THE MOBILITY CONSUMPTION OF CLIMATE CHANGE-CONVERSANT GRADUATES LIVING IN THE AMSTERDAM METROPOLITAN AREA

A QUALITATIVE ANALYSIS ON THE ROLE OF CLIMATE CHANGE KNOWLEDGE ON THE MOBILITY CONSUMPTION AND JUSTIFICATIONS OF HIGHLY EDUCATED URBAN RESIDENTS

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List of Acronyms

CC-CG	Climate change-conversant graduates
Gs	CC-CGs within the sample
NGs	Non-CC-CGs within the sample
AMA	Amsterdam Metropolitan Area
GHG	Greenhouse Gas
CO_2/ Carbon	Carbon Dioxide
E-bikes	Electric bicycles
KiM	Kennisinstituut voor Mobiliteitsbeleid

Abstract

Reducing individual mobility consumption is one of the objectives to reduce mobility emissions to reach climate targets. The high carbon lifestyles of especially individuals with high climate change knowledge is often perceived as hypocritical and is extensively studied because of their proven importance for their credibility and potential social influence. A gap in literature is found in understanding the coping mechanisms and strategies employed by urban residents with high climate change knowledge compared to individuals with lower climate change knowledge in terms of their mobility consumption. This research carried out an in-depth comparison on the knowledge, attitude and justifications between individuals who have completed an education related to climate change and other highly educated individuals living in Amsterdam. The results show how climate knowledge has indeed influenced the environmental consciousness in decision-making processes, leading to a lower mobility footprint than the average. However, a sense of personal responsibility seems to be a stronger indicator to identify individuals that have taken steps to reduce their mobility consumption. Lastly, the justification strategies differ between individuals that have already taken steps to reduce their mobility consumption, relying more on moral justifications, and individuals that have not, blaming the lack of sustainable mobility alternatives and prioritise their own comfort and desires. The analysis and discussion provide a categorisation and operationalisation of the different level of steps taken to reduce mobility consumption and justifications recognised in this sample. Moreover, the discussion highlights the limitations of individual responsibility. It stresses the need for structural changes in mobility systems and policies to achieve substantial reductions in mobility consumption as some of justifications have shown to be legitimate giving the existing context. Finally, policy and managerial recommendations are discussed that could effectively reduce the mobility consumption of highly educated urban residents.

Introduction

Climate change is a global problem and is amplified due to Greenhouse Gas (GHG) emissions such as carbon-dioxide (CO2). Recent data from the United Nations Environmental Programme (UNEP) shows that transportation, from now on referred to as mobility, accounts for a quarter of the total energy related GHG emissions (Platzer et al., 2021). Reducing the carbon impact of mobility is therefore one of the major concerns of governments. For example, the Dutch Climate Agreement includes the mobility goal of emitting 55% less CO2 by 2030 and 95% less by 2050, compared to the base year 1990, where the emissions were 220.5 Tg CO2-equivalent (CO2-eq) (Greenhouse Gas Emissions in the Netherlands 1990-2019, 2021). One influential aspect in reducing emissions is reducing individual mobility consumption. A vast amount of research is put into this challenge, and this research will continue on those studies with the aim of understanding the mobility consumption of highly educated individuals, comparing individuals with an education in climate change (Climate Change-Conversant Graduates) with other highly educated individuals.

Currently, political, technological, economic, ecological, and psychological components that all play a role in, and influence, mobility choices are being investigated (Geels, 2021). Geels claims that policymakers and companies are focused on sustainable technical innovations and not on transformational change or even diminishing the need and social structures for mobility consumption. An important psychological component playing a role in transformational change is known as 'hypocritical behaviour', a gap between people's attitudes towards mobility and their actual behaviour, often causing cognitive dissonance (Schrems & Upham, 2020). Hypocritical behaviour is recognised among individuals with high level of climate change knowledge, as they are often also individuals with a high personal carbon footprint[1]. Examples of these are academics, climate scientists, and green consumers, because they have high-energy consumption lifestyles (Cass et al., 2023), and for example extensive flying behaviour (Higham & Font; Gunster et. Al, 2018; McDonald et al., 2015; Schrems & Upham, 2020). It is important to understand their hypocritical behaviour because it undermines their credibility (Goodwin, 2020; Sparkman & Attari, 2020) and they have the potential to

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[1] A personal carbon footprint refers to the total amount of greenhouse gas emissions, primarily carbon dioxide (CO2), that is directly and indirectly produced by an individual's activities and lifestyle choices over a specific time period. It is a measure of the impact an individual has on climate change through their consumption patterns, energy use, transportation choices, and other factor (Wiedmann & Minx, 2008).

influence the behaviour of others (Ruhrort & Allert). In literature there are several names for this type of hypocritical behaviour. Schrems & Upham (2020) refer to the attitude-behaviour gap, Higham & Font (2019) have termed this behaviour climate hypocrisy, and Cass et al. (2023) call it climate change inaction or delay. These and other papers try to explain this hypocritical behaviour by looking at 'justification' strategies. Higham & Font (2019) apply Bandura's moral disengagement mechanisms, Cass et al (2023) and Gunster et al. (2018) applied discourses and discursive strategies, and Goodwin (2020) and Schrems & Upham (2020) looked at strategies and justifications. Chng (2021) emphasizes the importance of integrating different behavioural theories into a relevant framework for specific research, which can offer a more holistic view and increase practical relevance. Therefore, the literature review further explores and integrates hypocritical behaviour and justification theories.

The problem of hypocritical behaviour is also expected to be seen amongst so called "Climate Change-Conversant Graduates" (CC-CGs), which is an overarching name for a group of individuals that have a university degree in a programme relevant to the aspects of climate change. CC-CGs are also assumed to be part of a 'high-income' class in the Netherlands, since highly educated individuals are likely to directly belong to the higher edge of the 40% middle income-level and are likely to quickly move to the highest 10% income-level (Centraal Bureau voor de Statistiek, 2022; Menger & Nieuweboer, 2019, see Figure 16 and Figure 17 in Appendix E). Because they are on the high edge of middle-class/ high-income class, they are also expected to have exponentially higher personal carbon footprints than low edge of middle- or low-income classes (see Figure 14 and Figure 15 in Appendix G), causing what is called 'carbon inequality' (Ecorys, 2022). As CC-CGs are expected to have a high carbon footprint, a disparity between their high levels of climate change knowledge and actual behaviour is to be expected.

A current gap in literature is that most of the existing research on hypocritical mobility behaviour focuses solely on flying activities, while an individuals' urban mobility is more frequent and has shown to have a large impact on GHG emissions as well (Barr, 2018). Therefore, the current state of the literature does not explain all mobility behaviour and justifications of individuals with high-education and income. Additionally, Taylor et al. (2017) stresses the importance of understanding how individuals in a specific region justify their behaviour, due to differences between urban and rural areas. Urban areas have generally lower GHG emissions due to the density and sustainable mobility options, but higher GHG emissions due to

higher income levels and consumption opportunities (Gill & Moeller, 2018). Studies like those of Mattioli et al. (2021) highlight how individuals, often urban residents, that have low car-emissions, are likely to have high air travel emissions. These findings make cities interesting regions to investigate high-income and highly educated individuals in terms of their personal contribution to GHG emissions. Therefore, this research focuses on the Amsterdam Metropolitan Area (AMA), which is the fastest growing region in the Netherlands including the main capital Amsterdam. Amsterdam is considered one of the most sustainable cities in Europe. Considering mobility, Amsterdam offers residents many sustainable mobility modes (Consultancy.eu, 2018). However, what is seen as (un)sustainable mobility modes is dependent on a regional context and is further explored in this study. Although there is extensive research on mobility in Amsterdam, it has also mainly focused on specific transitions and sustainable innovations, leaving gaps in behavioural studies (Farla et al., 2010; Loorbach et al., 2021). By understanding the mobility consumption of individuals in this region, practical solutions can hopefully be developed to reduce GHG emissions of this groups current mobility, and recommendations can be made for future mobility policies or awareness campaigns.

