

**CAN YOU LIVE WITH YOURSELF?  
CONSUMERS' PERCEPTIONS OF COGNITIVE DISSONANCE IN RELATION TO  
AIR TRAVEL**

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## **Abstract**

**Context** Air travel is one of the most environmentally harmful means of transportation an individual can undertake. Nevertheless, especially educated people who behave in an environmentally friendly way in their everyday lives do not show any willingness to reduce their air travel behaviour which is why the average annual growth rate of the airline industry amounts to 5%. However, a behaviour change is necessary considering the developments towards a climate crisis. This urgent situation is the background for this study which examines cognitive dissonance in relation to air travel.

**Objectives** This study shed new light on cognitive dissonance in relation to air travel by investigating the effects of distance and period of stay in this context. More specifically, it was examined whether distance and period of stay have an influence on cognitive dissonance, likeability to share and willingness to compensate. Additionally, it was examined how this effect was influenced by additional aspects: consideration of attitude towards flying, environmental attitude, environmental self-perception, and actual environmental behaviour.

**Methods** A quantitative experimental 2 (close distance / far distance) x 2 (short period of stay x long period of stay) was applied. The study was conducted in an anonymous online survey. 141 responses from the target group of students in Europe were collected.

**Results** Considering the influence of all variables under investigation, no significant main effect of destination and period of stay on cognitive dissonance, likeability to share and willingness to compensate were found. However, when the effect of period of stay was isolated, without considering the influence of the covariates, a significant main effect on cognitive dissonance and likability to share was found.

**Conclusion** This study has shed new light on cognitive dissonance in relation to air travel by focusing on distance and period of stay. A main effect for period of stay, when isolating it from the covariates, on cognitive dissonance and likeability to share was found. Overall, however, the importance of the covariates, over the independent variables distance and period of stay, on the dependent variables needs to be highlighted and pursued further in future studies. In addition, the results should provide guidance for the aviation industry and governments for campaigns and educational work.

**Future research** Future research should be conducted in this field of interest with a more selective target group, which is environmentally friendlier and more involved in climate issues, to get deeper insights into cognitive dissonance. Due to the prevailing relevance of the covariates, more explorative studies drawing the main focus on these using a similar approach should be executed.

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## 1. Introduction

*A guilty conscience will not save the world.*

Flying is understood as freedom, adventure and everyday necessity. However, no other form of transportation contributes more to climate change than air travel. Taking an airplane for pleasure or business is one of the most climate unfriendly things an individual can undertake. Current studies assume that air travel has a severe environmental impact, accounting for around 2.5% of total CO<sub>2</sub> emissions (Lee et al., 2009). This figure does not look alarming at first sight. However, it becomes relevant when one considers that air travel has only been the privilege of a small part of humanity so far. 90% of the world's population has never seen an airplane from the inside, yet they dream of doing so, which brings the average annual growth rate of the airline industry to an estimated 5.3% (Gössling & Peeters, 2007). As a result, this development could lead to a duplication of air traffic every 20 years (Cohen & Higham, 2011; Dubois & Ceron, 2006). Therefore, debates about air travel restrictions to counteract the climate crisis and related effects such as global warming or the greenhouse effect keep coming up. There is debate about the 1.5-degree target, protest groups like Fridays for Future have become prominent and talk about flight shame, researchers investigate the possibilities of CO<sub>2</sub>-neutral flying, and environmentally conscious consumers financially compensate for their carbon footprint.

After a brief but severe interruption due to the global Covid-19 pandemic, current passenger numbers are almost back to 2019 and are expected to rise further. People are aware of the detrimental side of air travel, which is even more true for younger and future generations as they will be affected most. Paradoxically, especially educated people who in their everyday claim to act environmentally conscious do not show any willingness to change or reduce their air travel behaviour (McDonald et al., 2015). Consequently, there is a difference in individuals' attitudes and behaviours, known as cognitive dissonance. Cognitive dissonance refers to a state of feeling perceived as unpleasant and generated by inconsistent needs, desires, or perceptions (Festinger, 1957). Any individual who perceives this inconsistency is more or less instinctively trying to re-establish a consistent, more comforting state of mind as quickly as possible.

### *Relevance of the study*

In April 2022, around 30,000 German football fans travelled to Spain for the Euro League quarterfinal – a football match of just 90-minutes between the teams of Eintracht Frankfurt and Barcelona. Most of them took the plane. If the football fans were asked how they felt about this short trip, they would most likely describe it as worthwhile, considering the unique fan experience after the spectacular away victory. Did they feel guilty for taking an environmentally harmful flight to such a close distance and for such a short period of stay? Or did they instead only feel proud to share their away moments on social media, beating their guilty feelings and the willingness to compensate for emissions? This example is not exceptional: For some, it may be a weekend at the beach instead of a football match, while

others “need” the thrill of a weekend city trip or the comfort of a family reunion in another country. In any case, individuals will always find an excuse why they had to take that specific flight despite well-known environmental consequences.

Easy and cheap plane booking plus social media. For many young people, the shrinking world is a just global theatre, and they can play and participate by contributing colourful pictures of their own travel experiences. Time and distances no longer are a barrier.

At this point, it must be emphasised once again that individuals are not willing to reduce their air travel behaviour. One crucial question that arises in the case of modern air travel is whether individuals of the leisure class actually experience cognitive dissonance when boarding an airplane. More specifically: do individuals feel different levels of cognitive dissonance depending on the distance travelled?

This research is investigating the hitherto little-studied dimensions of the influence of distance and period of stay on cognitive dissonance in relation to air travel. Since studies have shown that specially educated people make the most frequent flyers, the target group of students was examined. The following research questions were formulated:

*RQ 1: To what extent do distance and period of stay influence cognitive dissonance in relation to air travel?*

*RQ 2: Are there other variables in relation to air travel influencing cognitive dissonance, likeability to share and willingness to compensate?*

This paper is divided into four parts. First, the concepts under investigation are defined and contextualized by means of a theoretical framework, resulting in a research model and corresponding hypotheses. Afterwards, the methods are presented. This is followed by the analysis of the results. Finally, a conclusion and discussion are made, providing implications for future research.

## **2. Theoretical framework**

Nowadays, mobility is more than getting from one point to another. Mobility is perceived as freedom. People love exploring new places and sharing special moments – on the beach or on Instagram. With frequent opportunities for air travel, travelling has changed from a time-consuming, complicated overland venture to a convenient and quick trip. In addition, social media amplifies this effect enormously by arousing wanderlust in users through numerous posts of foreign places and triggering their desire to share such an experience even with their acquaintances. However, it is not enough to consider the upside of the mobility made possible by aviation. As humans are predisposed to re-evaluate their behaviour constantly, air travel behaviour must also be part of it. How can individuals reconcile this with their conscience?

Numerous aspects could be examined in relation to air travel. However, this study chose a specific focus, presented in the following theoretical framework. First, the three main concepts cognitive dissonance, likeability to share and willingness to compensate, are discussed. Additionally, the covariates environmental self-perception, environmental attitude, actual environmental behaviour and attitude towards flying will be evaluated.

## **2.1 Cognitive dissonance**

Especially in the field of pro-environmental behaviour, cognitive dissonance is omnipresent. A substantial part of the population has a very positive attitude towards the environment and environmental protection. Numerous individuals show deep concerns regarding climate issues, perceive themselves as environmentally aware and friendly, often even more than their surroundings, and state that they embody these values in their everyday life. However, studies revealed that it is precisely these people who constitute the most frequent flyers within society, not willing to give up or even reduce their air travel behaviour (Alcock et al., 2017). This attitude-behaviour gap can be explained by the widely established theory of cognitive dissonance in social psychology.

The theory of cognitive dissonance, first established by Festinger in 1957, describes the mental conflict that arises if an individual's values do not align with their behaviour. Festinger (1957) himself defined the term as the feeling of discomfort when an inconsistency is present between a person's "cognitions (attitudes, beliefs, values, opinions, knowledge) about themselves, about their behaviour and about their surroundings" (p. 9). This definition is underlined by Thøgersen (2004), who states that people need to be consistent in their behaviour and feel discomfort when they fail to do so. In their work, McDonald et al. (2015) additionally emphasise that cognitive dissonance can arise in the event of a contradiction between belief and action but also when there is a contradiction between two simultaneously internalised beliefs that are contradictory to each other. According to Festinger (1957), this discomfort arises in the form of frustration or disequilibrium. Further scholars describe that the existence of dissonance causes individuals to feel equivocal, confused, unclear or oblique (Davidson & Keisler, 1964) and can even lead to feelings of anxiety, uncertainty, or doubtfulness (Sweeney, Hausknecht, and Soutar, 2000).

When establishing the theory of cognitive dissonance, it was initially stated that two cognitions of any kind that are inconsistent could lead to cognitive dissonance (Festinger, 1957). However, this viewpoint was expanded by Aronson (1968), who specifies that cognitive dissonance can only arise when the values that conflict with each other are consistent with the individual's self-concept. In other words, if an individual cannot identify with the conflicting values or does not consider them relevant, they cannot lead to cognitive dissonance. Since cognitive dissonance is accordingly a very individually perceived concept, it implies that some aspects being perceived as strongly dissonant by some individuals do not trigger the approach of conflict in others (Aronson, 1986). Consequently, different degrees of dissonance exist depending on the involvement (Festinger, 1957). This view is supported by

Soutar and Sweeney (2003): "cognitive dissonance is not a specific condition but rather it exists from lesser to a greater extent, at various stages in decision-making" (p. 231). In addition, the scholars Collins & Hoyt (1972); Festinger & Carlsmith (1959) state that cognitive dissonance cannot occur if individuals perceive not having power over their behaviour in a situation. The reason is that, in this case, a person can "attribute the inconsistency experienced to external forces" (Seymour, 1986; Thøgersen, 2004).

