicator variables (Hair et al., 2016).

In step 2, the path coefficients between each variable in the model are computed as standardized values ranging between -1 and +1 (Hair et al., 2016). Anything close to -/+ 1 indicates a strong relationship and are usually statistically significant—that is different from 0. On the contrary, values close to 0 represent weak relationships between variables and are often statistically insignificant, i.e. not different from 0.

Step 3 will help determine the predictive power of the model (Hair et al., 2016). R^2 will show values ranging from 0 to 1 for all endogenous constructs, where 1 indicates a very high level of predictive accuracy. However, determining an acceptable level of R^2 can be tricky. Some suggest that for consumer behaviour studies, values of 0.20 are considered high, but that for research related to marketing values of 0.75, 0.50 and 0.25 are considered substantial, moderate and weak respectively (Hair et al., 2016), whereas others argue that substantial, moderate and weak values are 0.67, 0.33 and 0.19 respectively (Chin, 1998; Henseler, Ringle & Sinkovics, 2009).

Respondents, who did not fly within the past 12 months were asked to select “not relevant” for all of the statements related to the constructs of cognitive dissonance towards flying, behavioural adjustment and attitude adjustment respectively. Therefore, these respondents are only included in a mean comparison for flying frequency between the two groups of AFV owners and non-AFV owners. When computing path coefficients between constructs and making mean comparisons for cognitive dissonance towards flying, behavioural adjustment and attitude adjustment, only respondents who flew in the past 12 months are included.

5.2.2.2 Initial evaluation of the inner model

The assessment of the structural model results allows for determining the model’s capability to predict target constructs as well as the significance of relationships between these constructs (Hair et al., 2016).

Initially, the model was checked for possible collinearity issues. As shown in Table 6, there are no critical levels of collinearity between any sets of predictor variables (AA, BA & CD as predictors of flying frequency (FF)).

	AA	BA	CD	FF
AA				1.511
BA				1.420
CD	1.000	1.000		1.532
FF				

Table 6: Inner VIF values.

Next, the structural model path coefficients were computed in order to estimate the strength of the hypothesized relationships between the constructs of the conceptual model.

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
AA -> FF	0.120	0.119	0.068	1.760	0.079
BA -> FF	-0.008	-0.006	0.063	0.130	0.897
CD -> AA	-0.527	-0.529	0.036	14.819	0.000
CD -> BA	0.481	0.485	0.053	9.048	0.000
CD -> FF	0.002	0.000	0.066	0.027	0.979

Table 7: Path coefficients and p-values for the inner model.

The results here showed that only the relationship CD -> AA and CD -> BA had path coefficients that were statistically significant. For CD -> AA, the coefficient was -0.527, meaning that higher levels of cognitive dissonance were related to lower levels of AA. For the CD -> BA relation, the opposite was true. Here, a higher level of CD was related to higher levels of BA. This means that people who experience high levels of cognitive dissonance towards flying are more likely to adjust their behaviour while people who experience low levels of cognitive dissonance are more likely to adjust their beliefs.

However, none of the constructs has a statistically significant relationship with the flying frequency (FF). Therefore, the model as a whole, including all respondents, cannot predict FF.

	R^2	P Values
AA	0.277	0.000
BA	0.231	0.000
FF	0.015	0.324

Table 8: R^2 and p-values for AA, BA and FF

This is further backed up by evaluating the model's predictive power using R^2. AA (R^2: 0.288; $p <$ 0.001) and BA (R^2: 0.231; $p < 0.001$) can both be predicted by the model. However, as was the results for the assessment of the path coefficients, FF cannot be predicted by the model. This means that AA and BA can be predicted by the model at a weak level (Chin, 1998; Henseler, Ringle & Sinkovics, 2009).

5.3 Hypotheses Testing

In order to test the hypotheses set forth in this study, a bootstrapping analysis was run in SmartPLS. This was done assuming a significance level of 5% (two-tailed test) setting the subsample size to 1,000. An additional bootstrap was run with a subsample size of 5,000. However, this did not change the outcome of the analysis. Hence, the results from the analysis with 1,000 subsamples were used.

From Table 7 (coefficients and p-values), the coefficients for each of the relationships as well as the *p*-values for these can be extracted. Based on this, the hypotheses H1-5 can be tested.

H1. The path from cognitive dissonance towards flying to flying frequency is positive and insignificant (0.002, n.s.). Therefore, H1 cannot be supported and is rejected.

H2. The path from cognitive dissonance towards flying to behavioural adjustment is positive and significant (0.481, $p < 0.001$). Thus, H2 is supported.

H3. The path from cognitive dissonance towards flying to attitude adjustment is negative and significant (-0.527, $p < 0.001$). A positive relationship between the two constructs was expected. Therefore, H3 is rejected.

H4. The path from behavioural adjustment to flying frequency is negative and insignificant (-0.008, n.s.). H4 is, therefore rejected.

H5. The path from attitude adjustment to flying frequency is positive and insignificant (0.120, n.s.). Thus, H5 is rejected. However, it is interesting to notice that the p-value is less than 0.1 meaning that the positive relationship would be accepted at a 10% significance level, which is sometimes used in explorative studies (Hair et al., 2016).

Hypothesis	*Relationship*	*Coefficient*	*p-value*	*Result*
H1. Cognitive dissonance towards flying will be negatively related to flying frequency.	CD -> FF	0.002	0.979	Rejected
H2. Cognitive dissonance towards flying will be positively related to behavioural adjustment.	CD -> BA	0.481	0.000	Supported
H3. Cognitive dissonance towards flying will be positively related to attitude adjustment.	CD -> AA	-0.527	0.000	Rejected
H4. Behaviour adjustment will be negatively related to flying frequency.	BA -> FF	-0.008	0.897	Rejected
H5. Attitude adjustment will be negatively related to flying frequency.	AA -> FF	0.120	0.979	Rejected

Table 9: Path coefficients, p-values and results from hypotheses testing (H1-H5).

A multi-group analysis was carried out using SmartPLS to see if there would be any significant differences in the path coefficients between the two groups, AFV and non-AFV. This was not the case. However, the analysis revealed that for AFV owners, the relationship AA -> FF was positive and significant (0.229, $p < 0.05$).

As PLS-SEM is a variance-based SEM method concerned with the relationship between constructs, this cannot be used to test the hypotheses H6-9. H6-9 are concerned with how the two consumer groups (i.e. owners of AFVs and non-AFVs respectively) compare to each other within each construct. Therefore, in order to test the hypotheses H6-9, a mean comparison was carried out. Since the distribution of the data was found to be nonnormally distributed, a nonparametric mean comparison method was needed in order to compare the two consumer groups. The Mann-Whitney U test was chosen for this comparison. The test was carried out using SPSS software.

		Ranks		
		N	Mean Rank	Sum of Ranks
CD	Non-AFV	151	131.23	19,815.50
	AFV	154	174.35	26,849.50
	Total	305		
BA	Non-AFV	151	135.32	20,433.00
	AFV	154	170.34	26,232.00
	Total	305		
AA	Non-AFV	151	174.32	26,323.00
	AFV	154	132.09	20,342.00
	Total	305		
FF	Non-AFV	219	253.93	55,610.00
	AFV	253	221.42	56,018.00
	Total	472		

Table 10: Mann-Whitney Test - Ranks for CD, BA, AA and FF

Table 10 shows the Ranks table output from the test, which shows how the two groups compare based on mean rank and sum of ranks.

Table 11 below shows the significance of the differences between the two consumer groups from Table 10. Based on this, it was possible to conclude on the hypotheses H6-9.

Test Statistics				
	CD	BA	AA	FF
Mann-Whitney U	8,339.500	8,957.000	8,407.000	23,887.000
Wilcoxon W	19,815.500	20,433.000	20,342.000	56,018.000
Z	-4.437	-3.526	-4.195	-2.661
Asymp. Sig. (2-tailed)	.000	.000	.000	.008

Table 11: Mann-Whitney Test - Statistics for CD, BA, AA and FF

H6. The mean score of cognitive dissonance towards flying is significantly higher for AFV owners compared to non-AFV owners (AFV > non-AFV, $p < 0.001$). Thus, H6 is supported.

H7. The mean score of flying frequency is significantly lower for AFV owners compared to non-AFV owners (AFV < non-AFV, $p < 0.01$). Therefore, H7 is supported.

H8. The mean score of behavioural adjustment is significantly higher for AFV owners compared to non-AFV owners (AFV > non-AFV, $p < 0.001$). Therefore, H8 is supported.

H9. The mean score of attitude adjustment is significantly lower for AFV owners compared to non-AFV owners (AFV < non-AFV, $p < 0.001$). It was expected that AFV owners would experience higher levels of attitude adjustment compared to non-AFV owners. Therefore, H9 is rejected.

Hypothesis	*Relationship*	*p-value*	*Result*
H6. Owners of AFVs will experience higher levels of cognitive dissonance towards flying than owners of non-AFVs.	AFV > non-AFV	0.000	Supported
H7. Owners of AFVs will fly less frequently than owners of non-AFVs.	AFV < non-AFV	0.008	Supported
H8. Owners of AFVs will experience higher levels of behavioural adjustment than owners of non-AFVs.	AFV > non-AFV	0.000	Supported
H9. Owners of AFVs will experience higher levels of attitude adjustment than owners of non-AFVs.	AFV < non-AFV	0.000	Rejected

Table 12: Path coefficients, p-values and results from hypotheses testing (H6-H9).