In conclusion, the goal of this research is to fill the identified gaps in literature by analysing the full scope of mobility consumption of CC-CGs living in the AMA, who have a strong potential for impact. The primary objective is to conduct an in-depth comparison of the mobility choices and justifications between individuals who have completed an education in climate change and those who have not. The study aims to investigate whether CC-CGs perceive a disparity between their knowledge and mobility consumption, as measured by their mobility choices and carbon footprint. Additionally, the research aims to identify the underlying reasons and factors that serve as justifications for their behaviour. By analysing these factors together, a deeper understanding can be gained of the underlying dynamics influencing sustainable mobility choices among CC-CGs, which can be used for the design of policies and intervention to reduce the environmental impact from mobility consumption among this group and other highly educated individuals. This study attempts to answer the following research question:

How do climate change-conversant graduates' knowledge, attitude and justifications relate to their actual mobility consumption, compared to other highly educated individuals?

The first objective of this study is to investigate the presence of a potential disparity between the knowledge, attitude, and behaviour among CC-CGs and to explore whether they perceive this disparity themselves. To assess their mobility consumption, the study measures the emissions produced, which allows for the determination of each individual's mobility carbon footprint based on their actions. This leads to the first three sub-questions.

SQ1: How does the mobility consumption and footprint of Climate Change-Conversant Graduates compare to other highly educated individuals?

SQ2: What are the attitudes and perceptions of climate change-conversant graduates, compared to other highly educated individuals, on individual responsibility and the importance of reducing personal mobility consumption?

SQ3: How do climate change-conversant graduates, compared to other highly educated individuals, perceive the potential disparity between their knowledge and their personal mobility behaviour?

The goal of the following sub question is to understand what underlying factors and reasoning CC-CGs use to explain their behaviour.

SQ4: What are the underlying factors and reasoning that climate change-conversant graduates, compared to other highly educated individuals, provide as justifications for their mobility consumption?

The final sub-question is formulated to gather insights from this group in terms of effective implications for policies and interventions for them.

SQ5: What do climate change-conversant graduates, compared to other highly educated individuals, perceive as effective policies and interventions to reduce the environmental impact of mobility consumption?

By addressing these research questions and sub questions, this study intends to explore the potential knowledge-behaviour disparity among CC-CGs, examine their perceptions and justifications, and provide insights for the development of targeted policies and interventions to mitigate carbon emissions resulting from mobility consumption within this highly educated group.

Figure 1 shows a model of the research process. The literature review contains an assessment of current theories on mobility, hypocritical behaviour and justifications that are relevant to this research. This review leads a combined theoretical framework and a conceptualisation for mobility consumption. The rest of the model is further described in the methodology section.

Figure 1

Research Process Model
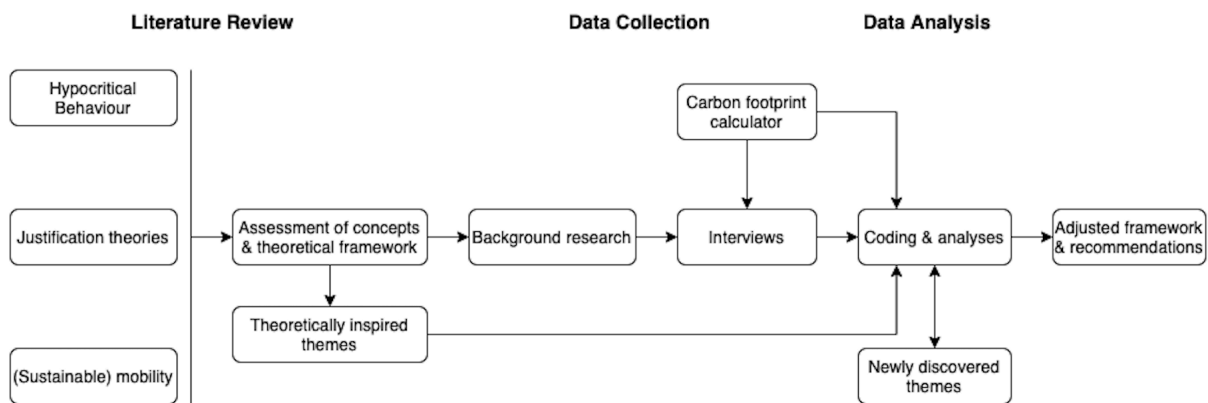
Literature review

In summary, this chapter aims to explore how the existing literature can be used to understand the mobility consumption of urban residents and how current theories could be adjusted or expanded based on this aim. Literature on the current understanding of (sustainable mobility), the wide range of theories used to explain individual behaviour, cognitive dissonance and justification mechanisms is consulted, together forming the theoretical framework for this research.

(Sustainable) Mobility

Mobility is an essential aspect of daily life, referring to the ability to move from one place to another, both locally and globally. Global mobility, such as international travel and migration, has significant economic, social, and cultural impacts, but it also contributes to high carbon emissions and air pollution (Barr, 2018; Loorbach et al., 2021). At the local level, mobility is vital for the access to employment, education, health care, and leisure activities.

Sustainable mobility aims to reduce the environmental impact of transportation, such as carbon emissions, air pollution, and noise, while improving accessibility, affordability, and safety (Holden et al., 2019; Bertolini & le Clercq, 2003; Graaf et al., 2021). Unsustainable mobility involves the use of high-emitting modes of transport, such as personal motorised vehicles. The Netherlands is leading in promoting sustainable mobility, with a focus on reducing the need for personal (non-sustainable) vehicles, improving infrastructure and services for electric and public transportation, and promoting active transportation through the development of bike lanes and pedestrian-friendly environments. Famously, The Netherlands has among the world's safest and most comprehensive cycling infrastructure, and it has an extensive public transportation system, including large tram and metro systems in big cities (Shi et al., 2021). Moreover, The Netherlands is one of the leading electric transport players in the world, having one of the world's most advanced charging infrastructures (Electric Transport in the Netherlands | RVO.nl, n.d.).

Amsterdam's mobility options include cycling, walking, public transport, and car use, with residents more likely to use sustainable modes of transport due to the city's infrastructure and policies (De Ingenieur, 2018). In urbanized areas, 35% of residents are dependent on cars, compared to 64% in rural areas and only

33% agreed that buying a car is not a free choice, but rather a necessity (Ministerie van Infrastructuur en Waterstaat, 2022a). Furthermore, studies have shown a change in attitude towards car-ownership in the Netherlands, with more young adults viewing it as less of a necessity (Van Kampen et al., 2019). A recent trend in many European cities is the use of E-bikes, that have a potential to be a more sustainable mode of transport because they lead to lower CO_2 emissions when substituted for a motorised vehicle (De Haas et al., 2021; Plazier, 2022; Philips et al., 2022). However, De Haas et al. have found that e-bike trips primarily substitute conventional bicycle trips in the Netherlands, which leads to the question whether they indeed have a positive effect on emission reductions.

Because of the uncertainty and ongoing research on the definition of sustainable mobility modes, this research focuses on the carbon emission aspect and the personal view on both global and local mobility options mentioned above. Moreover, emissions are the main concern when considering climate change and CC-CGs are expected to have a high carbon footprint, caused by carbon inequality among levels of education.

Overview of Individual Mobility Theory

Existing studies about sustainable mobility behaviour, often focus on the socio-technical approach, highlighting the interactions between different dimensions like technologies, markets, policies, cultural- and societal differences and the industry (Geels, 2012; Senkpiel et al., 2020; Truong et al., 2022). Ruhrort & Allert (2021), for example, use a socio-technical approach to address how individuals influence social norms in the mobility transition by taking on a specific role in society, while individuals choices are influenced by other aspects like a dominant mindset and group paradigms.

This complexity of the individual behaviour is also explained by a variety of behaviour and behavioural change theories, like the theory of planned behaviour and the theory of interpersonal behaviour (Chng, 2021). While this approach has yielded valuable insights, many studies tend to emphasize the promotion of behavioural change rather than delving into the nuances of attitude and justifications concerning current choices. This study shifts its focus towards investigating the potential disparity between individuals attitude and their actual choices and consumption in terms of mobility. Additionally, it explores the justifications individuals employ to understand the mechanisms influencing mobility consumption at the

individual level. It is important to acknowledge the limitations of individual consumption choices in the broader context of anthropogenic GHG emissions. Other factors, including industry and governments, play a significant role in reducing GHG emissions and require attention from other studies. This study immerses itself in the realms of cognitive dissonance theory and justifications theory, which will be elaborated on in the upcoming sections.