Festinger (1957) noted in his work that the more intense the dissonance, the greater the urge to free oneself from this inner discomfort, i.e., to reduce the cognitive dissonance. Various strategies exist to reduce discomfort, requiring different degrees of effort to achieve this. The coping strategies can be divided into two main categories: 'changing behaviour or cognitions about behaviour' and 'changing attitudes or cognitions about attitudes' (McDonald et al., 2015).

Behavioural change means that individuals actively adjust or even stop behaviour that conflicts with their attitudes to reduce or eliminate the dissonance. When this change is executed successfully, cognitive dissonance can lead to positive future behaviour change in any area (McDonald et al., 2015). By applying his self-consistency theory, Aronson (1968) argues that this active behaviour change must be specific in order to resolve the conflict for the particular situation. Steele (1988), however, contradicts this by referring to his self-affirmation theory, which states, „that the repair that is made does not need to be specific, but can be anything that reaffirms the individual's positive sense of self" (p. 1505).

Other coping strategies for cognitive dissonance are changing attitudes or cognitions about attitudes. On the one hand, this can mean that the person concerned discards the attitudes in conflict with the behaviour performed. On the other hand, this can also take the form of pleas that the attitude does not conflict with the behaviour (McDonald et al., 2015). Another possibility is to prioritise another attitude that is not in dissonance with the behaviour and thus reduce or even prevent the cognitive of the other dissonance through distraction (Zanna & Aziza, 1976).

Coping strategies that only involve an attitude change without changing the behaviour causing the conflict itself are more frequent. The reason is that a cognitive adjustment, compared to a behavioural one, requires significantly less effort (McDonald et al., 2015). Nevertheless, the issue with a lack of behavioural change is that it is not followed by concrete actions that improve the existing problem in the real world, not only in mind.

Since cognitive dissonance is omnipresent when it comes to air travel, in terms of holding pro-environmental beliefs but continuing to fly, many researchers investigated this topic. They gained numerous insights on specific coping strategies in this context. Becken (2007); Buckley (2011); Lorenzoni et al. (2007) state that individuals taking flights despite all concerns often describe that there are no alternative courses of action to their current behaviour. On top of that, to reduce their discomfort, individuals prioritise other problems that need to be solved before the problem of flying can be addressed. Another coping strategy is to use the break from everyday life that many associate with flying as an excuse to avoid

environmental concerns (Wearing et al., 2002). In addition, there are the related arguments for shifting blame onto others (Lorenzoni et al., 2007; Miller, Rathouse, Scarles, Holmes, & Tribe, 2010) and denying personal responsibility (Gössling et al., 2009). Moreover, arguments such as expressing confidence that new technologies will solve the problem (Gössling et al., 2009; Lorenzoni et al., 2007) or compensating through offsetting or exemplary behaviour in everyday life (Becken, 2007; Buckley, 2011) are frequently used.

McDonald et al. (2015) summarise these specific coping strategies established by other scholars by defining super categories. They distinguish between five different types, which can also be used in combination. In terms of no behavioural change, they define the reduction of discomfort types as justifications related to the travel product, justifications related to the travel context and justifications related to the personal identity. The fourth and fifth coping types including behavioural change are changing other behaviours and quitting the conflicting behaviour in the sense of stop flying. However, the latter, which would be the most effective, is the least used.

As the preceding shows, the emergence of cognitive dissonance is essential to achieve change, which is behavioural at best. This is the reason why the theory of cognitive dissonance is chosen as the central theory of this study. The literature review has shown that existing research deals with various forms of cognitive dissonance in relation to air travel, especially with coping strategies. However, this research is intended to take a hitherto under-researched focus and thus a new perspective on this theory. This new perspective will examine how the distance of a flight and the period of stay influence the intensity of cognitive dissonance.

The hypotheses in this study are based on Festinger's (1957) observation that the more intense the dissonance, the greater the urge to free oneself from this inner discomfort. Since a far distance leads to a higher generation of greenhouse gas emissions compared to a short distance, together with a statement by climate activist Greta Thunberg: "The bigger your carbon footprint, the bigger your moral duty" (The Guardian, 2019), the following hypothesis can be assumed:

***H1a*** *A far distance travelled by airplane leads to higher scores of cognitive dissonance as compared to a close distance travelled by airplane.*

***H2a*** *A short period of stay in relation to air travel leads to higher scores of cognitive dissonance as compared to a long period of stay in relation to air travel.*

***H3a*** *A far distance travelled by airplane in combination with a short period of stay will lead to the highest score of cognitive dissonance as compared to all the other combinations.*



## 2.2 Likeability to share experience

People define themselves through their experiences. Accordingly, it is natural for people to structure their lives so that they gain as many new experiences as possible to share them and become more aware of who they are as people. In conclusion, this means that experiences can lead to new insights that cannot be achieved in any other way (Kim & Fesenmaier, 2015). Consequently, it is understandable that individuals strongly urge to share formative experiences with their peers. In line with this, DiMaggio et al. (2001) and Vygotsky (1987) conclude that human relationships are based on personal experiences shared.

Unusual or extravagant experiences are especially formative, more interesting, and likely to be shared with others (Chen et al., 2012). Travel experiences can represent such experiences, especially if they involve air travel. Besides the traditional face-to-face sharing of the experience with family and friends, social media has created a wave of experience sharing of air travel. The endless possibilities that social media offers in terms of platforms and formats for sharing travel experiences have directed excessive dissemination in recent years (Ghaisani et al., 2017).

However, it is interesting to note that this initially seemingly insatiable trend has taken a severe turn since the term *flygskam* (Swedish for flight shame) emerged (Becken et al., 2021). The term *flygskam* describes that, unlike a few years ago, flying is often no longer perceived as privileged and luxurious but increasingly evokes the phenomenon of being ashamed (Gössling, 2020). This shame arises from the awareness that air travel harms the environment and future generations. This new development strongly questions the attractiveness of sharing the experience of taking a flight, whether on social media or from person to person.

As there is little research to date on how the rise of flight shame affects the sharing of air travel experiences, this study investigates the issue. Specifically, it is investigated whether the likeability to share differs for a flight with a far distance compared to a close distance and a short period of stay compared to a long period of stay.

Since long-haul flights and flights with a short period of stay, in particular, are strongly criticised for generating an extensive carbon footprint in connection with only a temporary personal short-term benefit, the following hypotheses were formulated in line with Festinger's (1957) theory of cognitive dissonance, which is central to this study:

***H1b*** *A far distance travelled by airplane leads to lower scores of likeability to share as compared to a close distance travelled by airplane.*

***H2b*** *A short period of stay in relation to air travel leads to lower scores of likeability to share as compared to a close distance in relation to air travel.*

***H3b*** *A far distance travelled by airplane in combination with a short period of stay will lead to the lowest score of likeability to share as compared to all the other combinations.*

### 2.3 Willingness to compensate

As long as no carbon-free substitutes for aviation are developed, other solutions must be found to counteract the environmental damage caused by air travel and the GHG emissions generated. Most of all, this is necessary because, despite increasingly urgent warnings, individuals show no increasing willingness to reduce flying significantly (McDonald et al., 2015). Especially the Covid-19 pandemic will shed new light on this aspect, as there will be catch-up effects, although there is currently no research on this topic yet. Moreover, technological advances are far from promising a timely and drastically sufficient relief of the environment from pollutants generated by air travel (Schrems & Upham, 2020).

In addition to carbon taxes imposed by governments, for example, in the form of higher ticket prices, over which the individual has no influence, there are voluntary options for consumption (Jou & Chen, 2015). Numerous voluntary carbon offsetting (VCO) options are available, allowing individuals to decide on their initiative to mitigate (part of) their GHG emissions generated by their air travel. Examples of how VCO payments can be used are climate projects that promote re- or afforestation, the development of energy efficiency or research into renewable energies (Schwirplies et al., 2019). Although individuals are free to decide on how much money they want to contribute to offsetting programs, numerous studies show that the willingness to compensate is overall very low (Gössling et al., 2009, McKercher et al., 2010).

For instance, a study by Gössling et al. (2009) found that 71% of respondents expressed concerns about climate change, and 82% were even convinced that their air travel behaviour actively contributed to the problem. However, it was found that despite the expressed concern, only a small percentage of 2% actually paid VCO. This percentage was so low because of ignorance or simply lack of interest. Jou and Chen (2015) and McKercher et al. (2010) came to the same conclusions. Gössling et al. (2009) dealt with ignorance in more detail in their study by finding that 76% of the respondents had no knowledge about VCO. Moreover, only 5% knew compensation payments could be made directly at the airlines, for example. However, after the ignorant were roughly informed about VCO, 55% showed a positive attitude towards VCO and perceived it as an excellent way to mitigate emissions. In addition, providing information about VCO resulted in 70% reporting that they were willing to perform such payments in the future. In line with the outcome of this study, Ziegeler et al. (2012) and Lu and Shon (2012) find that the willingness to pay for VCO is strongly related to awareness and associated knowledge. In parallel, Jacobsen (2011) highlights that awareness directs to a higher willingness to compensate. These findings underline the importance of more education and transparency in the domain, for example, through campaigns, to achieve the needed improvement (Schwirplies et al., 2019).

All these insights show that the willingness to compensate is strongly related to the theory of cognitive dissonance (Festinger, 1957). Compensation, especially through payments, is a coping strategy to reduce cognitive dissonance. The fact that only such a small proportion actually compensates, i.e. undertakes a behavioural change, is also in line with the

theory, as already stated: *Coping strategies that only involve an attitude change without changing the behaviour causing the conflict itself are more frequent* (McDonald et al., 2015).

As there are already numerous studies on the problem of the quasi-non-existent willingness to pay for compensation despite climate concerns, which, again, is in line with the theory of cognitive dissonance, this study focuses on another aspect of willingness to compensate. Due to the little-studied relationship between willingness to compensate and the components of distance and period of stay, this focus was chosen. More specifically, this study will examine how the willingness to compensate differs for a close distance flight compared to a distance flight and a short period of stay compared to a long period of stay.