Table 13 shows mean comparisons for all constructs and indicators. This table shows that there is a significant difference between the two consumer groups for all indicators and constructs except for AA_2, FF_2 and FF_3. All these indicators showed some difference. However, the difference was not large enough for the two groups to be considered statistically significantly different from each other.

	All respondents	A Non-AFV	B AFV	Mean comparison*
Cognitive dissonance towards flying	**1.86 (1.12)**	**1.56 (0.90)**	**2.16 (1.24)**	**A < B**
CD_4	2.17 (1.45)	1.81 (1.15)	2.52 (1.62)	A < B
CD_5	1.79 (1.26)	1.46 (0.96)	2.12 (1.42)	A < B
CD_6	1.63 (1.02)	1.42 (0.83)	1.83 (1.14)	A < B
Behavioural adjustment	**2.66 (1.64)**	**2.31 (1.45)**	**3.00 (1.74)**	**A < B**
BA_1	2.52 (1.91)	2.26 (1.75)	2.77 (2.03)	A < B
BA_2	2.79 (2.02)	2.35 (1.76)	3.22 (2.17)	A < B
Attitude adjustment	**4.32 (1.75)**	**4.74 (1.77)**	**3.91 (1.63)**	**A > B**
AA_1	4.10 (2.32)	4.83 (2.22)	3.40 (2.21)	A > B
AA_2	4.81 (2.14)	4.76 (2.22)	4.86 (2.06)	A = B
AA_3	4.04 (2.42)	4.64 (2.40)	3.46 (2.31)	A > B
Flying frequency	**3.24 (4.26)**	**3.83 (4.82)**	**2.74 (3.64)**	**A > B**
Domestic flights				
FF_1	0.41 (1.54)	0.63 (1.90)	0.23 (1.11)	A > B
European flights				
FF_2	1.96 (2.57)	2.17 (2.77)	1.77 (2.38)	A = B
International flights				
FF_3	0.88 (1.67)	1.04 (1.93)	0.74 (1.39)	A = B

*Mean comparisons are conducted by using Mann-Whitney Test (alpha = 0.05).
Standard deviations are shown in parentheses.

Table 13: Mean comparison between AFV owners and non-AFV owners.

5.4 Sub-Group Results

5.4.1 Relationships (AFV vs non-AFV)

By having another look at the data, it was found that while there was no statistically significant relationship between attitude adjustment and flying frequency for the sample as a whole, this relationship was positive and statistically significant for a sub-sample consisting of AFV respondents (0.229, $p < 0.05$) (see Table 14). Despite this relationship being statistically significant, it was not found to be significantly different from the non-AFV owners as a sub-group. This is the case for all relationships in the model. None of the relationships was statistically significantly different, when comparing AFV owners with non-AFV owners (see Appendix F).

	AFV	
	Path Coefficients Original (AFV)	p-Value (AFV)
AA -> FF	0.229	0.025
BA -> FF	-0.020	0.850
CD -> AA	-0.542	0.000
CD -> BA	0.454	0.000
CD -> FF	0.051	0.641

	Non-AFV	
	Path Coefficients Original (Non AFV)	p-Value (Non AFV)
AA -> FF	0.044	0.619
BA -> FF	0.026	0.734
CD -> AA	-0.454	0.000
CD -> BA	0.450	0.000
CD -> FF	0.020	0.804

Table 14: Path coefficients and p-values for sub-groups: AFV and non-AFV

5.4.2 Distance from Airport

The respondents were divided into sub-groups based on how far from the nearest airport they live. Respondents were given five options, when asked about this in the survey: (1) Less than 25 kilometres away; (2) 25-49 kilometres; (3) 50-74 kilometres; (4) 75-99 kilometres; and (5) more than 100 kilometres. In total (including both AFV owners and non-AFV owners), 106 replied less than 25 km, 79 replied 25-49 km, and 67 replied 50-74. Only 21 and 32 respondents answered (4) and (5) respectively, which is not enough for comparison (Hair et al., 2016). Therefore, three multi-group analyses were carried out in SmartPLS to test for differences between the three groups (1) 25, (2) 25-49 and (3) 50-74 according to their survey response. The three multi-analyses will, therefore, consist of: (1) 25 vs 25-49; (2) 25 vs 50-74; and (3) 25-49 vs 50-74.

All the multi-group analyses showed no statistically significant differences between the groups in terms of the relationships between the constructs.

A Mann-Whitney Test was carried out in order to compare the same three sub-groups based on their construct scores. The first comparison (25 vs 25-49) showed no significant difference in the scores for CD, BA and AA. However, it showed a statistically significant difference for FF (25 > 25-49, $p < 0.05$). More specifically, this was due to a higher flying frequency within Denmark (25 > 25-49, $p < 0.05$) and within Europe (25 > 25-49, $p < 0.05$). There was no significant difference between the groups when it came to flights outside of Europe (25 > 25-49, n.s.) (see Appendix G).

When comparing the second set of groups (25 vs 50-74), the conclusion is the same. Here, there is also a significant difference in terms of flying frequency (25 > 50-74, $p < 0.05$). A difference in domestic flights (25 > 50-74, $p < 0.05$) and in flights within Europe (25 > 50-74, $p < 0.01$) is also the main contribution to this difference. The difference in flying frequency outside of Europe is still insignificant (25 < 50-74, n.s.) (see Appendix G).

When comparing the last groups (25-49 vs 50-74), no statistically significant differences were found (see Appendix G).

Additionally, the respondents, who indicated that they live within 25 km from the airport, were split into two: (1) non-AFV owners and (2) AFV owners. These were then compared to check for differences among the two owner groups living less than 25 km from the nearest airport. An initial multi-group analysis showed that there were no significant differences in terms of path coefficients between the two groups (see Appendix L for test results).

Non-AFV owners showed similar results as for all non-AFV owners (see Table 14). Here, the path from cognitive dissonance towards flying to attitude adjustment was also negative and significant (-0.534, $p < 0.001$). Likewise, the path from cognitive dissonance towards flying to behavioural adjustment was positive and significant (0.391, $p < 0.05$). The remaining paths were insignificant.

The same was the case for AFV owners, who also showed similar results as to the entire sample of AFV owners according to Table 14. The path from cognitive dissonance towards flying to attitude adjustment is negative and significant (-0.515, $p < 0.001$). The path from cognitive dissonance towards flying to behavioural adjustment is positive and significant (0.613, $p < 0.001$). Finally, the path from attitude adjustment to flying frequency is positive and significant (0.405, $p < 0.05$). The remaining paths were insignificant.

A Mann-Whitney test was conducted to test for mean differences between the two groups (see Appendix M for full test results). This showed that the group consisting of AFV owners living within 25 km from the nearest airport scored significantly higher on cognitive dissonance towards flying compared to non-AFV owners living within the same distance from the airport (non-AFV < AFV, $p < 0.001$). AFV owners also scored significantly higher in the behavioural adjustment construct compared to non-AFV owners (non-AFV < AFV, $p < 0.01$). In the attitude adjustment construct, non-AFV owners scored significantly higher than AFV owners (non-AFV > AFV, $p < 0.01$). Finally, there was no significant difference in overall flying frequency between the two groups. However, looking solely at domestic flights, non-AFV owners scored significantly higher than AFV owners (non-AFV > AFV, $p < 0.05$), indicating that non-AFV owners living within 25 km from the nearest airport fly to domestic destinations more frequently than AFV owners living within the same distance from the nearest airport.

5.4.3 Time of Purchase (AFV)

Two additional sub-groups were created: One consisting of AFV owners, who bought their first AFV less than 12 months ago and one consisting of AFV owners, who bought their first AFV more than 12 months ago. This split was done based on the question Q3 that was presented to AFV owners only. Here, respondents were prompted to indicate whether they had bought their AFV within the past 12 months or more than 12 months ago.

A multi-group analysis was carried out in SmartPLS to test for differences in the path relationships between the two sub-groups. Initially, the path coefficients and p-values were calculated for each of the two groups (see Table 15). For respondents, who indicated that they bought their AFV within the past 12 months, the results were similar to the overall result of the entire sample except for the relationship between AA -> FF. There were no significant relationships between BA -> FF and CD -> FF. However, the path from AA to FF was positive and significant (0.306, $p < 0.05$). As for the entire sample, the path from CD to BA was positive and significant (0.484, $p < 0.001$), while the path from CD to AA was negative and significant (-0.530, $p < 0.001$).

For AFV owners, who bought their AFVs more than 12 months ago, the patterns are similar. Here, the relationships AA -> FF and BA -> FF are insignificant. However, for this group, the path from CD to FF is negative and significant (-0.199, $p < 0.05$). This is in contrast with the group of more recent AFV owners. For the first group, this path is positive (although insignificant), which indicates that AFV owners, who bought their first AFV more than 12 months ago, are more likely to fly less frequently when experiencing high levels of cognitive dissonance towards flying compared to more recent AFV owners. The difference between the two groups was also found to be statistically significantly different, with a *p*-value of 0.004 (see Appendix H).