Perceived Hypocrisy & Cognitive Dissonance

Hypocrisy, which stems from a Greek root meaning "to play a theatrical part" (Merriam-Webster, 2022), can refer to a discrepancy or inconsistency between what an individual says, aspires, or professes to do (especially in public), and what they actually do. Hypocrisy is ancient, but modern theorists have developed concepts that examine in more detail what causes it, how it operates, and how individuals and society at large contend with it. Festinger's (1962) theory of cognitive dissonance explains that this discrepancy causes discomfort, which motivates the individual to reduce that feeling and bring their desirable and actual behaviours into a state of consistency. Festinger explains three coping strategies that individuals employ: they change their attitude, change their behaviour, or rationalise/justify the inconsistency (Weder et al., 2020). Later, Aronson shifted the focus of hypocritical behaviour to when behaviour contravenes ones' self-concept, that is, the image one has of oneself and wants to uphold (Aronson, 1992; Fointiat, 2004).

In the context of dissonance theory, a distinction can be made between feelings of conflict with one's own personal standards (idiographic dissonance) and a feeling of conflict with normative societal standards (nomothetic dissonance) (McDonald et al., 2015; Schrems & Upham, 2020). Whether this concerns social norms among peer groups or society at large is unclear and could be further explored. The distinction is comparable to the feelings of guilt and shame (Tillman et al., 2019). Discrepancies between someone's actual behaviour and what they feel they should attain or what others feel they should achieve may result in guilt, similar to normative societal standards. While shame creates a feeling of distress or self-consciousness caused by the awareness of one's own perceived unacceptable behaviour, which may lead to a negative evaluation of oneself, similar to idiographic dissonance.

As noted in the introduction, it is expected that among CC-CGs there are individuals who engage in or perceive their behaviour as hypocritical and therefore experience cognitive dissonance, aligning with research on climate scientists, academics, and green consumers (Cass et al., 2023; Higham & Font, 2020; Gunster et al., 2018; Schrems & Upham, 2020). Schrems & Upham (2020) found that sustainability scientists experienced cognitive dissonance towards their personal flying behaviour, recognised by feelings of guilt or frustration. The authors propose a potential in further researching the variety of emotions in relations to coping strategies of cognitive dissonance. Some of their participants had changed their behaviour to reduce these feelings, but others justified their behaviour, further explained in the next section. In contrast, Dütschke et al. (2022) has found no relation between guilt and shame and past or future flying behaviour. Similarly, Gössling et al. (2020) have found that flight shame has indeed influenced moral and social norms regarding flying but have also not found a significant change in individual behaviour due to shaming. Given behaviour change as a dissonance strategy, investigating how CC-CGs may modify their mobility consumption is promising. As other studies indeed found that climate change researchers have indeed replaced some flights, are more likely to offset their flights financially and are willing to pay more and travel longer with a more sustainable mode of transport (Whitmarsh et al., 2020). Taylor et al (2017) used a categorisation of climate change knowledge compared exhibit sustainable conservation practices to identify and understand hypocritical behaviour. Levels of climate change knowledge were indicated by whether their participants believed climate change was real and caused by humans. As this study examines how if and how perceived hypocrisy can be recognized among CC-CG, the table in appendix offers an example of how highly educated individuals can possibly be designated to a similar categorisation based on their education in climate change.

In conclusion, this study employs these concepts to investigate whether CC-CGs perceive their consumption as hypocritical, experience a feeling of dissonance, and what causes that feeling.

Justification Strategies

A second set of theories identified in mobility research is used to explain how individuals justify their (hypocritical) behaviour. As mentioned before, Higham & Font (2020) use moral disengagement theory to explain how flying behaviour of academics, causing carbon inequality, is justified. The phenomenon of moral

disengagement was first studied in 1986 by Bandura, who explained psychological mechanisms that allow

individuals to justify unethical actions by changing their moral perception of those actions (Higham & Font,

2020) The visualisation of these mechanisms can be found Figure 13 in Appendix G (Voigt et al., 2016).

These mechanisms are dangerous in a way that they enable individuals to show immoral behaviour without

realising they might do harm or are acting unethically (Hyatt, 2017).

There is an interesting dynamic between dissonance theory and the theory of moral disengagement.

Whereas in cognitive dissonance the individual understands the difference between two disconnected values,

attitudes, standards and/ or behaviours, within moral disengagement the individual disengages from their

initial moral standards. Cognitive dissonance can be reduced through selective moral disengagement

mechanisms (Stoll-Kleemann & O'Riordan, 2020). Hyatt (2017) argues that moral distress is a type of

cognitive dissonance that leads to moral disengagement. When individuals experience moral distress, they

may feel guilt and shame, which causes them to engage in justification mechanisms to restore their self-

concept and reputation towards others (Tillman et al., 2018; McDonald et al., 2015).

The literature review on justification mechanisms identified several strategies and discourses that CC-

CGs may use to justify their hypocritical behaviour regarding mobility consumption (Cass et al., 2023;

Schrems & Upham, 2020; McDonald et al., 2015; Higham & Font, 2020). All of these are listed in Appendix

A. Table 1 is adapted from these theories, combined, and reformulated into 4 main mechanisms with an

example conceptualisation for this study explained in the following paragraphs.

The first mechanisms are moral justification, where individuals believe their action has a higher cause,

and comparison to others or other activities that have a higher mobility consumption (Hyatt, 2017). The next

mechanism is minimising, ignoring, or misconstruing the consequences of their consumption (Higham &

Font, 2020; Gössling & Peeters, 2007). Mattioli et al. (2023) explain that individuals driving less often tent to

fly more due to maintaining social networks and underestimating the emissions of flying compared to driving.

Minimising the consequences is particularly interesting for individuals with a high level of climate change

knowledge, as they have a good understanding of the emissions and the impact on climate change. The next

two mechanisms include surrendering, saying that they are already doing everything they can (acting within

limits of agency) or that they compensate mobility consumption by some other pro-environmental behaviour

(Cass et al., 2023; Schrems & Upham, 2020; Mattioli et al., 2023). In literature this behaviour is also referred

to as 'compensatory green beliefs', when individuals for example feel like they compensate their flying behaviour, by using public transport or other pro-environmental behaviour like recycling (Mattioli et al., 2023; Kaklamanou et al., 2013). However, Kaklamanou et al. have found that individuals with a higher education level, age, annual income, or greater concern about climate change are all less likely to endorse of compensatory green beliefs.

The last mechanism, denial of control/ placing responsibility elsewhere, is widely recognised among mobility studies, and has different interpretations. Denial of control may come into play when an individual asserts that their flying behaviour is constrained by external factors beyond their influence. These factors primarily encompass justifications associated with travel-related elements like time, expenses, and convenience, as well as aspects related to the travel context such as participation in specific events (Schrems & Upham, 2020; McDonald et al., 2015). In moral disengagement theory these are broken down into displacing responsibility and diffusing responsibility or the attribution of blame, of which examples are shown in the table. Displacing responsibility is similar to Cass et al.'s 'describe consequences of choices as needs', as participants argue that they, e.g., 'need' to go to work. However, the following author explains another way of looking at agency and responsibility: "Placing of responsibility elsewhere can be interpreted as an evasive strategy, avoiding behavioural change, but it can, on the other hand, be rational given the existing funding context. Furthermore, it can be a starting point of dialogue for change." (Eriksson et al., 2022, p.176).

Part of this study will explore these previously discussed justifications and apply them to understand and categorise the justifications used by CC-CGs and their peers about their mobility consumption. The research may lead to new justification strategies and a more accurate operationalisation of these justifications in terms of mobility consumption.