Since compensation is a coping strategy for cognitive dissonance, the hypotheses for willingness to compensate are again formulated as a consequence of the basic idea of cognitive dissonance central to this study *the more intense the dissonance, the greater the urge to free oneself from this inner discomfort* and thus parallel to the hypotheses formulated previously.

***H1c*** *A far distance travelled by airplane leads to higher scores of willingness to compensate as compared to a close distance travelled by airplane.*

***H2c*** *A short period of stay in relation to air travel leads to higher scores of willingness to compensate as compared to a long period of stay in relation to air travel.*

***H3c*** *A far distance travelled by airplane in combination with a short period of stay will lead to the highest scores of willingness to compensate as compared to all the other combinations.*

## **2.4 Covariates**

### ***Environmental self-perception***

According to Bem's self-perception theory (1972), "Individuals come to 'know' their own attitudes, emotions, and other internal states partially by inferring them from observations of their own overt behavior and/or the circumstances in which this behavior occurs" (p. 2). This definition implies that self-perception is central to the formation of attitudes toward an object in question (Fazio et al., 1977). However, it can be observed that individuals tend to behave in ways that are discrepant from their initial attitude and therefore realign their attitude toward the behaviour (e.g., Olson & Zanna, 1993; Kiesler et al., 1969). At this point it becomes apparent that the self-perception theory has many similarities with Festinger's theory of cognitive dissonance, which establishes a direct connection between the two concepts (Olson & Zanna, 1993).

When focusing on environmental concerns, it can be stated that environmental self-perception influences the environmental attitude and actual environmental behaviour (Czajkoswi et al., 2015). This is supported by more findings concluding that an individual's

sense of self is central to pro-environmental attitudes and behaviour (Akerlof & Kranton, 2000). Considering the reviewed literature, the following hypotheses were formulated:

**H4** *Environmental self-perception is related to a) cognitive dissonance b) likeability to share c) willingness to compensate.*

#### ***Environmental attitude and actual environmental behaviour***

Bohner and Dickel (2011) define attitudes as an evaluation of an object of thought. Parallel to this, Thurstone (1928) elaborates on the definition by stating that attitudes reflect evaluations such as 'inclinations, feelings, prejudice or bias, preconceived notions, ideas, fears, threats, and convictions about any specific topic' (p. 531). Olson (1995) summarises this by stating that attitudes are a helpful arrangement for people to deal with the impressions they encounter. Consequently, attitudes can be positive or negative. The classification of an object into positive or negative attitudes enables individuals to adopt a consistent attitude that saves them the cognitive effort of re-evaluating and reclassifying a situation in a similar context every time (Allport, 1935). This arrangement provides individuals with structure and orientation in a confusing world overflowing with impressions (Cocoloas, 2021).

Focusing on environmental matters, Eagly and Chaiken (1993) define *environmental attitudes* as a “psychological tendency that is expressed by evaluating perceptions of or beliefs regarding the natural environment, including factors affecting its quality, with some degree of favour or disfavour.” (p.1). Therefore, individuals can hold pro-environmental or con-environmental attitudes. Alcock et al. (2017) specify this by stating that pro-environmental attitudes can be described as the attributed importance of doing things that are great for the environment. Accordingly, this suggests that individuals holding pro-environmentally friendly attitudes are likely to translate this into corresponding actual behaviour (Alcock et al., 2017).

Concerning air travel, however, Lassen (2010), Barr et al. (2011) and Higham et al. (2016) conclude that individuals do not translate their pro-environmental attitudes into actual environmentally friendly behaviour. The scholars state that a disconnection between the held environmental attitudes and executed air travel is present. Alcock et al. (2017) support this, observing that individuals holding environmentally friendly attitudes, and even behaving respectively in their everyday life on the ground, continue to fly, well-aware of the environmental consequences. This is reinforced by findings of very low correlations between environmental attitudes and actual environmental behaviour, not reflecting prevailing climate concerns (Kalafatis et al., 1999; Paladino, 2005). This disconnection between attitudes and actual behaviour in the context of air travel is in line with the theory of cognitive dissonance (Festinger, 1957). As the theory predicts, individuals who hold pro-environmental attitudes but fail to translate these into actual behaviour by taking a flight experience mental conflict and discomfort (Juvan & Dolnicar, 2014).

These disclosed (dis)connections between environmental attitude and actual

environmental behaviour seem to embody cognitive dissonance and directly connect with likeability to share and willingness to compensate. Therefore, respective hypotheses were formulated.

***H5** Environmental attitude is related to a) cognitive dissonance b) likeability to share c) willingness to compensate.*

***H6** Actual environmental behaviour is related to a) cognitive dissonance b) likeability to share c) willingness to compensate.*

### ***Attitude towards flying***

Hogg and Reid (2006) note that social norms and cultural developments strongly influence attitudes. Due to numerous climate movements, attitudes towards flying have significantly shifted in recent years (Cocolas et al., 2021). The image of air travel has evolved in many public circles from a prestigious endeavour to an environmental sin to be ashamed of, referred to as flight shame (Mkono et al., 2020). Based on this change and pressing social norms, it may be assumed that among today's frequent flyers, a mainly negative attitude towards flying should be present (Higham, 2013).

However, this is contradicted by the finding of Gössling (2019) that the desirability of air travel, i.e. the attribution of positive or negative attitudes towards air travel, depends strongly on personal values and the individually attributed importance of flying. It is especially problematic that the environmental impacts that aviation causes are not tangible for the frequent flyer in everyday life (Cohen & Kantenbacher, 2020). Consequently, despite all the known negative consequences, many individuals maintain a positive attitude towards flying.

Since attitude towards flying is an important aspect, this study investigated whether it has an influence on the other elements examined in this study, namely cognitive dissonance, likeability to share and willingness to compensate. Consequently, the following hypotheses were formulated.

***H7** Attitude towards flying is related to a) cognitive dissonance b) likeability to share c) willingness to compensate.*

## 2.5 Conceptual research model

The research model (Figure 1) and combined hypotheses from the framework (Table 1) used in this study are presented below.

**Figure 1**

*Proposed Research Model*



**Table 1***Hypotheses overview*

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<b>H1 a,b,c</b>	A far distance travelled by airplane leads to a) higher scores of cognitive dissonance b) lower scores of likeability to share c) higher scores of willingness to compensate as compared to a close distance travelled by airplane.
<b>H2 a,b,c</b>	A short period of stay in relation to air travel leads to a) higher scores of cognitive dissonance b) lower scores of likeability to share c) higher scores of willingness to compensate as compared to a long period of stay in relation to air travel.
<b>H3 a,b,c</b>	A far distance travelled by airplane in combination with a short period of stay will lead to the a) highest score of cognitive dissonance b) lowest score of likeability to share c) highest score of willingness to compensate as compared to all the other combinations.
<b>H4 a,b,c</b>	Environmental self-perception is related to a) cognitive dissonance b) likeability to share c) willingness to compensate.
<b>H5 a,b,c</b>	Environmental attitude is related to a) cognitive dissonance b) likeability to share c) willingness to compensate.
<b>H6 a,b,c</b>	Actual environmental behaviour is related to a) cognitive dissonance b) likeability to share c) willingness to compensate
<b>H7 a,b,c</b>	Attitude towards flying is related to a) cognitive dissonance b) likeability to share c) willingness to compensate.

**3. Methods**

After elaborating on the constructs and formulating the hypotheses, the method used to collect and analyse the data are discussed. First, the research design and the stimuli are presented. Subsequently, it is revealed how a pre-test was used to determine whether the stimuli were suitable for the main study. In addition, the sample characteristics of the participants and the procedure are presented. Finally, the measures used in the main study are described.

**3.1 Research design**

To test the hypotheses for this study, a quantitative 2x2 experimental design was applied (Table 2). The first independent variable tested was distance, which is comprised of the two components 'close' and 'far'. The second tested independent variable is period of stay, which is divided into the categories 'short' and 'long'. By combining the elements of these two variables, four conditions were created, which were randomly distributed among the participants in the main study. The purpose of the design of the study was to investigate whether the effects on the main concepts differed depending on the condition. The three main concepts examined in this study are 'cognitive dissonance', 'experience sharing likeability' and 'willingness to compensate'.

First, it was examined whether a close distance versus a far distance had a positive

effect on the main constructs cognitive dissonance, willingness to compensate and a negative effect on likeability to share. In addition, the study tested whether a short period of stay versus a long period of stay had a positive effect on cognitive dissonance, willingness to compensate and a negative effect on likeability to share. To gain a deeper insight, the moderator variables environmental attitude, environmental self-perception, and actual environmental behaviour were additionally formulated. Subsequently, their moderating effects on the main constructs were examined. Moreover, the effect of the co-variate attitude towards flying was investigated. Finally, it was measured whether an interaction effect between distance in combination with period of stay was present.

**Table 2**

*2 x 2 Experimental design conditions*

		Distance	
		<u>Close Distance</u>	<u>Far distance</u>
Period of stay	short	Close distance & Short period of stay	Far distance & Short period of stay
	long	Close distance & Long period of stay	Far distance & Long period of stay

### 3.2 Stimuli

To make the conditions more substantial for the participants, specific attributes were assigned to the elements of the variable distance and period of stay. The city of Barcelona was chosen for the close distance and the city of New York for the far distance. It became apparent why the target group needed to focus only on students enrolled in Europe. By including participants from overseas, the perception of distance as being close or far would differ significantly depending on where the participants were located. Therefore, the results would not be comparable and could not be analysed. In addition, for the second variable period of stay, a weekend was defined as a short period of stay and a semester as a long period of stay.

To present the conditions pleasantly to the participants and achieve a high level of engagement, videos were chosen as the form of presentation. A total of four different videos were created, which had an identical design style and structure. Depending on the condition, different design elements were used to present the stimuli (see screenshots of the video materials). The length of the videos ranged from 51 to 99 seconds.