First AFV bought less than 12 months ago		
	Path Coefficients Original	p-Value
AA -> FF	0.306	0.049
BA -> FF	0.000	1.000
CD -> AA	-0.530	0.000
CD -> BA	0.484	0.000
CD -> FF	0.266	0.089

First AFV bought more than 12 months ago		
	Path Coefficients Original	p-Value
AA -> FF	0.110	0.401
BA -> FF	-0.023	0.871
CD -> AA	-0.578	0.000
CD -> BA	0.442	0.000
CD -> FF	-0.242	0.014

Table 15: Path coefficients and p-values for sub-groups: First AFV bought less than 12 months ago, and First AFV bought more than 12 months ago.

As for the previous sub-group comparisons, a mean comparison was carried out in order to compare the two groups on their scores within each variable in the measurement model. Once again, a Mann-Whitney Test was used for this purpose. This test showed no significant differences in construct scores between the two groups (see Appendix I for output).

5.4.4 Range (AFV)

Three sub-groups were created based on the range of the AFV indicated by the respondents. Respondents, who indicated that they own an AFV, were given four options to choose from when asked about the range of their AFV on a full tank and/or charge: (1) less than 200 kilometres (n=61); (2) 200-399 kilometres (n=107); (3) 400-599 kilometres (n=78); and (4) more than 600 kilometres (n=7). The last group consists of too few respondents for statistical comparison (Hair et al., 2016). Therefore, the three sub-groups consist of (1) less than 200 kilometres, (2) 200-399 kilometres and (3) 400-599 kilometres.

Three multi-group analyses were run in SmartPLS to check for differences in path coefficients between these groups: (1) less than 200 vs 200-399; (2) less than 200 vs 400-599; and (3) 200-399 vs 400-599.

AFV range: Less than 200 km		
	Path Coefficients Original	p-Value
AA -> FF	0.035	0.889
BA -> FF	-0.071	0.769
CD -> AA	-0.599	0.000
CD -> BA	0.345	0.050
CD -> FF	-0.113	0.543

AFV range: 200-399 km		
	Path Coefficients Original	p-Value
AA -> FF	0.113	0.463
BA -> FF	0.048	0.776
CD -> AA	-0.486	0.000
CD -> BA	0.550	0.000
CD -> FF	0.126	0.488

AFV range: 400-599 km		
	Path Coefficients Original	p-Value
AA -> FF	0.462	0.016
BA -> FF	-0.147	0.383
CD -> AA	-0.653	0.000
CD -> BA	0.451	0.000
CD -> FF	0.044	0.741

Table 16: Path coefficients and p-values for sub-groups: AFV range: Less than 200 km; 200-399 km and 400-599 km.

The multi-group analyses showed that only the path from CD to AA was significant (-0.599, $p < 0.001$) for those AFV owners, whose vehicles have a range of less than 200 km, while the remaining paths were insignificant. For AFVs with a range between 200 and 399 km, the results matched better with the results from the full sample. Here, the path from cognitive dissonance towards flying to attitude adjustment was negative and significant (-0.486, $p < 0.001$), and the path from cognitive dissonance towards flying to behavioural adjustment were positive and significant (0.550, $p < 0.001$). The remaining paths for this sub-group were insignificant. For the third sub-group consisting of respondents, whose AFVs had a range between 400 and 599 km, there were three significant paths. Similar to the before-mentioned sub-group, the path from cognitive dissonance towards flying to attitude adjustment was negative and significant (-0.653, $p < 0.001$), and the path from cognitive dissonance towards flying to behavioural adjustment were positive and significant (0.451, $p < 0.001$). However, uniquely among these sub-groups, this sub-group show a positive and significant path from attitude adjustment to flying frequency (0.462, $p < 0.05$).

Despite the overall differences in the number of significant paths from the measurement model between sub-groups, none of the sub-groups' paths was significantly different from one another (see Appendix J).

As for the other sub-group analyses, a Mann-Whitney Test was carried out in order to test for mean differences between the groups for each of the variables. As for the multi-group analyses, this was split into three separate mean comparisons based on the range: (1) Less than 200 km vs 200-399 km; (2) Less than 200 km vs 400-599 km; and (3) 200-399 km vs 400-599 km (see Appendix K for test results).

In the first comparison, a significant difference for attitude adjustment was found (Less than 200 km < 200-399 km, $p < 0.001$). For the remaining variables, no significant differences were found.

For the second comparison, a similar result was found. Here, attitude adjustment was also the only variable that showed a significant mean difference (Less than 200 km < 400-599, $p < 0.01$). The remaining variables also showed no significant differences.

In the final comparison (200-399 km vs 400-599 km), no significant differences were found in the mean scores of the variables.

6. Discussion

This chapter involves a discussion of the key findings of this research. The results are discussed in terms of path relationships and significance between constructs based on Hair et al. (2016). The hypotheses discussion is split into two sections: (1) Discussion of hypotheses H1-H5 and (2) discussion of hypotheses H6-H9. Thereafter, a presentation of theoretical and managerial implications is included. The chapter ends with an overview of the limitations of this thesis and suggestions for potential future investigations.

6.1 Hypotheses Discussion (H1-H5)

This first section does not differentiate between respondents based on the type of vehicle that they own. The results from the SEM analysis indicate that the relationship between variables (cognitive dissonance towards flying, behavioural adjustment, attitude adjustment and flying frequency) are mostly insignificant since the majority of the hypotheses are rejected.

H1: The hypothesis underlying the relationship between cognitive dissonance towards flying and flying frequency is rejected. In an early stage, this relationship was expected to be negative, since it was assumed that if consumers perceive an inconsistency between their believes and behaviour regarding the negative effects of flying, it will result in a lower flying frequency from these consumers. However, it was proved to be a slightly positive but insignificant relationship between those variables. This means that cognitive dissonance towards flying is not a good predictor of flying frequency generally speaking. It can be argued that regardless of consumers' self-perception on their flying habits, they will still opt to fly as much as before to which there are can be multiple explanations as indicated in past findings (Alcock et al., 2017; Barr et al., 2010; McDonald et al., 2015; Young et al., 2014).

However, a sub-group analysis based on when respondents had acquired their first AFV showed that for AFV owners, who bought their first AFV more than 12 months ago, the path from cognitive dissonance towards flying to flying frequency was negative and significant (-0.242, $p < 0.05$). Although the hypothesized negative relationship was not supported based on the results from the full sample, it was true for this sub-group that has had a long-term commitment to AFVs as an everyday mobility choice.

H2: The hypothesis underlying the relationship between cognitive dissonance towards flying and behavioural adjustment is supported. The constructs are positively related and found to be significant, which confirms the initial hypothesis. This means that high levels of cognitive dissonance in relation to air transport will encourage consumers to adapt their behaviour in order to reduce dissonance. Inversely, consumers who experience low levels of cognitive dissonance will be less likely to adjust their behaviour. The results of this analysis support existing literature in which the researchers identified behaviour adjustment as a mean to reach consonance (Juvan & Dolnicar, 2014; Kassarjian & Cohen, 1965).

The additional sub-group analyses showed that this was true for most of the sub-groups as well. Only among AFV owners, whose AFV had a range of less than 200 km, the path from cognitive dissonance towards flying was insignificant.

H3: The hypothesis underlying the relationship between cognitive dissonance towards flying and attitude adjustment is rejected. Even though the constructs are significant, they are negatively related. This means that consumers who experience high levels of cognitive dissonance towards flying are less likely to blame others or themselves, but will rather try to adjust their behaviour. Inversely, those who experience low levels of cognitive dissonance towards flying will be less prone to adjust behaviour, but instead more likely to blame others or themselves. This hypothesis recognizes consumer awareness about their own attitude-behaviour gap. This leads to assuming that attribution theory (Heider, 1958) should not be employed to justify consumers' attitudes when those experience high levels of cognitive dissonance towards flying.

This negative relationship was also found to be true and significant for all of the sub-groups.

H4: The hypothesis underlying the relationship between behavioural adjustment and flying frequency is rejected. The relationships between constructs are negative and insignificant. Initially, it was expected that people who actively wish to adjust their behaviour (i.e. who attempt to reduce their air travel activity in the past 12 months or carbon offset their flights) would fly less. However, since this relationship was found to be insignificant, it means that carbon offsetting and air travel adjustments in the past 12 months are not good indicators of flying frequency. Therefore, behavioural adjustment is not a good predictor of flying frequency. It can be argued that although consumers carbon offset their flights, it does not necessarily mean that they will fly less than others. They might find carbon offsetting as a greener way to balance out their flying activities, but they will still fly as much as anyone else. Likewise, a flight reduction in the past 12 months does not necessarily mean that consumers fly less than other travellers. They might just have decreased an existing gap between themselves and other travellers.

This relationship was furthermore found to be insignificant among all sub-groups that were analysed in this study.

H5: The hypothesis underlying the relationship between attitude adjustment and flying frequency is rejected. Although attitude adjustment and the endogenous variable are positively related, their relationship is insignificant. First, it was expected that flying frequency would be higher if people adjust their attitude. In other words, it was expected that people would find reasonable explanations to blame themselves or others in order to justify their flying frequency. However, this hypothesis is not supported meaning that attitude adjustment is not a good predictor for flying frequency. It can be argued that consumers are conscious of their attitudes as they know what encouraged them to choose air transport (e.g. personal choice, others' influence or no better alternatives) and this will not impact their flying frequency.