Table 1

Justification strategies for mobility consumption

Category name	Sub-category	Conceptualisation	Mobility example
Moral justification/ Comparison	Moral justification	Claiming that one's consumption has a social or moral purpose	Flying to another country for a climate conference
	Comparison	When someone's mobility is compared to more harmful	Saying that others drive their car even more often

		behaviour of something or someone	
Minimising, ignoring, misconstruing consequences/	N/a	Avoiding or minimising the environmental impact from mobility consumption	Saying that one's personal flight does not impact climate change significantly
Limits of agency/ surrender/ compensation	Limits of agency/ Compensation	Claim to be acting to limits of agency or compensate consumption by something else.	Saying that flying is compensated by eating vegan. Claiming to already do everything they can.
	Surrender	Saying that there's nothing we can do	Saying that it is already too late to reduce climate change with reducing mobility consumption
Denial of control/ Placing responsibility elsewhere	Displace	-	Saying that they have to drive a car for their job
	Diffuse	-	Saying that all other colleagues also flew to conference
	Attribution of blame	-	Emphasising the lack of a more sustainable mobility alternative

Methodology

Research Approach & Design

As mentioned, the design of the research mainly consisted of the analysis of a specific case region, the AMA. The research had a partly qualitative and partly quantitative approach. Some quantitative data was gathered to provide an overview of the case region and the sample that was studied. The main part of the research was gathering qualitative data on the sample to understand in-depth explanations while using theories as a guidance through the analysis. By examining a specific study sample, it has been possible to identify patterns and insights that can be applied to similar situations and/or regions. The aim was to draw conclusions and assumptions that can be used in future studies that analyse the mobility consumption of urban residents.

Data Collection

As can be seen in Figure 1 the data generation consisted of partly secondary data and primary data. The first step was gathering secondary data in the background section, followed by the collection of primary data from a carbon footprint calculator and interviews with highly educated individuals. The participants consisted of both CC-CGs (holding high levels of climate-change knowledge) and other highly educated individuals that have not graduated in a climate-change related programme. Finally, all results were combined and used for data analysis and answering of the research questions.

The start of the research consisted of understanding the current status of mobility in the case region. The background research consists of information and data on mobility features in The Netherlands, and as specifically as possible in the AMA.

The first action the participants had to do, was to answer a questionnaire containing questions about their socio-demographic information, their carbon footprint, their attitude towards climate change and justifications for their consumption (see the Participants Questionnaire in Appendix D). The questions concerning their carbon footprint were retrieved from the Klima application, further described in the next section. The results of their carbon footprint put the narratives of the interviewees in the context of their actual consumption compared to each other and compared to an average. Another advantage is that the interviewees had already thought about their consumption and thus already had certain details in their minds. However, a

downside was that because they had already thought about their consumption, they also have had the time to prepare justifications or lie about certain topics that they felt ashamed of.

The calculator was followed by a semi-structured interview (Bryman, 2012). Semi-structured interviews allow the interviewer to follow a certain structure and question-guide to maintain consistency and assure relevance to the research questions. Since the narrative of the participant was important, semis-structured interviewing also leaves room for open answers and steering of the order of the interview.

Carbon Footprint Calculator

One part of this research focused on the carbon footprint of individual mobility consumption. Individual carbon footprint calculators ask the user several questions about their consumption in different categories to calculate their personal carbon footprint, which is based on average emission data of these categories.

A personal carbon footprint calculator was first introduced in 2005 by oil producer BP, applying it in a marketing campaign to shift the focus of climate impact to the individual's actions (Kaufman, 2021). For this study it is important to acknowledge that the effectiveness and intentions behind the use of personal carbon footprint calculators can vary. One aspect is that they have been proven to be valuable in raising awareness and promoting changing individual consumption choices, initiating collective change (Mulrow et al., 2019; Turner, 2014). However, critics say that they were introduced to create the perception that solving climate change is primarily the responsibility of individuals, rather than acknowledging the significant role played by industries and governments (Turner, 2014; Gan, 2021; Kaufman, 2021; Solnit, 2021; Mitloehner, 2022). By emphasizing personal carbon footprints, industries and politics can shift the blame onto consumers, perpetuating the idea that individual choices alone can address the climate crisis and allowing them to avoid responsibility for implementing systemic changes and ambitious climate policies. This study does not seek to assign blame to the participants for their mobility footprint; instead, it utilizes it as a tool to discuss their individual consumption in relation to their education.

The carbon footprint calculator used for this study was the Klima application (*Fight Climate Change*, n.d.). Advantages are that the application is easy to use, it provides average data of the Netherlands and there

is a possibility to fine tune answers per category. The calculator includes data on travel, mobility, diet, shopping, home, pets, and public sector. The respondents were asked to answer 10 questions retrieved from the application on travel, mobility, diet, shopping, and home, to put the aspects of the interview into the context of their actual consumption (see Appendix D). However, the focus was on the different modes of mobility, Table 12 in Appendix E provides an overview of the unit of measurement and sub-categories included in the calculator. Two limitations of the calculator should be considered. Firstly, there are no questions on (E-) bike consumption. However, due to the complexity of substitution effects and the fact that electric vehicles are not part of a short carbon cycle, the calculation of direct emissions is too complex (KiM, 2022). Moreover, public transport is measured by distance travelled per week, combining busses, trams, and trains. As Amsterdam has an extensive public transport infrastructure, it might have been challenging for the individuals to calculate their total distance travelled, which is considered in the analysis of the results. The interviews have touched on public transport and E-bike use, to see if there were interesting qualitative insights.

Table 13 in Appendix E also provides an approximate overview of the average consumption and emissions of mobility in the Netherlands according to the Klima application (*Fight Climate Change.*, n.d.). Dutch people emit, on average including all activities, 10.08 tons CO_2-eq per year. Some averages are between two response scales, explaining a slight difference between the averages in Figure 9, Figure 10 and Figure 11 compared with the average. Moreover, according to Ecorys (2022), high income individuals emit on average approximately 30 tons CO2-eq per year. And even medium-income individuals (represented by 40%) have on average higher footprints (12.5 Tons CO_2-eq). Highly educated participants were expected to belong to the medium-income class and therefore emit at least 12.5 tons CO_2-eq on average, after graduation.

Operationalisation

For the operationalisation of the concepts defined in theory, several comparable papers were used as examples to formulate interview questions and to define indicators. A complete overview of the operationalisation can be found in Appendix C which includes all concepts with their indicators and measurements. Moreover, Appendix D provides a set of interview questions that formed the semi-structured

Interview Guide. The following paragraphs are an overview of the operationalisation of some of the core concepts from the combined framework. Lastly, Appendix A offers an overview of the discourses and strategies found in literature for the operationalisation for feelings and justifications in the interviews.

Climate change knowledge was indicated by education and current understanding of the environmental impact of mobility consumption on the processes that drive climate change, and it is measured by asking questions on the individuals' attitude towards climate change and factors that affect it. That the CC-CGs participants have knowledge on climate change knowledge is largely assumed based on the criteria they have met.

Cognitive dissonance and perceived hypocrisy were operationalised by looking at the carbon footprint of the respondents compared to each other and the national and income-level averages of the Netherlands. Also, questions in the interview about their attitude towards certain mobility choices in comparison and their actual consumption were used to measure a certain presence of hypocritical behaviour as well as their own perceived hypocrisy on their own consumption.

The *justification strategies* were identified by asking the interviewees questions about how they feel about their consumption. Whether they considered themselves sustainable consumers and why/ why not they could see themselves reduce their mobility consumption. Indicators for cognitive dissonance were feelings of distress, discomfort, confusion, and more. The justification mechanisms were indicated by recognising any of the existing mechanisms in Appendix A and the emergence of new themes.

Sampling Strategy

Purpose Sampling using specific criteria was applied, as the main unit of observation for this study were CC-CGs living and/or working in the AMA (Clark et al, 2021). The unit of observation was defined as

anyone with a degree in topics concerning the environment, climate change, innovation, and sustainability[2].

To put the narratives of CC-CGs in perspective, the test group was defined as highly educated individuals in the same age category, who's education covered little to no topics related to climate change. It is important that the graduates were already working and in a financially stable position. In terms of mobility, students and more recent graduates might not have the financial resources to engage in carbon-intensive practices, such as travelling extensively, purchasing a car, or making other deliberate decisions concerning their mobility. Alumni networks form different programmes from both Utrecht University (UU), the University of Amsterdam (UVA) and the Vrije Universiteit (VU) were approached to find respondents. Moreover, a snowball sampling strategy was applied, using the network of interviewees to gather other possible candidates (Bryman, 2012). To incentivise relevant individuals to participate, a sustainable care package was raffled among the participants.