**Figure 2**

*Video screenshots of the stimuli designs*



*Close distance, short period of stay*



*Far distance, short period of stay*



*Close distance, long period of stay*



*Far distance, long period of stay*

### *Pre-test of stimuli designs*

A pre-test was conducted to ensure that the participants perceived the stimulus material as desired. Only with satisfactory pre-test results the stimuli could be applied in the main survey. In the pre-test, 10 participants of the target group of students currently enrolled at a European university were asked online on Qualtrics about their perception of the presented conditions in video form. The pre-test was shared via WhatsApp.

After a short introduction (Appendix 2), the participants were first shown one of the four conditions in a randomised order to prevent bias. Afterwards, a series of related questions were asked. The questions consisted of a combination of questions regarding the realisticness of the conditions and perception of the stimuli, which had to be answered on a 7-point bipolar scale. Additionally, recall questions in the form of open-ended questions were posed. After the participant had completed one video and the related questions, the same procedure was repeated for the remaining three conditions. The sample consisted of 8 questions per scenario, which were asked repeatedly for all four conditions.

### *Manipulation checks for distance travelled by airplane*

To verify that the participants perceived the chosen destinations, Barcelona and New York, as close and far distances, they were asked questions in this regard. The identical questions were asked after each condition was presented. First, the respondents were asked the recall question *"Do you remember the destination mentioned?"*. This question was intended to

ensure that the participant had watched the entire video attentively. If this was not the case, all questions regarding this variable could be considered as not meaningful. Next, the question *"How far away do you consider the distance mentioned when travelling by airplane?"* was posed. The participants could answer this statement on a 7-point bipolar scale, ranging from close to far away.

#### *Manipulation checks for period of stay*

To verify that the participants perceived the chosen period of stays, one weekend and one semester, as short and long, they were asked questions in this regard. The identical questions were asked after each condition was presented. First, the respondents were asked the recall question *"Do you remember the period of stay mentioned?"*. This question was intended to ensure that the participant had watched the entire video attentively. If this was not the case, all questions regarding this variable could be considered as not meaningful. Next, the question *"How long do you consider the period of stay mentioned when travelling by airplane?"* was posed. The participants could answer this statement on a 7-point bipolar scale, ranging from close to far away.

#### *Perceived realisticness of the conditions*

In the main survey, all questions aimed at investigating the main effects are based on the video presented to the participant. Accordingly, it is crucial that the participant perceives the video as realistic and can identify with the situation presented. For this reason, the realisticness of the four conditions was tested in the pre-test in addition to the stimuli. Two statements were formulated to investigate this concern. *"To what extent do you think the scenario presented is realistic?"* and *"Could you imagine yourself to be in this scenario?"*. Both questions could be answered by the participants on a 7-point bipolar scale, ranging from not at all to extremely.

#### *Results pre-test*

A one-sample t-test was performed to check whether all mean scores for both independent variables as well as for the questions regarding realisticness and imagination showed a significant difference to the t-test midpoint of 4. The results are summarised in the following Table 3.

**Table 3***One-sample t-test of the manipulation checks pre-test*

	Barcelona / weekend		New York / weekend		Barcelona / semester		New York / semester	
	M	SD	M	SD	M	SD	M	SD
Perception of distance <sup>1</sup>	2.50*	1.18	6.10*	1.37	2.20*	1.03	6.30*	0.82
Perception of period of stay <sup>2</sup>	2.00*	0.94	1.50*	1.58	5.30*	0.95	5.60*	1.74
Realisticness <sup>3</sup>	6.13*	1.18	5.10	1.59	6.80*	0.42	6.20*	0.79
Imagination <sup>4</sup>	5.43*	1.70	4.20	2.04	6.20*	1.32	6.00*	0.67
Recall distance	10 correct		10 correct		10 correct		10 correct	
	0 incorrect		0 incorrect		0 incorrect		0 incorrect	
Recall duration	10 correct		10 correct		10 correct		10 correct	
	0 incorrect		0 incorrect		0 incorrect		0 incorrect	

<sup>1</sup> Measured on 7-point bipolar scale (nearby - far away)<sup>2</sup> Measured on 7-point bipolar scale (short - long)<sup>3</sup> Measured on a 7-point Likert scale (very unrealistic - very realistic)<sup>4</sup> Measured on a 7-point bipolar scale (not at all - extremely)

\* Significant difference from one sample t-test value 4 (p&lt;.05)

When looking at the results, it can be concluded that the values show overall satisfying results. The manipulations of distance and period of stay show for all four conditions significant differences from the t-test midpoint value of 4 (p<.05) der 7-point bipolar scales. This implied that the stimuli were perceived as desired and could therefore be incorporated into the main study without adjustments.

The values for realisticness and imagination were significant for three out of four conditions. The condition one weekend in New York, however, showed insignificant results. Since the values for this insignificant score were nevertheless above the midpoint of 4, and were satisfactory for all other conditions, it was decided to keep the condition unchanged. However, adjustments in the wording of the realisticness and imagination questions were expected to improve scores in the main study. Adjustments were made in the form of an introductory text that preceded the video. The introduction emphasised that the participants should disregard their personal situation, i.e. restrictions such as money or obligations, when imagining the conditions. In addition, the imagination question was specified: "Could you imagine yourself in the situation presented in the video if you had the opportunity and there were no restrictions?" By emphasising twice the absence of restrictions, a significant improvement was expected for the perceived realisticness in the main study, especially for the condition of a weekend in New York.

### 3.3 Measures

In order to find out to what extent the independent variables and the moderator variables have an effect on the main constructs, various measures were used in this study. The reliability and validity of the measures were ensured by using existing scales from validated studies. In addition, Cronbach's alpha was assessed for each measure applied to verify the reliability

once more.

All variables in the study were ordinal variables, which were measured on a 5-point Likert scale, except for attitude towards flying, demographics and the pre-test questions. The measures chosen were primarily taken from existing studies or adapted to the context of this study. For the construct willingness to compensate, items were freely invented to comply with the purpose of this study.

### ***Dependent variables***

#### *Cognitive dissonance*

The concept of cognitive dissonance was measured using ten items adapted from two studies by Sweeney et al. (2000) and Ong and Jeyaraj (2014). After the introductory sentence „How would you feel after having taken this flight? “, the statements, arranged on a matrix, were measured with a 5-point Likert scale (strongly disagree – strongly agree). Running a Cronbach's Alpha reliability test, the reliability for this scale scored very high with a value of .95.

#### *Likeability to share*

Likeability to share was measured using five statements arranged on a matrix, using a 5-point Likert scale (very unlikely – very likely). After the indication to refer to the mediated scenario when answering the following statements, all items were introduced with "How high is the probability that you would do the following? ". The statements, such as "I feel proud talking about this trip", were formulated individually to fit the context of the study and create more specificity. Running a Cronbach's Alpha reliability test, the reliability for this scale scored .71.

#### *Willingness to compensate*

The concept of willingness to compensate was measured using a set of seven items arranged on a matrix, using a 5-point Likert scale (not at all willing – very willing). After the introductory sentence „How willing are you to do the following? " statements such as "Pay more for SAF (Sustainable Aviation Fuel) to be used reducing the CO2 emissions around 80% "or "Put even more effort into environmentally friendly behaviour." were presented. The set was primarily formulated individually to fit the context of the study. Running a Cronbach's Alpha reliability test, the reliability for this scale scored very high with a value of .88.

### ***Covariates***

#### *Environmental self-perception*

Environmental self-perception was measured using four items adapted from a selection of a study by Adunyarittigun (2015) and subsequently adjusted to fit the context of this study. The statements, arranged on a matrix, were measured with a 5-point Likert scale (strongly

disagree - strongly agree). All statements were introduced with "Please indicate how much you agree with the following statement(s)". Running a Cronbach's Alpha reliability test, the reliability for this scale scored .67.

#### *Environmental attitude*

Attitude towards the environment was measured with a six-item set adapted from a study by Lavelle et al. (2015). 5 of the 6 statements, arranged on a matrix, were measured with a 5-point Likert scale (strongly disagree - strongly agree). For phrasing reasons, the sixth statement, "How do you feel about environmental issues?" was measured on a separate 5-point Likert scale (not at all concerned -very concerned). All statements were introduced with "Please indicate how much you agree with the following statement(s)". Running a Cronbach's Alpha reliability test, the reliability for this scale scored .73.

#### *Actual environmental behaviour*

The concept of actual environmental behaviour was measured using eight items adapted from a study by Marija Ham et al. (2016). The statements, arranged on a matrix, were measured with a 5-point Likert scale (strongly disagree - strongly agree). All statements were introduced with "Please indicate how much you agree with the following statement(s)". Running a Cronbach's Alpha reliability test, the reliability for this scale scored .67.

#### *Attitude towards flying*

From this point in the study, the scales used were all related to the video previously seen by the participant. Therefore, each item set was preceded by the sentence "Concerning the video you just saw, imagine that you would take the mentioned flight for the corresponding period of stay." The concept attitude towards flying was measured on a 7-point bipolar scale, arranged on a matrix, using six items: „Not appealing/Appealing“, „Cruel/Kind“, „Selfish/Unselfish“, „Unfair/Fair“, „Foolish/Wise“, and „Unnecessary/Necessary“. The statements were combined from various common bipolar scales (Richard, 1980; Berger 1979; Burton and Lichtenstein, 1988; Lichtenstein and Bearden, 1989). Running a Cronbach's Alpha reliability test, the reliability for this scale scored high with a value of .85.

### **3.4 Procedure**

Before sharing the study, it was reviewed and approved by the BMS ethics committee. The main survey was then conducted online on Qualtrics. The link shared with the participants took them to the survey homepage, consisting of a brief explanation of the study's background and instructions (Appendix 3). In addition, the participants were informed that the study was completely anonymous and could be withdrawn at any time. At the end of the page, the participants were asked to agree to the general conditions, which functioned as informed consent, or refuse, which terminated the survey through skipped logic. Next, questions were asked to ensure that the participant belonged to the desired target group.