However, this result is not applicable to all sub-groups in this study. For AFV owners in general, the path from attitude adjustment to flying frequency is, in fact, positive and significant (0.229, $p < 0.05$). Digging deeper into this sub-group showed that this path was only significant for those, who had bought their AFV within the past 12 months

(0.306, $p < 0.05$), and for those, whose AFV had a range between 400 and 599 km (0.462, $p < 0.05$). Therefore, it seems that attitude adjustment is a better predictor for flying frequency among AFV owners than non-AFV owners.

6.2 Hypotheses Discussion (H6-H9)

This section discusses the hypotheses according to vehicle ownership and aims to answer the sub-questions outlined in the introduction.

The results from the Mann-Whitney Test indicate that there is a significant difference between groups (AFV owners vs non-AFV owners) since the majority of the hypotheses are supported.

H6: It is supported that owners of AFVs will experience higher levels of cognitive dissonance towards flying than owners of non-AFVs. This is in line with the underlying assumption that AFV ownership is linked to pro-environmental behaviour (Figenbaum et al., 2014; Hardman & Tall, 2016; van Rijnsoever et al., 2009). In this way, it is fair to conclude that AFV owners are more conscious of their attitude-behaviour gap and therefore feel more flight-shame than owners of non-AFVs. This was verified across all the indicators related to cognitive dissonance towards flying that were presented in the model (see Table 13).

This was also found to be the case for car owners living within 25 km from the nearest airport. Here, the AFV owners also score significantly higher on cognitive dissonance towards flying.

When comparing AFV owners with each other, there was found no significant difference in the cognitive dissonance towards flying score between those that bought their AFV in the past 12 months and those that bought it more than 12 months ago. The same was the case when AFV owners were compared based on the range of their vehicles.

H7: Overall, it is supported that owners of AFVs will fly less frequently than owners of non-AFVs, which can be related to the higher levels of cognitive dissonance towards flying stated in H6. Although Table 13 indicates that non-AFV owners fly as often as AFV owners to destinations outside of Denmark, non-AFV owners fly more to domestic destinations (i.e. to destinations within Denmark).

When comparing respondents based on the distance they live from the nearest airport, it was found that people living within 25 km from the nearest airport would fly significantly more than people living 25-49 km and 50-74 km from the nearest airport respectively—they would fly significantly more often to domestic destinations within Denmark and to destinations within Europe. Among respondents that lived within 25 km from the nearest airport, those who own an AFV would fly significantly less frequently to domestic destinations than those owning a non-AFV. However, there was no difference when comparing flying frequency to destinations within Europe, outside Europe and for the total flying frequency.

H8: It is supported that owners of AFVs will experience higher levels of behavioural adjustment than owners of non-AFVs. This means that AFV owners are more likely to have reduced their amount of flights and/or to have increased their carbon-offsetting efforts in the past 12 months compared to the year before than non-AFV owners. Once more, it can be argued that green perceptions play an important role in behavioural adjustment.

None of the sub-groups showed results that were not in line with this conclusion.

H9: It is rejected that owners of AFVs will experience higher levels of attitude adjustment than owners of non-AFVs. This means that AFV owners are less likely to rationalize their flying frequency even by blaming themselves or blaming third parties. Instead, they are more likely to adjust their behaviour as confirmed in H8.

From looking at the sub-groups, it was found that the AFV owners, whose cars had a range of less than 200 km, would score significantly lower on attitude adjustment compared with those with ranges of 200-399 km and 400-599 km respectively. It is reasonable to assume that owners of these groups have acknowledged that they will not be able to drive to a holiday destination due to the limited range of their vehicle and therefore simply feel more at ease with the decision of flying.

6.3 Implication

6.3.1 Theoretical Implications

While past research focuses on understanding the cognitive dissonance in consumer travel behaviour based on social and psychological factors, the empirical findings of this research brought up a novel topic to academia that satisfies Juvan & Dolnicar's (2014) suggestion of investigating other sustainability-related aspects. In this case, different types of vehicle ownership were used in order to evaluate different mechanisms to study cognitive dissonance.

The theoretical contribution of this dissertation filled the research gap between ground mobility and air transport choices by investigating the 'cognitive dissonance towards flying' and 'flying frequency' of AFV and non-AFV owners in Denmark, which was not investigated before. Hence, the novelty in this research relied on the assumption that both consumer groups use air transport but at different frequencies. In fact, these findings showed different consumer flying habits according to the type of vehicle they own.

From the evaluation of the measurement model, it was found that cognitive dissonance towards flying, behavioural adjustment and attitude adjustment are in fact three distinct constructs after discriminant and convergent validity was established between them. However, some adjustments were needed before this could be done. First, the cognitive dissonance towards flying construct showed too high internal consistency reliability. The construct consisted of three pairs of statements—each pair related to a certain feeling: (1) ambivalence, (2) shame and (3) regret. However, the high level of internal consistency reliability suggested that some of these items were redundant, so one statement from each of the pairs was removed. For attitude adjustment, there was another redundant item. This one was related to vacations being a special occasion for which flying is okay. However, this item did not help explain the construct of attitude adjustment and was therefore removed.

Overall, only the paths from cognitive dissonance towards flying to behavioural adjustment (positive) and from cognitive dissonance towards flying to attitude adjustment (negative), respectively, were significant for the total sample. This indicates that only the constructs of behavioural adjustment and attitude adjustment can be predicted based on the level of cognitive dissonance that car owners experience towards flying. For the total sample, a high level of cognitive dissonance among respondents will, therefore, result in higher levels of behavioural adjustment, which is supported by past literature on cognitive dissonance theory (Festinger, 1957). Contrary, high levels of cognitive dissonance towards flying will result in lower levels of attitude adjustment, meaning that people are less prone to justify their behaviour based on internal or external circumstances. Since cognitive dissonance theory often suggests that people experiencing cognitive dissonance will adjust either their behaviour or beliefs (attitude) (Festinger, 1957), one can argue that the findings in this study are somewhat supported by literature too. This study showed that regardless of the type of vehicle people own, behavioural adjustment is the main driver to reduce high levels of cognitive dissonance, while people experiencing low levels of cognitive dissonance are more prone to justify their behaviour than to make an effort changing it.

Past studies measured the level of cognitive dissonance of green consumers in relation to their air travel behaviour, but only a few studies compared such dissonance on "not-so-green" consumers. For that reason, it was decided to differentiate consumers based on the assumption that AFV owners tend to be greener than owners of conventional cars.

The findings of this study support previous literature (McDonald et al., 2015) to the extent that everyday green mobility users experience higher levels of cognitive dissonance towards flying than owners of conventional non-AFVs. This study also concluded that owners of AFVs fly less frequently than owners of conventional cars, which contrasts with Barr et al. (2010) and Böhler et al.'s (2006) claims that green consumers fly more regularly than consumers without green credentials.

This study also finds that AFV owners are more eager to adjust their behaviour, rather than attitudes, compared to non-AFV owners, in order to reduce cognitive dissonance towards flying, which is aligned with Juvan & Dolnicar's (2014) and Kassarjian & Cohen's (1965) findings.

6.3.2 Managerial Implications

This study comprises practical implications for policymakers as well as for the airline industry in their approach towards the two consumer groups consisting of AFV owners and non-AFV owners, respectively.

Based on past literature, it was determined that when consumers are more aware of the environmental issues of flying, they tend to experience higher levels of cognitive dissonance towards this activity (Anable et al., 2006; McDonald et al., 2015). This study found that people who experience high levels of cognitive dissonance towards flying will adjust their behaviour more than those who experience low levels of cognitive towards flying. This can either be in the form of actively reducing the flying frequency or increasing spend on carbon offsetting schemes. Taking this into account, policymakers can make an impact by increasing consumers' knowledge on the impact of flying on the environment, e.g. through emotional and/or informative campaigns. Theoretically, the more policymakers can inform consumers about the environmental harm of flying—especially compared to other means of transportation—the more likely it will be that consumers start taking action by adjusting their behaviour rather than justifying it. Even, if consumers do not actively reduce their flying frequency, their increased spend on green carbon offsetting project can potentially have a significant positive impact on the global issues related to climate change.

As for the airline industry, it is important that the industry makes sure that flying does not conflict too much with internal beliefs if it wants to keep environmentally aware consumers as customers in the future. Adopting a green profile may serve as a competitive advantage, but it can be difficult convincing green consumers. This study found that consumers who experience high levels of cognitive dissonance towards flying will adjust behaviour, i.e. by reducing the number of flights per year or by spending more on carbon offsetting schemes. Implementing and promoting such schemes can, therefore, be one way for airlines to keep some of their customers that might have otherwise sought alternative means of transportation for their holidays.

Furthermore, just like past literature showed that increased knowledge on an issue would increase cognitive dissonance, it is not unlikely to think that increasing consumers knowledge on airlines' efforts to decreasing pollution from operations will lead to decreases in cognitive dissonance towards flying. For instance, the airlines could make a bigger effort out of promoting their newer and more fuel-efficient aeroplanes or their carbon offsetting schemes and how effective these projects are to the people this matter to the most—the environmentally concerned consumer. The airlines could also consider explaining what they do to help speed up the development of zero-emission aeroplanes, such as electric aeroplanes, which might help them long-term and potentially hook green consumers at an earlier stage.

6.4 Limitations and Future Research

Although the current dissertation contributed with a novel topic to consumer behaviour literature, this study comprises a few limitations both in methodological and theoretical terms.