26 interviews are conducted in total. 14 of which are CC-CGs and 12 non-CC-CGs. To simplify the indicators for the interviewees, participants among the CC-CGs group are from now on referred to as Gs (G1, G2, G3, etc.) and participants that are not CC-CGs are referred to as NGs (NG1, NG2, NG3, etc.). The list of interviewees together with their sex, age, income-level and yearly footprint is shown in Table 2. All participants are residents of Amsterdam.

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[2] Their knowledge was measured how much and which topics were discussed in their education (see questions in Appendix D)

Table 2

List of Interviewees with their Demographics and Carbon Footprint

Gs	Sex	Age	Income-level	Yearly total footprint	Travel	Mobility	Comments	Diet	Shopping	Home
G1	F	31	40.000-49.999	7,18	0.40	1.39	Once in 5 years	1.25	1.01	2.35
G2	F	30	Prefer not to tell	9,04	0.79	1.85		1.66	1.94	2.02
G3	M	32	Prefer not to tell	6,85	0.40	0.32	Almost never	1.66	1.01	2.68
G4	F	31	30.000-39.999	7,03	0.79	0.80		1.29	1.01	2.35
G5	F	28	>80.000	19,84	12.50	0.49		1.66	1.94	2.47
G6	M	28	<20.000	10,15	3.88	0.80		1.66	1.01	2.02
G7	M	33	>80.000	11,23	3.88	1.17		1.66	1.94	1.80

G8	F	29	40.000-49.999	14,35	9.34	0.14	2 mid-range return flights and 1 long-range	1.25	1.01	1.83
G9	F	27	40.000-49.999	5,8	0.79	0.32		1.25	1.01	1.64
G10	F	26	30.000-39.999	16,58	9.34	2.66	2 mid-range return flights and 1 long-range	1.25	1.01	1.55
G11	F	27	30.000-39.999	8,07	2.38	1.25	1 Long-range single flight	0.62	1.01	2.02
G12	M	29	30.000-39.999	15,06	7.13	2.32	1 long- 3 short	1.29	1.01	2.53
G13	M	25	40.000-49.999	8,48	0.79	0.14		2.31	1.94	2.53
G14	F	28	<20.000	14,18	7.84	1.25	1 short, 1 mid, 1 long	0.62	1.01	2.68
Average total				**10,99**						

	Sex	Age	Income-level	Yearly total footprint	Travel	Mobility	Comments	Diet	Shopping	Home
NGs										
NG1	F	28	50.000-59.999	11,35	3.88	0.62		1.66	1.94	2.47
NG2	F	28	50.000-59.999	14,66	6.34	1.60		1.66	1.94	2.35
NG3	F	31	40.000-49.999	13,21	3.88	1.39		1.66	1.94	3.56
NG4	F	31	>80.000	20,72	12.50	0.28		1.66	1.94	3.56
NG5	F	32	40.000-49.999	22,20	12.50	1.21		1.66	1.94	4.11
NG6	F	28	30.000-39.999	13,82	7.04	1.21		1.25	1.01	2.53
NG7	M	31	50.000-59.999	11,14	2.38	1.66	3 short-range return flights	2.57	1.94	1.80
NG8	M	28	Prefer not to tell	12,02	3.88	2.22		1.66	1.01	2.47
NG9	M	32	>80.000	21,06	12.50	2.57		1.66	1.01	2.53
NG10	M	29	50.000-59.999	15,04	3.88	4.04		2.31	1.01	3.02

NG11	M	32	40.000-49.999	10,74	3.88	1.60		1.66	1.01	1.80
NG12	M	27	Prefer not to tell	13,97	3.88	0.72		1.66	1.94	4.99
Average				**14,99**						

Data Analysis

The interviews were coded and analysed using thematic analysis, discovering similarities and differences in peoples' values, views, opinions, arguments, and experiences (Caulfield, 2022). Thematic analysis was relevant due to the opportunity to start with theoretically inspired codes as found in Appendix B, a one of the goals of the research was to identify whether existing social scientific concepts from the combined framework apply for the research sample (Bryman, 2012).. The coding was an iterative process, which started with an initial coding scheme based on theory and a first look through the transcriptions, followed by systematic In Vivo coding through the first set of interviews (6 participants). Based on this, a first selection was done to reduce overlap and redundancy of codes and to put the codes into categories. With this set of codes, the rest of the interviews were analysed, leaving room for new codes. After all the interviews were coded, a second reduction was done, after which all the interviews were analysed again to see if any newly discovered codes also apply to previously coded interviews or references did not fit anymore in a certain code. The reviewing, refining, and defining of final themes was done lastly.

Descriptive analysis is applied to the survey results to summarise and organise the data, testing it on the distribution, averages, and variability of the answers (Bhandari, 2023). The carbon footprint results of the Gs and NGs were held next to each other and to the country averages, to recognise potential patterns among each sample and highly educated individuals in general. Moreover, some of the survey questions were highlighted to identify other patterns in comparison to the interview data.

Reliability & Validity

The validity of a study questions whether the methods correctly measure the theoretical concepts (Clark et al., 2021). The use of mixed methods, also referred to as triangulation, in this mainly qualitative research was chosen to increase credibility, making it more valid for generalisability and put other findings in a context, to be able to draw more detailed conclusions (Carter et al., 2014; George, 2022; Clark et al., 2021). The reliability depends on the consistency of the indicators. The internal reliability is high due to the use of pre-existing codes and semi-structured interviews. However, there was also room for the interviewee to steer

the conversation and formulate new themes based, which makes the study more subjective, decreasing replicability.

Ethical Issues

Bhandari (2022) explains what ethical issues should be considered when including human participation in your study. Before the interview, the respondents were asked to sign an informed consent form, agreeing to the purpose of the interview. However, the interviewees could still decide to withdraw from the research at any moment. The participants are partly known by the researcher, but the identities and other confidential information of the participants are not enclosed. The informed consent form can be found in Appendix F.

Background Information on the AMA

The goal of this background section is to provide an overview of the situational influences that should not be lost out of sight while focussing on the psychological aspects of behaviour. Every case region is context-dependent; therefore, this study requires information on average mobility consumption before something can be said about individual behaviour. That way, comments by the unit of observation can better understood and their behaviour and carbon footprint put in perspective.

The AMA, referred to in Dutch as Metropoolregio Amsterdam (MRA), is a collective of 30 municipalities, two provinces, and the transport authority of Amsterdam (*About Amsterdam Metropolitan Area*, 2022). This region is home to over 2.5 million people, accounting for more than 14% of the population of the Netherlands. With a thriving economy, the AMA is considered the strongest economic region in the country and holds a strong position globally. Due to the interconnectedness and dependency of the municipalities, many challenges require regional decision-making, including the transition to a green economy, housing and mobility system demands, while preserving quality of living. To achieve this, the AMA is making efforts to improve sustainable transportation, which is particularly important given the growing job market, increased commuting, and advancements in electric vehicles (Metropoolregio Amsterdam Internationale topregio met hoge leefkwaliteit: Agenda voor een toekomstbestendige en evenwichtige metropool 2020-2024, 2020). The goal of the AMA is to reduce greenhouse gas emissions from transportation, increase the development of sustainable transportation modes, and improve air quality in the region.

Personal mobility patterns

Personal mobility plays a crucial role in shaping transportation systems and addressing sustainability challenges. This section provides a comprehensive overview of personal mobility patterns across different demographics and years in the Netherlands, focusing specifically on modes of transportation such as cars, public transport, bicycles, and air travel. The analysis incorporates information obtained from various sources, including the "Kerncijfers Mobiliteit 2022" report by Kennisinstituut voor Mobiliteit (KiM), the Rijksoverheid magazine on sustainable mobility, and data from the Central Bureau of Statistics (CBS).