After, general demographic questions were asked regarding age, nationality, gender, and education level. Afterwards, a set of questions regarding the participant's environmental attitude was asked. This was followed by another set of questions on environmental self-perception and actual environmental behaviour.

After a short introduction, added based on the pre-test results and intended to bring the participants more into the setting of the manipulation, one of the four video scenarios was shown to each participant. Different sets of questions followed, asking the participants to imagine themselves being in the situation presented when answering the questions. The first questions addressed their attitude towards flying concerning the video they had watched. Several questions about how they would feel after hypothetically having taken the flight mentioned in the video followed, aiming at the concept of cognitive dissonance. Afterwards, a set of questions about willingness to share the experience. Subsequently, questions about the willingness to compensate were posed.

Finally, questions from the pre-test were asked again, with the difference that the question regarding realisticness was adjusted. After the participants had completed this last part, the survey ended with a thank you message. All conditions presented were randomised evenly among the participants. Additionally, the order of all matrix questions was randomised not to influence the results.

### **3.5 Participants**

After the main survey was finalised, the process of finding participants began. The condition to participate in the study was to be at least 18 years old and to be enrolled at a European university at the time of the survey. The reduction to Europe was made for the reason that if overseas had also been included, a completely different perception of the stimuli of distance would have arisen, depending on the location of the participants. Since there were no other restrictions, the non-probability sampling method 'convenience sampling' was used. The survey was shared online via Instagram, LinkedIn, and WhatsApp (appendix). To acquire more participants, additional QR code flyers were distributed on campus.

A total of 212 participants took part in the survey. 47 responses were removed because they were incomplete due to the withdrawal of the study or skipped logic questions that ended the survey prematurely. In addition, 24 participants were removed because they answered the recall questions incorrectly or not at all. Moreover, participants who only watched the video for a few seconds were removed. Both cases were exclusion criteria as they indicated that the participants had not internalised the stimuli materials. Considering these factors, 141 participants remained for the final data analysis.

To determine whether the sample was evenly distributed among the four conditions, some SPSS statistics were performed. First, a general analysis was run to examine the general characteristics of the participants named gender, age, and educational level (see Table 4).

Additionally to the reported means and standard deviations, scoring in a similar range, an ANOVA analysis indicated that there were no significant differences in age between the

conditions,  $F(3, 140)=0,79, p=.50$ , meaning the sample was roughly evenly distributed among the participants. When looking at the gender component, it became evident that the percentage of females is considerably higher than the percentage of males for the fourth condition. This difference must be considered when discussing the findings. However, for the other conditions, the percentages between females and males were very similar. Running a Person Chi-Square test, it could be concluded that there was no significant effect between the four conditions and gender,  $\chi^2 (6, N = 141) = 8.10, p=.231$ .

Looking at the characteristics of the educational level, it was noticeable that in all conditions, the majority of respondents were completing a bachelor's degree at the time of the survey. Running a Chi-Square test revealed that no significant effect between the four conditions and educational level was present,  $\chi^2 (9, N = 141) = 10.62, p=.303$ .

**Table 4**

*Distribution of sample characteristics*

	Distance close		Distance far	
Period of stay short				
Age <sup>a)</sup>	M= 22,09 / SD = 1,58		M= 21,87 / SD = 1,61	
Gender <sup>b)</sup>	Male	52%	Male	42%
	Female	48%	Female	58%
Educational level <sup>c)</sup>	1)	81%	1)	87%
	2)	19%	2)	7%
	3)	0%	3)	0%
	4)	0%	4)	6%
Period of stay long				
Age <sup>a)</sup>	M= 21,41 / SD = 2,12		M= 21,84 / SD = 1,94	
Gender <sup>b)</sup>	Male	50%	Male	27%
	Female	50%	Female	71%
Educational level <sup>c)</sup>	1)	74%	1)	79%
	2)	23%	2)	16%
	3)	0%	3)	1%
	4)	3%	4)	4%
a)	Mean + SD of self-reported age			
b)	Percentage division Male / Female			
c)	Percentage: 1)=Bachelor / 2)=Master / 3)=PhD / 4)=Other			

## 4. Results

After conducting the main study online, the data was compiled and analysed. In the following, the results of the data analysis are presented in the form of manipulation checks and the testing of the main effects, interaction effect and effects of the covariates on the established hypotheses.

### 4.1 Manipulation checks

First, independent t-tests were performed to compare the mean scores separately for the stimuli of distance, period of stay as well as for the questions regarding realismness and imagination. Afterwards, one-sample t-tests were run to check whether all mean scores showed a significant difference from the t-test midpoint of 4. The results are summarised in the following Table 5.

**Table 5**

*One-sample t-test of the manipulation checks main study*

	Barcelona / weekend		New York / weekend		Barcelona / semester		New York / semester	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Perception of distance <sup>1</sup>	3,55*	1,43	6,61*	0,67	3,56*	1,58	6,18*	0,91
Perception of period of stay <sup>2</sup>	2,13*	1,09	1,74*	1,21	5,23*	1,78	5,62*	1,13
Realisticness <sup>3</sup>	6,13*	1,09	4,97*	1,40	5,85*	1,54	5,98*	1,44
Imagination <sup>4</sup>	5,93*	1,36	5,42*	1,50	5,85*	1,52	6,07*	1,44

<sup>1</sup> Measured on 7-point bipolar scale (nearby - far away)

<sup>2</sup> Measured on 7-point bipolar scale (short - long)

<sup>3</sup> Measured on a 7-point Likert scale (very unrealistic - very realistic)

<sup>4</sup> Measured on a 7-point bipolar scale (not at all - extremely)

\* Significant difference from one-sample t-test value 4 ( $p < .05$ )

#### *Distance travelled by airplane*

As the first part of the manipulation checks, an independent t-test was performed to check whether the stimuli of the independent variable distance were perceived as intended. The t-test showed significant differences in the scores for the close ( $M=3,55$ ,  $SD=1,43$  &  $M=6,61$ ,  $SD=0,67$ ) compared to the far distance ( $M=3,55$ ,  $SD=1,58$  &  $M=6,18$ ,  $SD=0,91$ ) conditions,  $t(60)=-10,9$ ,  $p<.001$  &  $t(77)=-9,27$ ,  $p<.001$ .

Furthermore, a one-sample t-test was conducted to check whether all mean scores for this variable showed a significant difference from the t-test midpoint of 4 ( $p<.05$ ). Looking at Table 5, it can be observed that all scores show satisfying significant differences. Consequently, it can be concluded that the manipulation of the stimuli distance was successful.

#### *Period of stay*

Moreover, for the second independent variable period of stay, the independent t-test showed



significant differences in the scores for the short ( $M=2,13$ ,  $SD=1,09$  &  $M=5,23$ ,  $SD=1,78$ ) compared to the long period of stay ( $M=1,74$ ,  $SD=1,21$  &  $M=5,62$ ,  $SD=1,13$ ) conditions,  $t(63)=-8,40$ ,  $p<.001$  &  $t(74)=-14,26$ ,  $p<.001$ . Also, the one-sample t-test shows significant differences from the test midpoint of 4. Consequently, it can be concluded that the manipulation of the stimuli of period of stay was successfully perceived as intended.

#### *Perceived realisticness of the conditions*

When looking at the results for realisticness and imagination, the one-sample t-tests showed for both components significant differences from the test midpoint of 4. This indicates that the adjustments applied to the realisticness and imagination questions due to unsatisfying pre-test results have resulted in the desired improvements. This was especially the case for the condition one weekend in New York, which had previously scored insignificant in the pre-test. These results imply that all elements were perceived as desired.

Additionally, a one-way ANOVA using Bonferroni multiple comparisons was performed to test whether all scenarios were perceived as congruent and reliable in the realisticness and imagination components. The results do not show significant differences between the conditions for realisticness [ $F(3, 140)=4,52$ ,  $p=.005$ ]. However, for the component imagination, the value scored not a significant effect [ $F(3, 140)=1,27$ ,  $p=.287$ ]. Consequently, it can be concluded that all scenarios were perceived equally in terms of realisticness but not of imagination.

#### **4.2 Correlation test of covariates**

To find out whether the established covariates can be treated as such, a bivariate Pearson's correlation analysis was performed. More specifically, the purpose of this correlation analysis was to determine whether the subsequent analysis should include the effects of the covariates on the dependent variables in form of an ANCOVA – in the case of existing correlations. Or whether it should only focus on the main effects of the independent variables on the dependent variables in the form of an ANOVA – in the case of non-existing correlations. In line with that, the prior formulated hypotheses regarding the covariates could be evaluated. The results of the bivariate correlation analysis are summarized in Table 6.

**Table 6***Bivariate correlation analysis for covariates on dependent variables*

	1	2	3	4	5	6	7
1. Cognitive dissonance		-.60**	.48**	.53**	.42**	.34**	-.74**
2. Likeability to share			-.35**	-.36**	-.28**	-.25**	.50**
3. Willingness to compensate				.58**	.39**	.49**	-.37**
4. Environmental attitude					.47**	.50**	-.43**
5. Environmental self-perception						.53**	-.30**
6. Actual environmental behaviour							-.23**
7. Attitude towards flying							

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\*\* Correlation is significant at the 0.01 level (2-tailed)

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Looking at the values, it can be concluded that all variables score significantly high correlations. Therefore, *H4*, hypothesizing that environmental self-perception is related to a) cognitive dissonance b) likeability to share c) willingness to compensate can be supported. Furthermore, *H5*, stating that environmental attitude is related to a) cognitive dissonance b) likeability to share c) willingness to compensate can be supported. Additionally, *H6*, hypothesizing that actual environmental behaviour is related to a) cognitive dissonance b) likeability to share c) willingness to compensate is supported. Lastly, *H7*, assuming that attitude towards flying is related to a) cognitive dissonance b) likeability to share c) willingness to compensate is supported. Consequently, each variable can be treated in the subsequent analysis as a covariate.