Starting out with data collection, conducting survey-based research involves several limitations. Firstly, the inevitable response-bias originated from the questions. Although the respondents did not have an in-depth knowledge of the research purpose, when those were faced with specifics topics, i.e. flying behaviour and vehicle ownership, they were likely to provide biased responses to some extent (Henderson, 2011).

Secondly, considering that the survey was shared in different online platforms, including a wide range of users, it was difficult to assess the degree of honesty and credibility of the responses. In that regard, some experts suggest that respondents should be rewarded with incentives (monetary or non-monetary) in order to increase the response rate, which likely encourages them to provide truthful responses (Malhotra & Birks, 2007) and hence, this suggestion should be considered in future research.

A third aspect refers to the use of mono-method approach which might have influenced the quality of the results since respondents were limited and mainly exposed to closed questions throughout the entire questionnaire, which made it difficult for the researchers to understand consumers' perceptions accurately. In line with this, future studies should use a mixed-method approach to managing quantitative and qualitative methods.

Furthermore, it is important to consider the limited sampling-frame of the present research, which merely considered the rationales of consumer behaviour in Denmark. A larger cross-cultural investigation using both quantitative and qualitative research would be interesting to determine if AFV ownership impacts flying behaviour in other countries.

In addition, upcoming studies ought to include 'demographics' in their research. Segmenting the population might provide fruitful insights into the tourism industry, and the results from such a study might be helpful in order to determine the size of a possible new market for a producer of AFVs.

7. Conclusion

This study contributes to the consumer behaviour literature by examining the influence of cognitive dissonance towards flying on flying frequency. This was measured both directly as well as indirectly through the mediators of behavioural adjustment and attitude adjustment. Finally, differences between the two groups, (1) owners of AFVs and (2) owners of non-AFVs were determined.

This study aimed to answer the main research question: “How do AFV owners adjust their behaviour and attitudes towards flying in order to reduce cognitive dissonance from flight shame compared to the owners of non-AFVs in Denmark?” The results of this study found a positive and significant path coefficient from cognitive dissonance towards flying to behavioural adjustment for both AFV owners and non-AFV owners. From cognitive dissonance towards flying to attitude adjustment, a negative and significant path coefficient was found—likewise for both AFV owners and non-AFV owners. Finally, a multi-group analysis comparing AFV owners with non-AFV owners found no significant differences between the two groups for these paths. This means that AFV owners adjust their behaviour and attitude towards flying in the same way as non-AFV owners, which answers the main research question of this paper.

Mean comparison was computed in order to test for differences in construct scores between the two consumer groups consisting of AFV owners and owners of non-AFVs. The results from this showed that AFV owners experience cognitive dissonance towards flying at a significantly higher level than owners of non-AFVs, which answers this study’s first sub-question: “Do AFV owners feel flight shame (cognitive dissonance towards flying) to a greater extent than owners of non-AFVs?”

When comparing the two groups’ flying frequency, it was found that AFV owners fly significantly less frequently compared to owners of non-AFVs, which answers the study’s second sub-question: “How often do AFV owners fly compared to owners of non-AFVs?”

In terms of behavioural adjustment, the results showed that AFV owners score significantly higher indicating that AFV owners are more prone to actively adjust their behaviour compared to owners of non-AFVs, which answers this study's third sub-question: "How do AFV owners adjust their flying related behaviour due to flight shame compared to owners of non-AFVs?"

Concerning attitude adjustment, AFV owners scored significantly lower in this construct compared to owners of non-AFVs, which indicates that non-AFV owners are more likely to justify their flying behaviour than owners of AFVs, which answers the study's fourth and final sub-question: "How do AFV owners adjust their attitudes towards flying due to flight shame compared to owners of non-AFVs?"

This study increases academia and marketers' comprehension of the connection between green everyday mobility choices and vacation mobility choices. The findings comprise relevant implications for policymakers and the airline industry, namely how policymakers can influence consumers´ flying behaviour and how the airline industry can manage the consequences of this.

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Appendices

Appendix A: Kurtosis and Skewness of data

	Excess Kurtosis	Skewness
X1	0.463	1.156
X2	1.344	1.449
X3	0.453	1.268
X4	1.342	1.396
X5	4.071	2.031
X6	5.501	2.186
X7	-0.221	1.038
X8	-0.775	0.828
X9	-1.611	0.019
X10	-1.373	-0.411
X11	-1.690	0.021
X12	-0.404	0.762
X13	27.234	4.983
X14	2.703	1.691
X15	9.410	2.687
FF	8.299	2.365

Green = Within the criteria of normally distributed data.
Red = Outside the criteria of normally distributed data.

Appendix B: PLS Algorithm & Bootstrapping (first run)

	CD	BA	AA
CD_1	0.763	0.426	-0.373
CD_2	0.735	0.344	-0.332
CD_3	0.874	0.487	-0.604
CD_4	0.860	0.425	-0.503
CD_5	0.885	0.416	-0.522
CD_6	0.862	0.466	-0.441
BA_1	0.392	0.792	-0.356
BA_2	0.464	0.870	-0.423
AA_1	-0.475	-0.382	0.815
AA_2	-0.332	-0.268	0.661
AA_3	-0.438	-0.406	0.772
AA_4	0.153	0.048	-0.155

Outer loadings + cross loadings.

	AA	BA	CD
AA	0.656		
BA	-0.471	0.832	
CD	-0.568	0.517	0.832

Fornell-Larcker criterion matrix

	AA	BA	CD
AA			
BA	0.852		
CD	0.829	0.716	

HTMT ratios

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
BA -> AA	0.852	0.831	0.678	1.001
CD -> AA	0.829	0.784	0.662	0.894
CD -> BA	0.716	0.720	0.581	0.859

Confidence intervals for HTMT ratios

Appendix C: PLS Algorithm & Bootstrapping (second run)

	CD	BA	AA
CD_1	0.763	0.426	-0.359
CD_2	0.735	0.344	-0.325
CD_3	0.874	0.487	-0.587
CD_4	0.860	0.425	-0.491
CD_5	0.885	0.416	-0.510
CD_6	0.862	0.466	-0.428
BA_1	0.392	0.792	-0.362
BA_2	0.464	0.870	-0.416
AA_1	-0.475	-0.382	0.825
AA_2	-0.332	-0.268	0.668
AA_3	-0.438	-0.406	0.779

Outer loadings + cross loadings

	AA	BA	CD
AA	0.761		
BA	-0.469	0.832	
CD	-0.552	0.517	0.832

Fornell-Larcker criterion matrix

	AA	BA	CD
AA			
BA	0.771		
CD	0.703	0.716	

HTMT ratios

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
BA -> AA	0.771	0.775	0.622	0.944
CD -> AA	0.703	0.704	0.607	0.798
CD -> BA	0.716	0.719	0.574	0.865

Confidence intervals for HTMT ratios

Appendix D: PLS Algorithm & Bootstrapping (third run)

	CD	BA	AA
CD_4	0.875	0.424	-0.492
CD_5	0.926	0.417	-0.510
CD_6	0.916	0.466	-0.427
BA_1	0.363	0.789	-0.362
BA_2	0.432	0.872	-0.416
AA_1	-0.447	-0.382	0.822
AA_2	-0.316	-0.268	0.667
AA_3	-0.424	-0.406	0.783

Outer loadings + cross loadings

	AA	BA	CD
AA	0.760		
BA	-0.470	0.832	
CD	-0.527	0.481	0.906

Fornell-Larcker criterion matrix

	AA	BA	CD
AA			
BA	0.771		
CD	0.690	0.677	

HTMT ratios

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
BA -> AA	0.771	0.776	0.628	0.939
CD -> AA	0.690	0.693	0.600	0.787
CD -> BA	0.677	0.679	0.540	0.820

Confidence intervals for HTMT ratios

Appendix E: Mann-Whitney Test Results

Ranks				
		N	Mean Rank	Sum of Ranks
CD_4	Non-AFV	151	134.00	20,234.00
	AFV	154	171.63	26,431.00
	Total	305		
CD_5	Non-AFV	151	130.47	19,701.50
	AFV	154	175.09	26,963.50
	Total	305		
CD_6	Non-AFV	151	137.14	20,708.50
	AFV	154	168.55	25,956.50
	Total	305		
CD	Non-AFV	151	131.23	19,815.50
	AFV	154	174.35	26,849.50
	Total	305		
BA_1	Non-AFV	151	142.64	21,538.00
	AFV	154	163.16	25,127.00
	Total	305		
BA_2	Non-AFV	151	134.80	20,355.50
	AFV	154	170.84	26,309.50
	Total	305		
BA	Non-AFV	151	135.32	20,433.00
	AFV	154	170.34	26,232.00
	Total	305		
AA_1	Non-AFV	151	180.17	27,206.00
	AFV	154	126.36	19,459.00
	Total	305		
AA_2	Non-AFV	151	152.40	23,012.00
	AFV	154	153.59	23,653.00
	Total	305		
AA_3	Non-AFV	151	173.47	26,194.50
	AFV	154	132.93	20,470.50
	Total	305		
AA	Non-AFV	151	174.32	26,323.00
	AFV	154	132.09	20,342.00
	Total	305		
FF_1	Non-AFV	219	249.33	54,603.50
	AFV	253	225.39	57,024.50
	Total	472		
FF_2	Non-AFV	219	245.52	53,769.50
	AFV	253	228.69	57,858.50
	Total	472		
FF_3	Non-AFV	219	244.33	53,508.50
	AFV	253	229.72	58,119.50
	Total	472		
FF	Non-AFV	219	253.93	55,610.00
	AFV	253	221.42	56,018.00
	Total	472		