According to the KiM Mobility report, car ownership is prevalent in the Netherlands, with 68% of households owning at least one car as of January 2020 (KiM, 2022). Furthermore, 16% of households possessed more than one car. Despite an increase in car usage between 2020 and 2021, the overall figures remained 22% lower than those observed in 2019. Interestingly, the usage of gasoline for road traffic decreased, resulting in a reduction of CO2 emissions from total road transport. In 2021, CO2 emissions equalled those of 2020, representing a 15% decrease compared to 2019 and a substantial 24% decrease compared to 2010. These reductions can be attributed to a combination of factors, including improved transport efficiency, reduced travel distances, and the growing adoption of electric vehicles.

Of all individuals over 18 years old, 8% travels daily with public transportation, with a higher proportion observed among highly educated individuals (9%) compared to lower-educated individuals (4%). Notably, cities exhibited the highest percentage of daily public transport users, reaching 14% travelling daily. Although public transport usage experienced a modest 3% increase of distance travelled by bus, tram, metro, and ferry between 2020 and 2021, it remained significantly lower (46%) than pre-pandemic levels in 2019 with 172 km travelled per habitant per year. Also, distance travelled by train has not yet recovered to pre-pandemic levels, with a decrease of 42% in 2021 compared to 2019, which amounts to 549 km travelled per habitant per year.

In contrast, biking, both traditional and e-bikes, witnessed a notable surge in usage, with e-bikes demonstrating a remarkable 26% increase in distance travelled. Bicycling is as a popular mode of transport, with individuals averaging 4.6 bike trips per week. Higher education levels and urban living positively influenced daily bike usage.

Air travel also played a significant role in personal mobility, with 46% of individuals having taken at least one flight within the 12 months preceding the study. Out of these, 88% were for holiday or city trips, 16% for work-related purposes, and 8% for other reasons. The CBS report on "Klimaatverandering en Energietransitie: Opvattingen en Gedrag van Nederlanders in 2020" sheds light on sustainable behaviour patterns across different demographics (Kloosterman et al., 2021). Urban residents were found to exhibit less sustainable air travel behaviour, with approximately 60% of city dwellers having travelled by plane in the past year compared to around 30% of rural residents. Moreover, individuals from high-income households displayed less sustainable travel habits, with 60% reporting having flown in the previous 12 months compared

to 32% of those in low-income households. Interestingly, the sentiment of guilt associated with air travel did not differ significantly between these income groups. The report by Kloosterman also highlighted that a substantial proportion (69%) of highly educated individuals expressed the belief that they should live more climate-conscious lives, while this sentiment was shared by 47% of low-educated individuals. Furthermore, city residents demonstrated a tendency to opt for alternative modes of transportation for short-distance travel, indicating a reduced reliance on cars.

Flying has traditionally been the preferred mode of international travel journeys from the Netherlands. The country has several major airports, such as Schiphol Airport in Amsterdam, which offers extensive international flight connections. However, there has been a growing interest in sustainable travel options, and international train travel has gained popularity in recent years (Ministerie van Infrastructuur en Waterstaat, 2023c). However, flying remains the predominant mode of transportation due to its speed and convenience (Kloosterman et al. 2021). 40% of the flights departing from Schiphol Airport go to a destination below 750 kilometres distance, that's comparable to the distance from Amsterdam to Bazel or Berlin (Ministerie van Infrastructuur en Waterstaat, 2022b). Both international and national governments are working together in initiatives like the transport services provider EuroLink to improve international train connectivity across Europe.

Results

The results of the coding process can be found in Table 15 in Appendix H, showing the ***top-level*** and *parent- and child-codes* after reducing overlap and redundancy of the codes based on the first 7 interviews. This section discusses the results on each sub-question.

The codes are divided into **different Top-Level categories**, briefly described below:

"*Climate Knowledge and Awareness"* reflects the participants' level of knowledge, (un)consciousness, and information about climate change. It includes factors such as common knowledge, education, exposure to climate change information, awareness of disinformation, and the importance of education. This code allows for a comprehensive analysis of participants' awareness levels, sources of information, and the ways in which they engage with and respond to climate change information.

"View on responsibility" reflect the participants' attitude and perception of environmental impact, (future) mobility, carbon footprint, and their view on responsibility divided over the individual, businesses, institutional & structural factors such as the government and innovation & technology.

"Contexts" encompasses the statements about environmental impact, non-mobility contexts and concepts of mobility contexts, divided into daily commute, leisure mobility and the European train system. This category represents various contexts or situations in which individuals engage in mobility-related activities. It allows for analysis of the participants' behaviours, attitudes, and considerations specifically within these different mobility contexts.

"Internal factors" include concepts like guilt, shame, and perceived hypocrisy, which all relate to individuals' emotional reactions and self-evaluation in the context of their mobility consumption and climate consciousness. It highlights the internal reflections and self-evaluations participants may undergo when considering their own actions. Moreover, it includes internal barriers and drivers that play a role in their decision-making processes for their mobility, including incentives that drive their actions.

"External factors" include the participants view on the role that costs, comfort, time and social factors play in their mobility choices. The last social factors include how the interviewees perceive their behaviour in comparison to their surrounding and how social norms have influenced their behaviour.

The last category allows for the analysis of the participants' *"Reducing mobility consumption"*, which captures the participants' likeliness or unlikeliness to enact or have reduced their mobility consumption as well as their personal intentions, preferences, and commitments towards certain decisions.
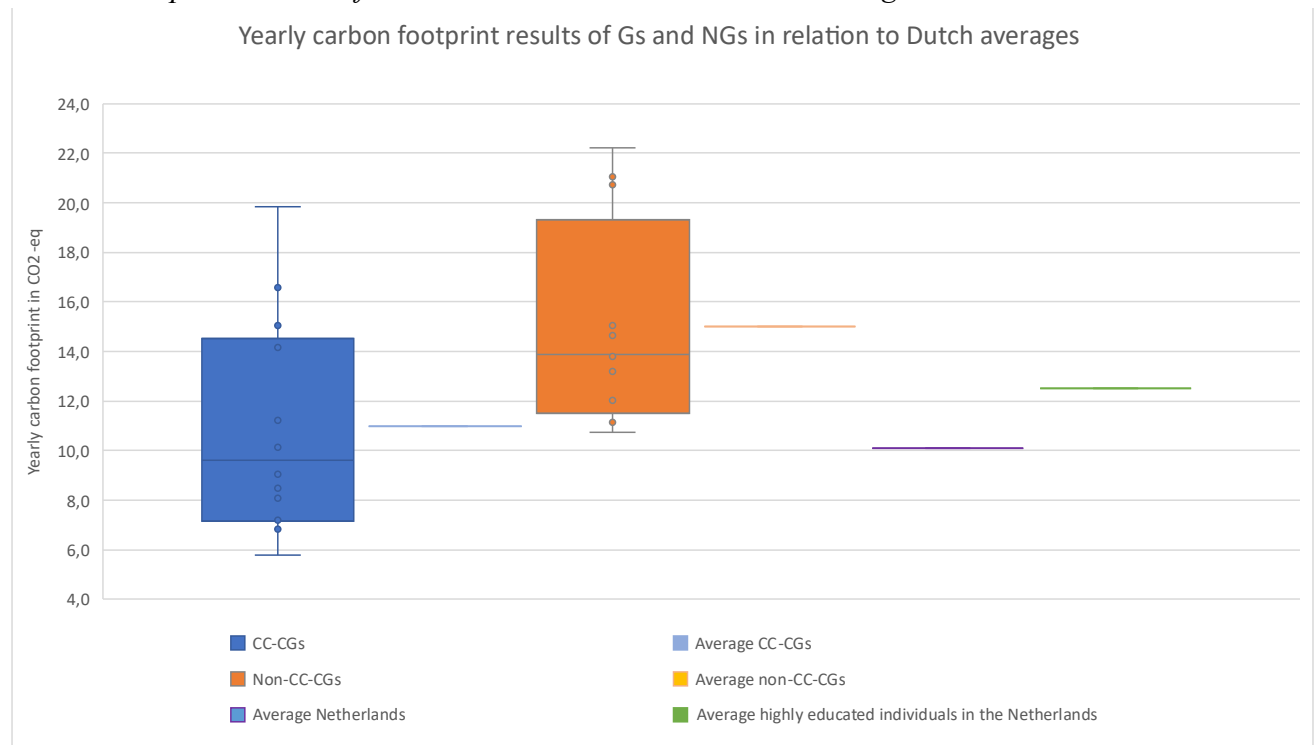
Mobility Consumption

SQ1: How does the mobility consumption and footprint of Climate Change-Conversant Graduates compare to other highly educated individuals?