In order to differentiate between the main effect of the independent variables on the dependent variables with and without considering the influence of the covariates, the analysis was split into an ANOVA and an ANCOVA.

### 4.3 Hypotheses testing

#### *Main effects of distance*

In order to analyse the established hypothesis for the main effects of distance on the dependent variables, first, a descriptive statistics analysis was performed to observe the first tendencies of the effects. Afterwards, an ANOVA was conducted, testing for the main effects of the independent variable distance on the dependent variables without considering the influence of the covariates. Finally, an ANCOVA was performed, adding the effects of the covariates, allowing the observation of whether significant changes in the effect sizes of the independent variable on the dependent variables are present. The results are summarised in Table 7.

**Table 7***Descriptives, ANOVA and ANCOVA for distance*

<i>Distance</i>	Descriptives				ANOVA		ANCOVA*	
	<u>close</u>		<u>far</u>		<i>F-value</i>	<i>Sig.</i>	<i>F-value</i>	<i>Sig.</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>				
Cognitive Dissonance <sup>a)</sup>	2,57	0,96	2,53	1,16	0,002	0,96	1,90	0,17
Likeability to share <sup>b)</sup>	3,80	0,60	3,91	0,74	0,52	0,47	0,05	0,82
Willingness to compensate <sup>c)</sup>	3,57	0,82	3,48	0,97	0,38	0,54	0,31	0,58

*a) 5-point Likert scale (1=strongly disagree / 5=strongly agree)**b) 5-point Likert scale (1=very unlikely / 5=very likely)**c) 5-point Likert scale (1= not at all willing / 5=very willing)**\* Including the covariates environmental self-perception, environmental attitude, actual environmental behaviour, attitude towards flying*

First, only looking at the descriptive statistics for distance, it can be noted that there are only minor differences in the means and standard deviations for close and far destination. Accordingly, it can be assumed that contrary to the hypothesis, the effect of distance on the dependent variables does not seem to be very strong.

Considering the ANVOA output, it can be concluded that the main effect of distance on cognitive dissonance, likeability to share, and willingness to is not significant. Consequently, it can be concluded that, contrary to what the established hypothesis assumed, a far distance does not have a greater effect on cognitive dissonance and willingness to compensate and did not result in a smaller likeability to share as compared to a short distance. Therefore, hypothesis *H1a,b,c* is rejected.

Examining the ANCOVA, considering the influence of the covariates, it can be concluded that the main effect sizes remain insignificant.

### *Main effects of period of stay*

In order to analyse the established hypothesis for the main effects of period of stay on the dependent variables, the same procedure as for the independent variable distance was applied. The results of the descriptive statistics, ANOVA and ANCOVA are summarised in Table 8.

**Table 8***Descriptives, ANOVA and ANCOVA for period of stay*

<i>Period of stay</i>	Descriptives				ANOVA		ANCOVA*	
	<u>short</u>		<u>long</u>		<i>F-value</i>	<i>Sig.</i>	<i>F-value</i>	<i>Sig.</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>				
Cognitive Dissonance <sup>a)</sup>	2,81	1,17	2,34	0,94	6,78	0,01	0,07	0,79
Likeability to share <sup>b)</sup>	3,68	0,71	4,01	0,63	7,73	0,01	2,21	0,14
Willingness to compensate <sup>c)</sup>	3,50	0,93	3,52	0,85	0,88	0,85	2,01	0,15

*a) 5-point Likert scale (1=strongly disagree / 5=strongly agree)**b) 5-point Likert scale (1=very unlikely / 5=very likely)**c) 5-point Likert scale (1= not at all willing / 5=very willing)**\* Including the covariates environmental self-perception, environmental attitude, actual environmental behaviour, attitude towards flying*

Looking at the descriptive statistics for period of stay, greater differences in the mean scores are present. There appears to be a tendency for the mean values for a short period of stay to be slightly higher than those for a long period of stay. This seemingly present effect is in line with the hypothesis that was established for this concept.

The performance of an ANOVA analysis confirms this tendency. Significant main effects of period of stay on cognitive dissonance [ $F(3, 140)=6,78, p=.01$ ] and likeability to share [ $F(3, 140)=7,73, p=.01$ ] are present. On willingness to compensate, however, no main effect was found [ $F(3, 140)=0,04, p=.85$ ]. These results indicate that a short period of stay results as hypothesised in greater cognitive dissonance and a smaller likeability to share as compared to a long period of stay. Nonetheless, it does not lead to a greater willingness to compensate. As a result, *H2a,b,c* can partially be supported.

Examining the ANCOVA, differences in the significance of the main effects on the dependent variables as compared to the ANOVA are detectable. More specifically, the in the ANOVA strongly significant main effects of the independent variable period of stay on cognitive dissonance [ $F(3, 140)=6,78, p=.01$ ] and likeability to share [ $F(3, 140)=7,73, p=.01$ ] score insignificant when the effects of the covariates are included [ $F(3, 140)=0,07, p=.79$ ], [ $F(3, 140)=2,21, p=.14$ ]. This implies that the influence of attitude towards flying, environmental attitude, environmental self-perception and actual environmental behaviour let the beforehand present main effects of period of stay disappear. This depicted change needs to be addressed in the discussion.

### Interaction effects

To analyse the established hypothesis for the interaction effect of distance and period of stay on the dependent variables, the same procedure as for the independent variables was applied. The results of the descriptive statistics, ANOVA and ANCOVA are summarised in Table 9.

**Table 9**

*Descriptives, ANOVA and ANCOVA for interaction effect distance\*period of stay*

Descriptives for the interaction effect distance*period of stay					ANOVA for the interaction effect distance*period of stay		ANCOVA* for the interaction effect distance*period of stay	

a) 5-point Likert scale (1=strongly disagree / 5=strongly agree)

b) 5-point Likert scale (1=very unlikely / 5=very likely)

c) 5-point Likert scale (1=not at all willing / 5=very willing)

\* Including the covariates environmental self-perception, environmental attitude, actual environmental behaviour, attitude towards flying

When looking at the descriptive statistics for the interaction effect, the minor differences in the mean values seem to indicate that the hypothesised interaction effect

between distance and period of stay is not present.

Looking at the ANOVA confirms that no significant interaction effects of distance in combination with period of stay on the dependent variables cognitive dissonance, likeability to share and willingness to compensate are present. Therefore, it can be concluded that, contrary to what the established hypothesis assumed, a far distance in combination with a short period of stay does not lead to the greatest cognitive dissonance, smallest likeability to share and greatest willingness to compensate as compared to a close distance in combination with a long period of stay. As a result, H3a,b,c can be rejected.

Examining the ANCOVA, considering the influence of the covariates, it can be concluded that the interaction effects remain insignificant.

## **5. Discussion and conclusion**

In the following section, the main results found in this study are discussed. Afterwards, comments on the experienced limitations of the study and recommendations for future research are made. Finally, a conclusion of the main findings is drawn.

### **5.1 Discussion of the findings**

The main objective of this study was to find out whether distance travelled by airplane and period of stay influence the occurrence of cognitive dissonance, likeability to share and willingness to compensate. Besides this focus, the aim was to determine whether additional factors such as attitude towards flying, environmental attitude, environmental self-perception, and actual environmental behaviour have an impact on this effect.

#### ***Cognitive dissonance***

##### ***Distance***

Based on the theoretical framework, it was hypothesised that a far leads to higher scores of cognitive dissonance as compared to a close distance. However, the results of the ANOVA and ANCOVA showed that, contrary to this expectation and the findings in the reviewed literature, no significant main effect of distance on the occurrence of cognitive dissonance could be found.

Several explanations for these results are possible. On the one hand, it can be assumed that the respondents felt cognitive dissonance when hypothetically taking a flight but reduced it as quickly as possible with the available coping strategies and thus did not consider the distance of the flight at all. Flying alone, regardless of distance, represented a conflict for these individuals. Hence, the extent of dissonance could not score greater for a far distance than for a close distance.

Another explanation could be that contrary to what the literature describes in connection with flying, cognitive dissonance did not occur in the first place for participants of the sample size. Possibly, the individuals prioritised the experiential aspect of undertaking an adventure, which is established in the different conditions, so firmly that they perceived no

conflict in flying at all. Consequently, in the absence of cognitive dissonance, it could also not be greater for a far distance than for a close distance.

#### *Period of stay*

Based on the theoretical framework, it was hypothesised that a short period of stay leads to higher scores of cognitive dissonance than a long period of stay. Looking at the ANOVA results for the main effects of the independent variable on cognitive dissonance, significant effects support the hypothesis established. This finding is supported by existing literature highlighting that especially flights associated with a short period of stay are perceived as particularly bad for the environment (e.g. Higham et al., 2013).

However, this result must be considered with caution. Looking at the results of the ANCOVA, the initial main effects of period of stay on cognitive dissonance, which were significant in the ANOVA, are no longer significant when the covariates are added. Therefore, it can be concluded that the covariates attitude towards flying, environmental attitude, environmental self-perception and actual environmental behaviour have a considerably stronger influence on the dependent variables than the stimuli of the independent variables presented in the conditions.

#### *Combination of distance and period of stay*

Based on the individually formulated hypotheses for the main effects of the independent variables distance and period of stay on cognitive dissonance, assumptions for the interaction effects between these were made. This led to the hypothesis that a far distance travelled by airplane in combination with a short period of stay will lead to the highest score of cognitive dissonance.

However, the performed ANOVA and ANCOVA analyses show results that contradict this expectation, as no significant effects are present. This can be explained by the fact that the hypotheses for distance and period of stay, considering the influence of the covariates, did not show any significant effects on the dependent variables. The previously significant effects in the ANOVA for period of stay on cognitive dissonance are disappearing in the combination with distance.