Mann-Whitney Test Ranks (1/2)

Test Statistics								
	CD_4	CD_5	CD_6	**CD**	BA_1	BA_2	**BA**	
Mann-Whitney U	8,758.000	8,225.500	9,232.500	8,339.500	10,062.000	8,879.500	8,957.000	
Wilcoxon W	20,234.000	19,701.500	20,708.500	19,815.500	21,538.000	20,355.500	20,433.000	
Z	-3.942	-4.969	-3.568	-4.437	-2.158	-3.709	-3.526	
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.031	.000	.000	
	AA_1	AA_2	AA_3	**AA**	FF_1	FF_2	FF_3	**FF**
Mann-Whitney U	7,524.000	11,536.000	8,535.500	8,407.000	24,893.500	25,727.500	25,988.500	23,887.000
Wilcoxon W	19,459.000	23,012.000	20,470.500	20,342.000	57,024.500	57,858.500	58,119.500	56,018.000
Z	-5.423	-.121	-4.098	-4.195	-3.499	-1.419	-1.416	-2.661
Asymp. Sig. (2-tailed)	.000	.903	.000	.000	.000	.156	.157	.008

Mann-Whitney Test Statistics (2/2)

Appendix F: Non-AFV vs AFV PLS Multi-Group Analysis Output

	Differences in path coefficients (Non-AFV vs AFV)		
	Path Coefficients-diff (Non AFV - AFV)	p-Value original 1-tailed (Non AFV vs AFV)	p-Value new (Non AFV vs AFV)
AA -> FF	-0.185	0.917	0.165
BA -> FF	0.046	0.360	0.720
CD -> AA	0.088	0.107	0.214
CD -> BA	-0.004	0.503	0.993
CD -> FF	-0.031	0.590	0.820

Appendix G: Mann-Whitney Test Results – Airport Distance

Ranks				
		N	Mean Rank	Sum of Ranks
CD	25	106	94.95	10,065.00
	25-49	79	90.38	7,140.00
	Total	185		
BA	25	106	94.37	10,003.50
	25-49	79	91.16	7,201.50
	Total	185		
AA	25	106	92.91	9,848.00
	25-49	79	93.13	7,357.00
	Total	185		
FF_1	25	154	147.50	22,714.50
	25-49	129	135.44	17,471.50
	Total	283		
FF_2	25	154	151.07	23,265.50
	25-49	129	131.17	16,920.50
	Total	283		
FF_3	25	154	144.93	22,318.50
	25-49	129	138.51	17,867.50
	Total	283		
FF	25	154	152.41	23,471.00
	25-49	129	129.57	16,715.00
	Total	283		

Mann-Whitney Test – Ranks (25 vs 25-49)

Test Statistics							
	CD	**BA**	**AA**	FF_1	FF_2	FF_3	**FF**
Mann-Whitney U	3,980.000	4,041.500	4,177.000	9,086.500	8,535.500	9,482.500	8,330.000
Wilcoxon W	7,140.000	7,201.500	9,848.000	17,471.500	16,920.500	17,867.500	16,715.000
Z	-.596	-.410	-.028	-2.160	-2.139	-.826	-2.401
Asymp. Sig. (2-tailed)	.551	.682	.978	.031	.032	.409	.016

Mann-Whitney Test – Statistics (25 vs 25-49)

		Ranks		
		N	Mean Rank	Sum of Ranks
CD	25	106	89.14	9,448.50
	50-74	67	83.62	5,602.50
	Total	173		
BA	25	106	89.77	9,516.00
	50-74	67	82.61	5,535.00
	Total	173		
AA	25	106	88.72	9,404.50
	50-74	67	84.28	5,646.50
	Total	173		
FF_1	25	154	134.09	20,650.00
	50-74	104	122.70	12,761.00
	Total	258		
FF_2	25	154	140.69	21,665.50
	50-74	104	112.94	11,745.50
	Total	258		
FF_3	25	154	126.34	19,456.00
	50-74	104	134.18	13,955.00
	Total	258		
FF	25	154	138.41	21,314.50
	50-74	104	116.31	12,096.50
	Total	258		

Mann-Whitney Test – Ranks (25 vs 50-74)

Test Statistics	**CD**	**BA**	**AA**	FF_1	FF_2	FF_3	**FF**
Mann-Whitney U	3,324.500	3,257.000	3,368.500	7,301.000	6,285.500	7,521.000	6,636.500
Wilcoxon W	5,602.500	5,535.000	5,646.500	12,761.000	11,745.500	19,456.000	12,096.500
Z	-.734	-.930	-.571	-2.073	-3.086	-.992	-2.391
Asymp. Sig. (2-tailed)	.463	.352	.568	.038	.002	.321	.017

Mann-Whitney Test – Statistics (25 vs 50-74)

Ranks				
		N	Mean Rank	Sum of Ranks
CD	25-49	79	73.99	5,845.00
	50-74	67	72.93	4,886.00
	Total	146		
BA	25-49	79	75.21	5,941.50
	50-74	67	71.49	4,789.50
	Total	146		
AA	25-49	79	75.42	5,958.00
	50-74	67	71.24	4,773.00
	Total	146		
FF_1	25-49	129	117.12	15,108.00
	50-74	104	116.86	12,153.00
	Total	233		
FF_2	25-49	129	120.77	15,579.00
	50-74	104	112.33	11,682.00
	Total	233		
FF_3	25-49	129	111.10	14,332.00
	50-74	104	124.32	12,929.00
	Total	233		
FF	25-49	129	117.69	15,182.50
	50-74	104	116.14	12,078.50
	Total	233		

Mann-Whitney Test – Ranks (25-49 vs 50-74)

Test Statistics							
	CD	**BA**	**AA**	FF_1	FF_2	FF_3	**FF**
Mann-Whitney U	2,608.000	2,511.500	2,495.000	6,693.000	6,222.000	5,947.000	6,618.500
Wilcoxon W	4,886.000	4,789.500	4,773.000	12,153.000	11,682.000	14,332.000	12,078.500
Z	-.158	-.540	-.597	-.063	-1.025	-1.801	-.181
Asymp. Sig. (2-tailed)	.875	.589	.551	.949	.306	.072	.856

Mann-Whitney Test – Statistics (25-49 vs 50-74)

Appendix H: Time of Purchase (AFV) PLS Multi-Group Analysis Output

	Differences in path coefficients (Less than 12 months vs More than 12 months)		
	Path Coefficients-diff (Less than 12 months - More than 12 months)	p-Value original 1-tailed (Less than 12 months vs More than 12 months)	p-Value new (Less than 12 months vs More than 12 months)
AA -> FF	0.196	0.164	0.329
BA -> FF	0.023	0.449	0.899
CD -> AA	0.049	0.279	0.558
CD -> BA	0.042	0.369	0.738
CD -> FF	0.509	0.002	0.004

Appendix I: Mann-Whitney Test Results – Time of Purchase (AFV)

Ranks				
		N	Mean Rank	Sum of Ranks
CD	< 12 mths	80	78.89	6,311.00
	> 12 mths	74	76.00	5,624.00
	Total	154		
BA	< 12 mths	80	76.03	6,082.50
	> 12 mths	74	79.09	5,852.50
	Total	154		
AA	< 12 mths	80	79.15	6,332.00
	> 12 mths	74	75.72	5,603.00
	Total	154		
FF_1	< 12 mths	137	129.13	17,691.00
	> 12 mths	116	124.48	14,440.00
	Total	253		
FF_2	< 12 mths	137	123.98	16,985.00
	> 12 mths	116	130.57	15,146.00
	Total	253		
FF_3	< 12 mths	137	124.56	17,065.00
	> 12 mths	116	129.88	15,066.00
	Total	253		
FF	< 12 mths	137	123.76	16,955.00
	> 12 mths	116	130.83	15,176.00
	Total	253		

Mann-Whitney Test – Ranks (< 12 months vs > 12 months)

Test Statistics							
	CD	**BA**	**AA**	FF_1	FF_2	FF_3	**FF**
Mann-Whitney U	2,849.000	2,842.500	2,828.000	7,654.000	7,532.000	7,612.000	7,502.000
Wilcoxon W	5,624.000	6,082.500	5,603.000	14,440.000	16,985.000	17,065.000	16,955.000
Z	-.411	-.430	-.479	-1.193	-.767	-.722	-.797
Asymp. Sig. (2-tailed)	.681	.667	.632	.233	.443	.470	.426

Mann-Whitney Test – Statistics (< 12 months vs > 12 months)

Appendix J: Range (AFV) PLS Multi-Group Analysis Output

Differences in path coefficients (Range: Less than 200 km vs 200-399 km)			
	Path Coefficients-diff (Less than 200 - 200-399)	p-Value original 1-tailed (Less than 200 vs 200-399)	p-Value new (Less than 200 vs 200-399)
AA -> FF	-0.078	0.612	0.776
BA -> FF	-0.118	0.679	0.641
CD -> AA	-0.114	0.844	0.311
CD -> BA	-0.205	0.875	0.250
CD -> FF	-0.240	0.824	0.351