On average, the participants have a footprint of 12.84 tons CO2-eq per year. Which is more than the average of the Netherlands according to the Klima application (10.08 tons CO2-eq), and less than the average of their similar income class (12.5 tons CO2-eq). Within the sample, climate change education is correlated with a lower carbon footprint than the average for people of the same income level, including other graduates (see Figure 2). The Gs have an average of 10.99 tons CO2-eq, ranging from 5.8 tons to 19.84 tons CO2, while the NGs have an average of 14.99 tons CO2-eq, ranging between 10.74 to 22.20 tons. Noticeably there is a larger variance in footprints among the Gs than the NGs. These differences are mainly due to the divergence in flying behaviour, as six out of the fourteen Gs (G-1, 2, 3, 4, 9, 13) have a smaller air travel footprint than the average in the Netherlands (<0.79), while the other eight range from a yearly air travel footprint of 2.38 to 12.50 tons CO2-eq. In contrast, none of the Gs have a lower air travel footprint than 3.88 tons. Furthermore, the majority of the participants drive up to 5,000 km (65%) per year. The next largest group does not drive at all (15%), which is less than the average in the Netherlands. Four participants have a mobility (driving and public transport) consumption above average, of which one participant drives 5.000-10.000 km, two drive 10.000-15.000 km and one more than 15,000 km.

The results from the footprint calculator are just one indicator of behaviour and are relative to the specific period it was gathered, this means that for instance some individuals that had exceptionally higher air travel last year compared to the years before had a relatively high footprint, which might not have been representative for their average over a longer timeframe. Therefore, the interviews were also focused on understanding individuals' choices. Given that each individual possesses a unique and specific set of circumstances—such as residing at varying distances from their workplace, engaging in frequent or infrequent (work) travel, having international residency experience, and more—it becomes challenging to draw generalized conclusions from the participants' responses. The spectrum of differences is considerable, and due to the constraints of time efficiency this complexity is accepted without delving extensively into it. A more comprehensive explanation of these variations in terms of participants attitude and reasoning for certain mobility choices is provided in the following sections and the following paragraph provides an overview of the mobility consumption of the participants.

Figure 2

Yearly Carbon Footprint Results of Gs and NGs in Relation to Dutch Averages

Attitude on Individual Responsibility

SQ2: What are the attitudes and perceptions of climate change-conversant graduates, compared to other highly educated individuals, on individual responsibility and the importance of reducing personal mobility consumption?

Attitude on Individual Responsibility

Figure 3 shows results from the survey data, indicating that the majority of the participants agree that reducing individual mobility consumption is moderately to very important, leading to a mean responsibility of 3.12. This is in line with the data on another survey question, where the mean responsibility that respondents attribute to Individuals (mean=3.25) is lower than that which they attribute to Politics (mean=4.72) and Business & Industry (mean=4.48), see Table 3.

Figure 3

What do you consider the importance of reducing individual mobility consumption?
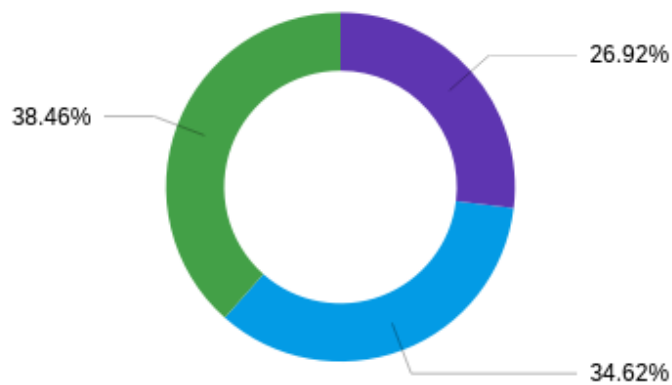
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What do you consider the importance of reducing individual mobility consumption?	2.00	4.00	3.12	0.80	0.64	26

Table 3

How much responsibility do each of the following have in terms of combatting climate change? (1 = none at all, 2 = a little, 3 = a moderate amount, 4 = a lot, 5 = a great deal)

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Politics	3.00	5.00	4.73	0.52	0.27	26
2	Business & Industry	4.00	5.00	4.46	0.50	0.25	26
3	Each individual person	2.00	5.00	3.24	0.76	0.58	25
4	The society as a whole	2.00	5.00	4.19	0.79	0.62	26
5	The industrialised/developed countries	2.00	5.00	4.50	0.80	0.63	26
6	The developing countries	1.00	5.00	2.77	0.89	0.79	26
7	Others, namely	1.00	5.00	3.60	1.50	2.24	5

Based on the interviews, the attitude towards *Individual responsibility* differs among the participants. 18 out of the 23 participants expressed in some way that *individuals can be critical about behaviour to make little differences (G-1, 11, 13, 14, 12, 4, 5, 7, 8, 9; NG-1, 10, 11, 2, 3, 6, 7, 8, 9)*, based on several child-codes as can be found in Table 15. However, also 19 participants are of the opinion that the *individual is not the starting person (G-1, 11, 13, 14, 12, 2, 3, 4, 5, 7, 8, 9; NG-10, 11, 12, 2, 3, 5, 7, 8, 9)* in achieving change, based on the different argument also to be found in Table 15.

A general observation on the entire sample can be made, based on similar child-codes that are found in the two groups about if and how individuals are expected to contribute to combatting climate change in their personal choices. In summary, the participants are of the opinion that individuals could be more conscious about the environmental impact of their consumption and take this into account when possible. Some examples include making thoughtful choices about how you travel and consider climate change when casting your vote for governmental elections. However, many feel like *individual behavioural change does not make enough difference* (G-11, 13, 5; NG-10, 12, 3, 5, 9), because individuals do not change fast enough, and their personal carbon footprint is negligible when compared to the footprint of all individuals and the emission from industry. To help up speed up the process of reducing personal footprints, the participants feel like *individuals need to be guided and nudged* (G-2; NG-11, 12, 5, 7, 9) and there is *need for stimulation and financial incentives for sustainable mobility* (G-11, 13, 14, 2, 4, 5, 6, 7, 9; NG-1, 12, 6, 7, 8, 9).

Some Gs are more nuanced about expecting others to change, but some also feel more strongly about one or the other. For example, there are several quotes of especially Gs about that it is *difficult to expect from individuals not knowing their background* (G-1, 11, 14, 12, 5, 8, 9; NG-8), due to the fact that they have other things to worry about or are not financially able to afford more sustainable choices, so it *can't be expected of individuals to pay more for sustainable options* (G-13, 14, and 7). Interestingly, among the Gs there are also some individuals that feel more strongly about the responsibility of the individual. G2, 4 and 8 feel like *individuals are lazy, don't read into it*, choose what is easiest and make a fuss about being expected to change behaviour. G4 also argues that since *everyone plays a role in the system, thus carries responsibility*. Or like G11 and NG6, who agree that *individuals who can afford a sustainable option, should do it.* Or *individuals feel victimised when expected to change behaviour* (G-11, 14; NG-12).

On the opposite of this are participants with a stronger opinion against the individual responsibility. For some, the *responsibility* of an *individual depends on what they want to contribute* (G-12, 3; NG-10, 11, 5) and G13, G5 and NG12 think *too much responsibility has been put on the individual*, distracting the attention from the industries and governments. The two quotes below show opposite attitudes towards the individual responsibility.