#### ***Likeability to share***

##### *Distance*

Based on existing literature, it was hypothesised that a far distance leads to a smaller likeability to share the experience. However, contrary to the expectation, the results regarding this effect do not show any significance. The likeability to share is not smaller for a far distance than for a close distance. This observation is in line with the non-significant effect of distance on cognitive dissonance. Also, for likeability to share, the possible explanation can be found that the occurrence of an exciting experience presented in the conditions was prioritised by the individuals surveyed and therefore, the aspect of distance was neglected.

The desire to share such an experience seems either present or absent, irrespective of the environmental aspects and the flight shame present in society. However, the consideration that an environmentally damaging flight is taken, not to mention the distance travelled, which is decisive for the extent of the environmental impact, does not seem to be present. This argumentation is also supported by the non-significant results of the ANCOVA, as these underline that additionally taking environmental components and attitude towards flying into account also do not reduce the likeability to share.

#### *Period of stay*

Additionally, it was hypothesised that a short period of stay leads to a smaller likeability to share the experience as compared to a long period of stay. Since the ANOVA result shows a significant effect, this hypothesis can be supported in line with the expectation. This finding is supported by the reviewed literature, suggesting that due to widespread flight shame and the urge to conform to socially accepted norms, the attractiveness of sharing the experience can be questioned (Chen et al., 2012). Consequently, individuals tend to be less likely to share the experience of taking a flight for a short period of stay.

However, this significant main effect of period of stay on likeability to share must be considered with caution, as previously the effect of period of stay on cognitive dissonance. Here too, the significant effect of the period of stay on likeability to share becomes insignificant when the influence of the covariates attitude towards flying, environmental attitude, environmental self-perception and actual environmental behaviour is added. Therefore, this finding suggests repeatedly, that the covariates have a considerably stronger influence on the dependent variables than the stimuli of the independent variables presented in the conditions.

#### *Combination of distance and period of stay*

In line with the individually formulated hypotheses for the main effects of the independent variables distance and period of stay on likeability to share, assumptions for the interaction effects between these were made. This led to the hypothesis that a far distance travelled by airplane in combination with a short period of stay will lead to the lowest score of likeability to share.

However, the performed ANOVA and ANCOVA analyses show results that contradict this expectation, as no significant effects are present. This can be explained by the fact that the hypotheses for distance and period of stay, considering the influence of the covariates, did not show any significant effects on the dependent variables. The previously significant effects in the ANOVA for period of stay on likeability to share are disappearing in the combination with distance.

## ***Willingness to compensate***

### *Distance*

In line with existing literature, it was assumed that the individuals show a greater willingness to compensate in the case of a far distance than in the case of a close distance. A greater willingness because in connection with a far distance, a greater occurrence of cognitive dissonance was assumed in parallel, which causes a greater urge (willingness) to reduce it.

However, contrary to the expectation, the results of the ANOVA and ANCOVA regarding this effect show no significance. The willingness to compensate is not greater for a far distance than for a close distance. This result is comprehensible, considering the previously described also non-significant effects of distance on cognitive dissonance and likeability to share. For this reason, the same assumption can be made as to why there is also no significant effect for this component, namely the prioritisation of the experience over consideration of the well-being of the environment.

### *Period of stay*

Parallel to the concept of distance, it was assumed that the consumer shows a greater willingness to compensate in the case of a short period of stay than in the case of a long period of stay. However, contrary to the expectation, the results of the ANOVA and ANCOVA regarding this effect do not show any significance. Willingness to compensate is the only dependent variable on which the period of stay has no main effect in the ANOVA, i.e., when disregarding the covariates.

A possible explanation for this result could be that willingness to pay is the only concept demanding an actual behavioural change in form of payment from the individuals as compared to cognitive dissonance and likeability to share, leaving room for attitude changes. Neither the influence of period of stay nor of the covariates seem to be convincing enough for individuals to be more willing to take the actual step to compensate.

### *Combination distance and period of stay*

Based on the individually formulated hypotheses for the main effects of the independent variables distance and period of stay on willingness to compensate, assumptions for the interaction effects between these were made. This led to the hypothesis that a far distance travelled by airplane in combination with a short period of stay will lead to the highest score of cognitive dissonance.

However, the performed ANOVA and ANCOVA analyses show results that contradict this expectation, as no significant effects are present. This can be explained by the fact that the hypotheses for distance and period of stay, with and without considering the influence of the covariates, did not show any significant effects on the dependent variables.



## **5.2 Limitations**

Although the study in generally performed well and met the expected outcome, some limitations can be identified. First, the aspect of the representativity of the sample selected from the population can be mentioned. Especially since convenience sampling was mainly used, it must be questioned to what extent the sample embodies the pertinent characteristics of the study similar to those of the population. It is possible, for example, since no questions addressed this topic, that respondents do not represent frequent flyers and are therefore less able to identify with the scope of the study and thus less able to answer adequately.

In line with the representativity of the sample, another limitation is evident, namely the broad selection of the target group, which could have contributed to the insignificance of the tested effects. The selection of students as target group was carefully chosen, as they represent the educated generation that could still influence climate change. However, it turned out that, despite this fact, many respondents openly showed their disinterest in proactive environmental behaviour. The prioritization of making new personal experiences over common welfare limits a more effective investigation of the effects of the stimuli on the dependent variables.

Additionally, it is essential to note that the Covid-19 pandemic prevailed when the survey was conducted. The pandemic involved a longer period of severe restrictions or complications for air travel. However, as travel business almost returned to normal in the months before the survey was conducted, the so called “catch-up effect” definitely was an factor and influenced the results. Consequently, it represents a possible effect on why the tested hypotheses turned out to be insignificant.

A final limitation is the fictitious nature of the video scenarios presented. Although the videos in the main study were perceived as realistic, it must be concluded that they cannot compete with a real-life situation in which a respondent is physically involved. Consequently, the fictitious set-up limited the respondents’ motivation to engage in the survey: only two-thirds of the total units sampled could be included in the data analysis, as about one-third had to be removed beforehand, mainly because they had not processed the video material entirely.

## **5.3 Implications and future research**

This study contributes to the academic field as it adds to the existing body of knowledge by researching cognitive dissonance in relation to air travel while drawing the focus on distance and period of stay. This research is intended to serve as a basis for further exploratory and in-depth studies to focus on this relationship and its effects further.

Contrary to expectations, the main effects examined were insignificant concerning the covariates. However, disregarding the influence of the covariates, the significant main effect of the period of stay on the dependent variables, cognitive dissonance and likeability to share must be highlighted and can be taken as an approach for practical implications. For instance, the aviation industry and governments can focus their campaigns on the period of stay if, for example, the aim is to generate as much cognitive dissonance as possible to discourage

consumers from short time flying or educating them. It must be emphasised at this point that awareness and education are central aspects. It can be observed that, contrary to expectations, many people are still not sufficiently informed about the extent of the environmental damage caused by air travel or the available compensation options. Therefore, raising awareness and knowledge of facts is essential to bring about urgent change.

However, it is even more essential to highlight the finding of the relevance of the covariates over the independent variables for explaining the dependent variables. Therefore, future academic studies should go one step back, taking an explorative approach in the form of more surveys, investigating the specific effects of the covariates environmental attitude, environmental self-perception, actual environmental behaviour and attitude towards flying on the dependent variables cognitive dissonance, likeability to share and willingness to compensate. Only when more is known about the effects of the covariates it should be focused on more specific effects such as distance and period of stay in relation to air travel.

Additionally, some more recommendations for future research can be derived from the previously stated limitations. First, since the prevailing disinterest of the respondents for the welfare of the environment led to many insignificant effects on the dependent variables, it can be recommended to follow-up studies in the same context to choose a more selective sample group with more environmentally friendly participants. This selective sampling would have the advantage that the absence of a considerable variation in environmental behaviour would most likely not negatively influence the main effects, as it was the case in this study. In line with that, future studies should increase the validity and reliability of the representativeness of the sample by aiming at a more representative target group for air travel.

## **5.4 Conclusion**

This study aimed to investigate the effect of distance and period of stay on cognitive dissonance in relation to air travel. More specifically, it was examined whether period of stay and distance, considered separately but also in combination, had an influence on cognitive dissonance, likeability to share and willingness to compensate. In addition, it was investigated how this effect was influenced by the additional consideration of attitude towards flying, environmental attitude, environmental self-perception, and actual environmental behaviour.

The study used a quantitative experimental 2x2 design consisting of a close and far distance and a short and long period of stay. The study was conducted in an anonymous online survey in which the stimuli were presented to the participants in video form.

The analysis results show that, contrary to expectations, there are no significant main effects, considering all the elements under investigation. However, disregarding the influences of attitude towards flying, environmental attitude, environmental self-perception, and actual environmental behaviour, a main effect for period of stay on cognitive dissonance and likeability to share is present. Overall, however, the finding of the relevance of the

covariates over the independent variables on all dependent variables cognitive dissonance, likeability to share and willingness to compensate needs to be highlighted.

This outcome can be taken as an impetus for further research with a more selective, environmentally friendly target group. Similarly, this outcome can serve as an approach for campaigns to discourage excessive flying or educational work for the aviation industry and governments. At the same time, future studies should take one step back by investigating the highly influential covariates, before focusing on more specific topics such as distance and period of stay.

## 6. References

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## 7. Appendices

### Appendix I) Hyperlinks to videos of stimuli designs

Condition 1: close destination, short period of stay

[https://youtu.be/\\_YjWgbPTx0Q](https://youtu.be/_YjWgbPTx0Q)

Condition 2: far destination, short period of stay

<https://youtu.be/yishESautb4>

Condition 3: close destination, long period of stay

<https://youtu.be/Dfp8u-sWHbs>

Condition 4: far destination, long period of stay

<https://youtu.be/hJEURRpnyrE>

### Appendix II) Pre-test

#### *Introduction*

Thank you very much for participating in this study! In the following, you will be presented with four different video scenarios. Please watch them carefully and make sure that your audio is working. After each video, you will be asked some questions. Please answer them honestly. There are no right and wrong answers!