Range: Less than 200 km vs 200-399 km

Differences in path coefficients (Range: Less than 200 km vs 400-599 km)			
	Path Coefficients-diff (Less than 200 - 400-599)	p-Value original 1-tailed (Less than 200 vs 400-599)	p-Value new (Less than 200 vs 400-599)
AA -> FF	-0.427	0.908	0.185
BA -> FF	0.077	0.421	0.842
CD -> AA	0.054	0.352	0.704
CD -> BA	-0.106	0.693	0.615
CD -> FF	-0.157	0.758	0.484

Range: Less than 200 km vs 400-599 km

Differences in path coefficients (Range: 200-399 km vs 400-599 km)			
	Path Coefficients-diff (200-399 - 400-599)	p-Value original 1-tailed (200-399 vs 400-599)	p-Value new (200-399 vs 400-599)
AA -> FF	-0.349	0.925	0.151
BA -> FF	0.195	0.200	0.400
CD -> AA	0.168	0.059	0.118
CD -> BA	0.099	0.243	0.486
CD -> FF	0.083	0.362	0.725

Range: 200-399 km vs 400-599 km

Appendix K: Mann-Whitney Test Results – Range (AFV)

Ranks				
		N	Mean Rank	Sum of Ranks
CD	< 200	36	55.79	2,008.50
	200-399	66	49.16	3,244.50
	Total	102		
BA	< 200	36	54.08	1,947.00
	200-399	66	50.09	3,306.00
	Total	102		
AA	< 200	36	37.36	1,345.00
	200-399	66	59.21	3,908.00
	Total	102		
FF_1	< 200	61	85.77	5,232.00
	200-399	107	83.78	8,964.00
	Total	168		
FF_2	< 200	61	79.79	4,867.00
	200-399	107	87.19	9,329.00
	Total	168		
FF_3	< 200	61	85.24	5,199.50
	200-399	107	84.08	8,996.50
	Total	168		
FF	< 200	61	81.42	4,966.50
	200-399	107	86.26	9,229.50
	Total	168		

Mann-Whitney Test – Ranks (Range: Less than 200 km vs 200-399 km)

Test Statistics							
	CD	**BA**	**AA**	FF_1	FF_2	FF_3	**FF**
Mann-Whitney U	1,033.500	1,095.000	679.000	3,186.000	2,976.000	3,218.500	3,075.500
Wilcoxon W	3,244.500	3,306.000	1,345.000	8,964.000	4,867.000	8,996.500	4,966.500
Z	-1.105	-.660	-3.576	-.596	-1.015	-.185	-.644
Asymp. Sig. (2-tailed)	.269	.509	.000	.551	.310	.853	.519

Mann-Whitney Test – Statistics (Range: Less than 200 km vs 200-399 km)

Ranks				
		N	Mean Rank	Sum of Ranks
CD	< 200	36	45.81	1,649.00
	400-599	46	38.13	1,754.00
	Total	82		
BA	< 200	36	41.79	1,504.50
	400-599	46	41.27	1,898.50
	Total	82		
AA	< 200	36	33.79	1,216.50
	400-599	46	47.53	2,186.50
	Total	82		
FF_1	< 200	61	70.69	4,312.00
	400-599	78	69.46	5,418.00
	Total	139		
FF_2	< 200	61	67.52	4,119.00
	400-599	78	71.94	5,611.00
	Total	139		
FF_3	< 200	61	70.89	4,324.00
	400-599	78	69.31	5,406.00
	Total	139		
FF	< 200	61	69.36	4,231.00
	400-599	78	70.50	5,499.00
	Total	139		

Mann-Whitney Test – Ranks (Range: Less than 200 km vs 400-599 km)

Test Statistics							
	CD	**BA**	**AA**	FF_1	FF_2	FF_3	**FF**
Mann-Whitney U	673.000	817.500	550.500	2,337.000	2,228.000	2,325.000	2,340.000
Wilcoxon W	1,754.000	1,898.500	1,216.500	5,418.000	4,119.000	5,406.000	4,231.000
Z	-1.473	-.099	-2.602	-.398	-.692	-.288	-.173
Asymp. Sig. (2-tailed)	.141	.921	.009	.691	.489	.774	.862

Mann-Whitney Test – Statistics (Range: Less than 200 km vs 400-599 km)

Ranks				
		N	Mean Rank	Sum of Ranks
CD	200-399	66	57.30	3,781.50
	400-599	46	55.36	2,546.50
	Total	112		
BA	200-399	66	54.87	3,621.50
	400-599	46	58.84	2,706.50
	Total	112		
AA	200-399	66	58.64	3,870.00
	400-599	46	53.43	2,458.00
	Total	112		
FF_1	200-399	107	92.72	9,921.50
	400-599	78	93.38	7,283.50
	Total	185		
FF_2	200-399	107	93.83	10,040.00
	400-599	78	91.86	7,165.00
	Total	185		
FF_3	200-399	107	93.38	9,991.50
	400-599	78	92.48	7,213.50
	Total	185		
FF	200-399	107	94.30	10,090.00
	400-599	78	91.22	7,115.00
	Total	185		

Mann-Whitney Test – Ranks (Range: 200-399 km vs 400-599 km)

Test Statistics							
	CD	**BA**	**AA**	FF_1	FF_2	FF_3	**FF**
Mann-Whitney U	1,465.500	1,410.500	1,377.000	4,143.500	4,084.000	4,132.500	4,034.000
Wilcoxon W	2,546.500	3,621.500	2,458.000	9,921.500	7,165.000	7,213.500	7,115.000
Z	-.319	-.644	-.836	-.200	-.265	-.143	-.402
Asymp. Sig. (2-tailed)	.750	.519	.403	.841	.791	.886	.687

Mann-Whitney Test – Statistics (Range: 200-399 km vs 400-599 km)

Appendix L: Distance from airport: Less than 25 km (Non-AFV vs AFV) PLS Multi-Group Analysis Output

	Differences in path coefficients (Distance: Less than 25 km; Non-AFV vs. AFV)		
	Path Coefficients-diff (Distance: Less than 25 km; Non-AFV vs. AFV)	p-Value original 1-tailed (Distance: Less than 25 km; Non-AFV vs. AFV)	p-Value new (Distance: Less than 25 km; Non-AFV vs. AFV)
AA -> FF	-0.400	0.933	0.134
BA -> FF	0.035	0.453	0.906
CD -> AA	-0.019	0.549	0.901
CD -> BA	-0.222	0.901	0.198
CD -> FF	0.067	0.404	0.808

Distance from airport: Less than 25 km; Non-AFV vs AFV)

	Distance from airport: Less than 25 km; Non-AFV	
	Path Coefficients Original	p-Value
AA -> FF	0.005	0.980
BA -> FF	0.060	0.687
CD -> AA	-0.534	0.000
CD -> BA	0.391	0.012
CD -> FF	-0.012	0.937

	Distance from airport: Less than 25 km; AFV	
	Path Coefficients Original	p-Value
AA -> FF	0.405	0.047
BA -> FF	0.025	0.915
CD -> AA	-0.515	0.000
CD -> BA	0.613	0.000
CD -> FF	-0.079	0.720

Distance from airport: Less than 25 km; AFV and Non-AFV: Path coefficients and p-values

Appendix M: Mann-Whitney Test Results – Distance from airport: Less than 25 km (Non-AFV vs AFV)

Ranks				
		N	Mean Rank	Sum of Ranks
CD	Non-AFV	65	45.23	2,940.00
	AFV	41	66.61	2,731.00
	Total	106		
BA	Non-AFV	65	45.52	2,958.50
	AFV	41	66.16	2,712.50
	Total	106		
AA	Non-AFV	65	60.99	3,964.50
	AFV	41	41.62	1,706.50
	Total	106		
FF_1	Non-AFV	89	82.19	7,314.50
	AFV	65	71.08	4,620.50
	Total	154		
FF_2	Non-AFV	89	81.22	7,228.50
	AFV	65	72.41	4,706.50
	Total	154		
FF_3	Non-AFV	89	80.89	7,199.00
	AFV	65	72.86	4,736.00
	Total	154		
FF	Non-AFV	89	83.17	7,402.00
	AFV	65	69.74	4,533.00
	Total	154		

Mann-Whitney Test – Ranks (Distance from airport: Less than 25 km; Non-AFV vs AFV)

Test Statistics							
	CD	**BA**	**AA**	FF_1	FF_2	FF_3	**FF**
Mann-Whitney U	795.000	813.500	845.500	2,475.500	2,561.500	2,591.000	2,388.000
Wilcoxon W	2,940.000	2,958.500	1,706.500	4,620.500	4,706.500	4,736.000	4,533.000
Z	-3.610	-3.411	-3.177	-2.377	-1.257	-1.367	-1.883
Asymp. Sig. (2-tailed)	.000	.001	.001	.017	.209	.172	.060

Mann-Whitney Test – Statistics (Distance from airport: Less than 25 km; Non-AFV vs AFV)

Appendix N: Survey

In Danish (original)

Del 1 af 3: Introduktion

Hej!

Vi er to kandidatstuderende fra CBS. Som en del af vores speciale ønsker vi at lave en undersøgelse omhandlende bilejeres flyvevaner i forbindelse med ferie. Venligst besvar alle spørgsmålene. Alle inputs er meget værdsatte.

På forhånd tak!

Med venlig hilsen
Francisco og Lasse

Q0: Ejer eller leaser du en bil?

0. Nej
1. Ja

Q1: Ejer du en elbil, en hybrid eller lignende, der ikke udelukkende kører på benzin eller diesel?

0. Nej
1. Ja

Q2: Hvis ja, hvad er rækkevidden på dit køretøj på en fuld opladning/tank?

1. Mindre end 200 km
2. 200-399 km
3. 400-599 km
4. 600 km eller mere

Q3: Hvis ja, hvornår købte du denne?

1. Inden for de seneste 12 måneder
2. Mere end 12 måneder siden

Q4: Hvor langt bor du fra nærmeste lufthavn med afgange til destinationer uden for Danmark?

1. Mindre end 25 km
2. 25-49 km
3. 50-74 km
4. 75-99 km
5. 100 km eller mere

Del 2 af 3: Resten af spørgeskemaet omhandler rejseaktiviteter relateret til fritid, ferie og besøg hos venner og familie. **Du bør derfor IKKE inkludere forretningsrejser, når du besvarer spørgsmålene**.

FF_1: Hvor mange indenrigsflyvninger (til destinationer inden for Danmark) har du haft de seneste 12 måneder? Returrejser tæller for to flyvninger.

0. 0
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
11. Mere end 10

FF_2: Hvor mange flyvninger har du haft til destinationer inden for Europa de seneste 12 måneder? Returrejser tæller for to flyvninger.

0. 0
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
11. Mere end 10

FF_3: Hvor mange flyvninger har du haft til destinationer uden for Europa de seneste 12 måneder? Returrejser tæller for to flyvninger.

0. 0
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
11. Mere end 10

Del 3 af 3: Hvor enig er du i følgende udsagn? Vælg "Ikke relevant", hvis du ikke har fløjet.

CD_1: Måske skulle jeg have valgt et alternativt transportmiddel til mine flyrejser.

0. Ikke relevant
1. Meget uenig
2. Uenig
3. Delvist uenig
4. Hverken uenig eller enig
5. Delvist enig
6. Enig
7. Meget enig

CD_2: Jeg er ikke helt sikker på min beslutning om at flyve til destinationerne.

0. Ikke relevant
1. Meget uenig
2. Uenig
3. Delvist uenig
4. Hverken uenig eller enig
5. Delvist enig
6. Enig
7. Meget enig

CD_3: Jeg føler ubehag, når jeg tænker på min beslutning om at flyve til destinationerne.

0. Ikke relevant
1. Meget uenig
2. Uenig
3. Delvist uenig
4. Hverken uenig eller enig
5. Delvist enig
6. Enig
7. Meget enig

CD_4: Jeg ved ikke, om det var rigtigt at flyve.

0. Ikke relevant
1. Meget uenig
2. Uenig
3. Delvist uenig
4. Hverken uenig eller enig
5. Delvist enig
6. Enig
7. Meget enig

CD_5: Nu, efter at have fløjet, føler jeg uro på grund af min beslutning.

0. Ikke relevant
1. Meget uenig
2. Uenig
3. Delvist uenig
4. Hverken uenig eller enig
5. Delvist enig
6. Enig
7. Meget enig

CD_6: Jeg fortryder min beslutning om at flyve.

0. Ikke relevant
1. Meget uenig
2. Uenig
3. Delvist uenig
4. Hverken uenig eller enig
5. Delvist enig
6. Enig
7. Meget enig

Hvad vil det sige at klimakompensere?
Når man køber en flybillet, får man sommetider mulighed for at "klimakompensere" sin flyrejse mod et ekstra gebyr. Dette gebyr går ofte til at støtte grønne projekter (fx til at plante træer).

BA_1: De seneste 12 måneder har jeg klimakompenseret mere for mine flyrejser end tidligere.

0. Ikke relevant
1. Meget uenig
2. Uenig
3. Delvist uenig
4. Hverken uenig eller enig
5. Delvist enig
6. Enig
7. Meget enig

BA_2: Jeg har reduceret mit antal af flyvninger de seneste 12 måneder sammenlignet med året før.

0. Ikke relevant
1. Meget uenig
2. Uenig
3. Delvist uenig
4. Hverken uenig eller enig
5. Delvist enig
6. Enig
7. Meget enig

AA_1: Jeg føler et personligt ansvar for, hvor ofte jeg har fløjet de seneste 12 måneder.

0. Ikke relevant
1. Meget uenig
2. Uenig
3. Delvist uenig
4. Hverken uenig eller enig
5. Delvist enig
6. Enig
7. Meget enig

AA_2: Jeg føler, at venner, familie og/eller min partner har stor indflydelse på, hvor ofte jeg har fløjet de seneste 12 måneder.

0. Ikke relevant
1. Meget uenig
2. Uenig
3. Delvist uenig
4. Hverken uenig eller enig
5. Delvist enig
6. Enig
7. Meget enig

AA_3: Jeg ville gerne have fløjet mindre de seneste 12 måneder, men der var ikke bedre alternativer til at flyve (eksempelvis fordi destinationen var for langt væk, fordi rejsetiden ville blive for lang, eller fordi rejsen ville blive for dyr).

0. Ikke relevant
1. Meget uenig
2. Uenig
3. Delvist uenig
4. Hverken uenig eller enig
5. Delvist enig
6. Enig
7. Meget enig

AA_4: Når jeg tager på ferie, er det okay at flyve (eksempelvis fordi jeg ikke rejser ofte, fordi jeg er miljøbevidst resten af året, og/eller fordi jeg klimakompenserer for min flyrejse).

0. Ikke relevant
1. Meget uenig
2. Uenig
3. Delvist uenig
4. Hverken uenig eller enig
5. Delvist enig
6. Enig
7. Meget enig

Har du en kommentar til din besvarelse? (Valgfrit)

In English (translated)

Part 1 of 3: Introduction

Hi!

We are two master's students from CBS. As part of our thesis, we wish to conduct a survey about car owners' flying habits when going on vacation. Please answer all questions. All inputs are very appreciated.

Thank you in advance!

Best regards,
Francisco and Lasse

Q0: Do you own or lease a car?

1. No
2. Yes

Q1: Do you own an electric car, a hybrid or similar that does not run exclusively on gasoline or diesel?

0. No
1. Yes

Q2: If yes, what is the range of your vehicle on a full charge/tank?

1. Less than 200 km
2. 200-399 km
3. 400-599 km
4. 600 km or more

Q3: If yes, when did you buy this?

1. Within the past 12 months
2. More than 12 months ago

Q4: How far do you live from the nearest airport with departures to destinations outside of Denmark?

1. Less than 25 km
2. 25-49 km
3. 50-74 km
4. 75-99 km
5. 100 km or more

Part 2 of 3: The rest of the survey is related to traveling for leisure, holidays or for visiting family or friends. **You should therefore NOT include business trips, when you answer the questions.**

FF_1: How many domestic flights (to destinations within Denmark) did you have in the past 12 months? Return flights count as two flights.

0. 0
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
11. More than 10

FF_2: How many flights did you have to destinations within Europe in the past 12 months? Return flights count as two flights.

0. 0
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
11. More than 10

FF_3: How many flights did you have to destinations outside of Europe in the past 12 months? Return flights count as two flights.

0. 0
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
11. More than 10

Part 3 of 3: To what extent do you agree to the following statements? Choose “Not relevant”, if you have not flown.

CD_1: Maybe I should have chosen an alternative form of transportation to my flights.

0. Not relevant
1. Strongly disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Strongly agree

CD_2: I am not completely certain about my decision about flying to the destinations.

0. Not relevant
1. Strongly disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Strongly agree

CD_3: I feel discomfort when I think about my decision to fly to the destinations.

0. Not relevant
1. Strongly disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Strongly agree

CD_4: I do not know if flying was the right thing to do.

0. Not relevant
1. Strongly disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Strongly agree

CD_5: Now, after having flown, I feel uneasy because of my decision.

0. Not relevant
1. Strongly disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Strongly agree

CD_6: I regret my decision to fly.

0. Not relevant
1. Strongly disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Strongly agree

What does it mean to carbon offset?
When you buy a flight ticket, you are often presented with the option to "carbon offset" your flight for an extra fee. This fee is used to support green projects (for instance, for planting trees).

BA_1: In the past 12 months, I have carbon offset more flights than before.

0. Not relevant
1. Strongly disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Strongly agree

BA_2: I have reduced my number of flights in the past 12 months compared to the year before.

0. Not relevant
1. Strongly disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Strongly agree

AA_1: I feel personally responsible for how often I have flown in the past 12 months.

0. Not relevant
1. Strongly disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Strongly agree

AA_2: I feel that friends, family and/or my partner have/has a big influence on how often I have flown in the past 12 months.

0. Not relevant
1. Strongly disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Strongly agree

AA_3: I would have liked to fly less in the past 12 months, but there were no better alternatives to flying (e.g. because the destinations were too far away, because the travel time would become too long, or because the journey would become too expensive).

0. Not relevant
1. Strongly disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Strongly agree

AA_4: When I go on vacation, it is okay to fly (e.g. because I do not travel often, because I am environmentally conscious for the rest of the year, and/or because I carbon offset my flight).

0. Not relevant
1. Strongly disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Strongly agree

Do you have any further comments? (Optional)