All four video scenarios were presented to the participants in a randomized order, after each video presentation the following questions were asked. The questions are presented in the table below.

Measure	Question	Scale used
Realisticness	To what extend do you think the scenario presented is realistic?	7-point bipolar scale (very unrealistic – very realistic)
Imagination	Could you imagine yourself to be in this scenario?	7-point bipolar scale (not at all – extremely)
Recall question destination	Do you remember the destination mentioned?	Yes / No → open ended question
Distance	How far away do you consider this distance when travelling by airplane?	7-point bipolar scale (nearby – far away)
Recall question period of stay	Do you remember the period of stay mentioned?	Yes / No → open ended question
Period of stay	How long do you consider this period of stay when traveling by airplane?	7-point bipolar scale (short – long)

## Appendix III) Main survey

### Introduction

Thank you for participating in this survey!

This study is conducted as part of my bachelor's thesis in Communication Science at the University of Twente. The purpose is to investigate the relationship between the occurrence of cognitive dissonance in relation to air travel and a combination of different conditions. The study will take approximately 5-10 minutes. First, you are asked to honestly answer some questions about your sustainable attitude and behavior. There are no right and wrong answers. Afterwards, you are presented with a scenario in form of a short video. Please watch it carefully and make sure that your audio is working. Try to identify as much as possible with the scenario presented. Finally, you are asked to answer a few more questions.

All your data will be kept strictly confidential and anonymous. Your participation is voluntary and can be withdrawn anytime without the need to provide any reason. In case of any questions about this study, you can always contact me.

k.k.schmidsberger@student.utwente.nl

I hereby confirm that I am at least 18 years old and currently enrolled at a European university. I declare that I have been informed clearly about the nature and method of this research. All my questions have been answered sufficiently.

☐ I consent.

☐ I do not consent and do not wish to participate in this study.

One of the four video scenarios was presented to the participants. They were asked some questions regarding the concepts before and afterwards. The questions for each measure are presented in the table below.

Measure	Question	Scale used
Target group	Are you a student at a university or any other type of higher education institute?	Yes/No
	Which degree are you currently absolving?	Bachelor, Master, PhD, other
Demographics	Gender: how do you identify yourself?	Man, non-binary, woman, prefer to self-describe below
	Age	Open ended question

	Nationality	Dutch, German, or open ended
<b>Environmental attitude</b>	<p><i>Please indicate how much you agree with the following statements.</i></p> <p>I would be willing to accept cuts in my standards of living, if it helped to protect the environment.</p> <p>I would be willing to pay higher prices for goods and services, if it helped the environment.</p> <p>I would be willing to support higher taxes if, if it helped the environment.</p> <p>I would be willing to sacrifice some personal comforts, in order to save energy.</p> <p>I feel my own behaviour can bring about positive environmental change.</p> <p>How do you feel about environmental issues? (Not at all concerned/very concerned)</p>	5-point Likert scale (strongly disagree – strongly agree)
<b>Environmental self-perception</b>	<p><i>Please indicate how much you agree with the following statements.</i></p> <p>I feel like I am more environmentally responsible in my daily behaviour than others.</p> <p>I seem to know more about environmental issues than my family and friends.</p> <p>Others seem to be more aware of environmental issues than me. *</p>	5-point Likert scale (strongly disagree – strongly agree)

	My friends and family think of me as a sustainable person.	
<b>Actual environmental behaviour</b>	<p><i>Please indicate how much you agree with the following statements.</i></p> <p>I separate my waste for recycling.</p> <p>I cut down my energy consumption.</p> <p>I cut down my water consumption.</p> <p>I reduce the consumption of disposable items.</p> <p>I choose an environmentally friendly way of travelling.</p> <p>I choose locally produced products or groceries.</p> <p>I bought environmentally friendly products marked with an environmental label.</p> <p>I used my car less.</p>	5-point Likert scale (strongly disagree – strongly agree)
<b>Presentation of video scenario</b>	<p><i>Introduction video</i></p> <p>Please watch the video carefully and make sure that your audio is working. Try to identify with the situation as much as possible. Forget about your current personal situation and imagine that you are not limited by any restrictions, such as money, university commitments or work. Just think: what if that were me?</p>	
<b>Attitude towards flying</b>	<p><i>Concerning the video you just saw, imagine that you would take the mentioned flight for the corresponding period of stay. What is your attitude towards flying in this case?</i></p>	Bipolar statement scale

	<p>Not appealing / appealing</p> <p>Cruel / kind</p> <p>Selfish / unselfish</p> <p>Unfair / fair</p> <p>Foolish / wise</p> <p>Unnecessary / necessary</p>	
<b>Cognitive dissonance</b>	<p><i>Concerning the video you just saw, imagine that you would take the mentioned flight for the corresponding period of stay. How would you feel after having taken this flight?</i></p> <p>I feel conflict</p> <p>I wonder if I really needed to take that flight.</p> <p>I feel ashamed.</p> <p>I feel guilty. I feel comfort.</p> <p>I wonder if I should have not taken that flight at all.</p> <p>I feel frustrated.</p> <p>In my opinion there was something wrong with taking the flight.</p> <p>I feel disappointed with myself.</p> <p>I wonder if I have made the right choice taking this flight.</p>	5-point bipolar scale (not at all – extremely)
<b>Likeability to share</b>	<p><i>Concerning the video you just saw, imagine that you would take the mentioned flight for the corresponding period of stay. How high is</i></p>	5-point Likert scale (strongly disagree – strongly agree)

	<p><i>the probability that you would do the following?</i></p> <p>I tell my friends and family that I am taking a flight to the destination mentioned.</p> <p>I share the flight on social media.</p> <p>I hesitate to talk about the trip.</p> <p>I feel proud to talk about the trip.</p> <p>I hide that I took this flight so others would not know about it.</p>	
<b>Willingness to compensate</b>	<p><i>Concerning the video you just saw, imagine that you would take the mentioned flight for the corresponding period of stay. How willing are you to do the following?</i></p> <p>Pay more for SAF (Sustainable Aviation Fuel) to be used reducing the CO2 emissions around 80%.</p> <p>Pay more for trees to be planted to offset my flight carbon emissions.</p> <p>Pay more to support the research on electric flying.</p> <p>Pay more to support projects offsetting my emissions in carbon offset projects in developing and newly industrializing countries.</p> <p>Walk/take the bike/use public transport more than before instead of using the car.</p>	5-point bipolar scale (not willing at all – totally willing)

	Put even more effort on environmentally friendly behaviour.	
	Take more initiative becoming more environmentally friendly.	

## Appendix V) Logbook

Date	Data-base	Search Terms	Hits	Article
26/04	Scopus	Flying, cognitive dissonance	9	<p>McDonald, S., Oates, C. J., Thyne, M., Timmis, A. J., &amp; Carlile, C. (2015). Flying in the face of environmental concern: why green consumers continue to fly. <i>Journal of Marketing Management</i>, 31(13-14), 1503–1528.  <a href="https://doi.org/10.1080/0267257x.2015.1059352">https://doi.org/10.1080/0267257x.2015.1059352</a></p> <p>Schrems, I., &amp; Upham, P. (2020). Cognitive Dissonance in Sustainability Scientists Regarding Air Travel for Academic Purposes: A Qualitative Study. <i>Sustainability</i>, 12(5), 1837.  <a href="https://doi.org/10.3390/su12051837">doi.org/10.3390/su12051837</a></p> <p>Cohen, S. A., Higham, J. E. S., &amp; Cavaliere, C. T. (2011). Binge flying: Behavioural addiction and climate change. <i>Annals of Tourism Research</i>, 38(3), 1070–1089.  <a href="https://doi.org/10.1016/j.annals.2011.01.013">doi.org/10.1016/j.annals.2011.01.013</a></p>
26/04	Scopus	Pro-environmental behaviour air travel	21	<p>Cohen, S. A., &amp; Kantenbacher, J. (2019). Flying less: personal health and environmental co-benefits. <i>Journal of Sustainable Tourism</i>, 28(2), 361–376.  <a href="https://doi.org/10.1080/09669582.2019.1585442">doi.org/10.1080/09669582.2019.1585442</a></p>
27/04	FindU T	Willingness to compensate	1376	<p>Jou, R.-C., &amp; Chen, T.-Y. (2015). Willingness to Pay of Air Passengers for Carbon-Offset. <i>Sustainability</i>, 7(3), 3071–3085.  <a href="https://doi.org/10.3390/su7033071">https://doi.org/10.3390/su7033071</a></p>

27/04	<b>FindU T</b>	<b>Air travel social norms</b>	<b>720</b>	Gössling, S. (2019). Celebrities, air travel, and social norms. <i>Annals of Tourism Research</i> , 79, 102775. doi.org/10.1016/j.annals.2019.102775
29/04	<b>FindU T</b>	<b>pro- environment al behaviour change air travel</b>	<b>279</b>	Alcock, I., White, M. P., Taylor, T., Coldwell, D. F., Gribble, M. O., Evans, K. L., Corner, A., Vardoulakis, S., & Fleming, L. E. (2017). “Green” on the ground but not in the air: Pro-environmental attitudes are related to household behaviours but not discretionary air travel. <i>Global Environmental Change</i> , 42, 136–147. doi.org/10.1016/j.gloenvcha.2016.11.005
29/04	<b>FindU T</b>	<b>climate change” “air travel”</b>	<b>485</b>	Higham, J., Cohen, S. A., Cavaliere, C. T., Reis, A., & Finkler, W. (2016). Climate change, tourist air travel and radical emissions reduction. <i>Journal of Cleaner Production</i> , 111, 336–347. doi.org/10.1016/j.jclepro.2014.10.100