> "Look, I mean, a lot of these studies are about systemic change, so everyone has their role in a system, and I think it's a nonsense argument to say that the individual has almost no influence. That's not true because all these individuals contribute to the current state of the system. So, the individual does have an influence, and while, of course, the impact of a single individual might seem negligible within the context of a vast population, the responsibility does indeed rest with each and every person."[3]
>
> (G4)

> "And I think that perhaps a calculator like this can intensify the discussion around a particular topic where we focus on the individual again. Instead of focusing on the expansion of Schiphol and the fact that it's cheaper to fly from Schiphol to Brussels than to take the train. I believe that decisions like that ultimately have a greater impact, such as cancelling the flight from Schiphol to Brussels. It should be a

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[3] G4: "Kijk, ik bedoel, veel van deze studies gaat over systeemverandering, dus iedereen heeft z'n rol in een systeem en ik vind het een onzin argument om te zeggen het individu heeft maar uh, een-, heeft bijna geen invloed. Dat is namelijk niet waar, want al deze individuen zorgen ervoor dat het systeem nu zo is. Dus het individu heeft wel degelijk een invloed en natuurlijk is het wel één individu weinig op een hele grote bevolking, maar wel degelijk ligt het bij iedereen ligt die verantwoordelijkheid."

decision made by KLM rather than relying on a calculator that shows how much more an individual flies compared to the average Dutch person who goes on vacation once a year."[4]

(G5)

Attitude on Reducing Personal Mobility Consumption

Apart from their attitude towards the expectation of others, they were also asked about their own likeliness to reduce their mobility consumption. The coding scheme is divided into the following categories: *likeliness to (have) reduce(d) mobility consumption*, *personal intentions and preferences*, and *unlikely to reduce mobility consumption*.

Based on the sample, it can be observed that most Gs are consciously thinking about their mobility choices, especially in terms of *leisure mobility*, but also in their *daily and work commute* some deliberately choose to take a more sustainable way of transport, even though that is not always the easiest option. To start with the first category of codes where individuals have shown likeliness to reduce consumption there are a couple of interesting insights. Within the group and the individuals that acknowledge they *used to fly more* (G-12, 2, 4, 5, 8, 9; NG-1, 10, 11, 5, 6, 7, 8) and/or *prefer not to fly anymore* (G-1, 11, 13, 2, 4, 8, 9), most do *allow themselves some exceptions* (G-1, 11, 13, 2, 4, 8, 9; NG-11, 9), more on these exceptions later on. G-12, 5 and all NG's that used to fly more, do not have the intention not to fly anymore. For NG-5 and 10 flying less is due to *more work and less need to travel*, for NG1 and NG11 this is due to changing jobs and only for NG8 and NG6 this is due to trying to reduce their mobility consumption. G-1, 5, 7 and NG4 have *less mobility consumption due to remote working* since COVID and G12 used to have a long-distance relationship. The following two examples are of Gs that have consciously decided to lower their mobility consumption.

"Yes, but it depends on the job, of course. For example, C-makers was located in Hoofddorp, and some people did come by car. But it was also very difficult to reach by public transportation, although I always used public transport."[5]

(G4)

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[4] G5: "En dat ik denk dat het wellicht dus zo'n calculator dus wellicht de discussie kan verharden rondom één topic waarin we het dus weer bij het individu leggen. En niet bij de uitbreiding van Schiphol en dat je van Schiphol naar Brussel kan vliegen en dat dat goedkoper is in je ticket dan met de trein door. Ik denk dat dat soort beslissingen-, het uiteindelijk meer impactvol zou zijn om de vlucht Schiphol- Brussel te schrappen. Dat het een beslissing is van KLM. Dan dat het wellicht-. Het vanuit zo'n calculator komt van jij als individu zit veel meer in het vliegtuig dan de gemiddelde Nederlander die een keer per jaar op vakantie gaat."

[5] G4: "Ja, maar afhankelijk van het werk natuurlijk, want C-makers was dan buiten, was in Hoofddorp. Daar kwamen mensen ook wel in met de auto. Maar dat was ook heel moeilijk te bereiken met OV, maar goed ik ging wel altijd met OV."

"I had actually decided not to fly at all. But now, uh, [laughing], yes, I ended up going with two friends. So, my goal is not to fly. And as a minimum, maybe once every 5 years and for a duration longer than two weeks and such. In recent years, when I go on vacation, it's usually by train. Uh, or by car, for example, when going on a skiing holiday." [6]

(G1)

Moreover, G-11, 8, 9 and NG-12 *decided not to go somewhere due to the lack of sustainable mobility mode*. According to G9, going abroad for a short time is not worth the travel time it would take to go by train. G11, G8 and NG12 have decided not to go somewhere because they did not want to make another trip by plane. A similar code is for the participants that try to *choose locations based on time and justifiable travel mode (G-1, 11, 4, 9; NG-6, 8),* although an interesting note to make is that the Gs within this code have a relatively low footprint (7.18; 8.07; 7.03; 5.80 respectively), while NG6 and NG8 have a yearly footprint of 13.83- and 12.02-tons CO_2-eq. This leads to a next interesting observation which is made, is that the perception on what is extensive or too much flying behaviour differs within the groups, more on this further down.

In the next category, the intention of the participants to reduce their mobility consumption is captured. Generally, most participants have expressed in some way that they have certain intentions or preferences in terms of reducing their mobility consumption. However, this category very clearly shows a distinction in the discourses of individuals. One of the example child-codes is when individual say in some way: *I hope my flying behaviour will decrease* (G-12 and NG-1, 12, 4). An example of this code is the following.

"And yes, I say this with a bit of a sideways glance. I do hope that I will fly less for leisure, that's probably how you would describe it in your piece."[7]

(NG1)

Lastly, the majority of the individuals are unlikely to reduce their mobility consumption. Interesting codes for this are, *I should but I probably won't* (G-12, 6, 8; NG-10, 2, 4, 9), *not as much as I could* (NG-1, 7, 9)*, not flying is not an option* (G-3, 5, 7; NG-3, 4, 6)*, or only if external factors change* (G-3, 5; NG-1, 2, 4, 5, 7).

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[6] G1: "Ik had eigenlijk besloten om helemaal niet meer te vliegen. Maar nu, uuh, [laughing], ja ben ik toch gegaan met twee vriendinnen. Dus mijn streven is om niet te vliegen. En dan als minimum misschien dan een keer per 5 jaar en dan langer dan twee weken en dat. En als ik op vakantie ga, is het afgelopen jaren meestal met de trein. Uuh, of met de auto bijvoorbeeld op skivakantie."

[7] NG1: "En ik, ja, maar dat zeg ik wel een beetje met een schuin oog. Ik zou hopen dat ik minder ga vliegen voor recreatie, zo ga je het waarschijnlijk noemen in je stuk"

Analysing the division of participants over the child-codes, have resulted in roughly two categorisations of participants. There is a remarkable overlap of individuals that have consciously taken steps to change their consumption towards more sustainable choices, compared to participants that either have shown little to no steps at all to have changed or change their consumption in (near) future.

The following participants have taken moderate to strong steps to reduce their mobility consumption: G-1, 10, 11, 12, 13, 14, 2, 4, 6. 8, 9; NG-11, 12, 3, 6, 8. Figure 4 shows how the codes related to 'have taken moderate to strong steps towards action' are relatively distributed over the previously listed participants. Participants with a larger square have more references related to the likeliness to have reduced their mobility consumption and the following external and internal factors. For example: G-2, 4, 6, 8 and NG-12, 6 say they have *taken the train instead of flying even though it was more expensive*. One exception is G6, who is not part of the above list, but as elaborated more later on, the decision for the more expensive train was not due to environmental consideration. Also, G9 and NG8 say they are *willing and able to afford a more sustainable mode,* so that is not a barrier to them. In terms of time differences, G-11, 12, 9 and NG-6 agreed that the *travel time is seen as a disadvantage but not as a barrier*, although they would like it to improve. This attitude overlaps with G-10, 11, 14, 2, **3**, 4, 9; NG-6, these participants (mostly Gs) seem willing to travel longer for a more sustainable mobility mode. The following two Gs both pay more and spend more time to take the train within Europe, but understand that others would not:

"If trains were as expensive as flights, many more people would also find it attractive, at least within Europe, to travel by train."[8]

(G2)

"Yes, it's very expensive and I get it, but also because you don't pay the real price of flying, but-, that makes it even less accessible."

(G4)

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[8] G2: "Als de trein even duur zou zijn als een vlucht, dan zouden ook veel meer mensen het aantrekkelijk vinden, om in ieder geval binnen Europa met de trein te reizen."

Figure 4

Relative distribution of references of codes related to having taken moderate to strong steps to reduce mobility consumption
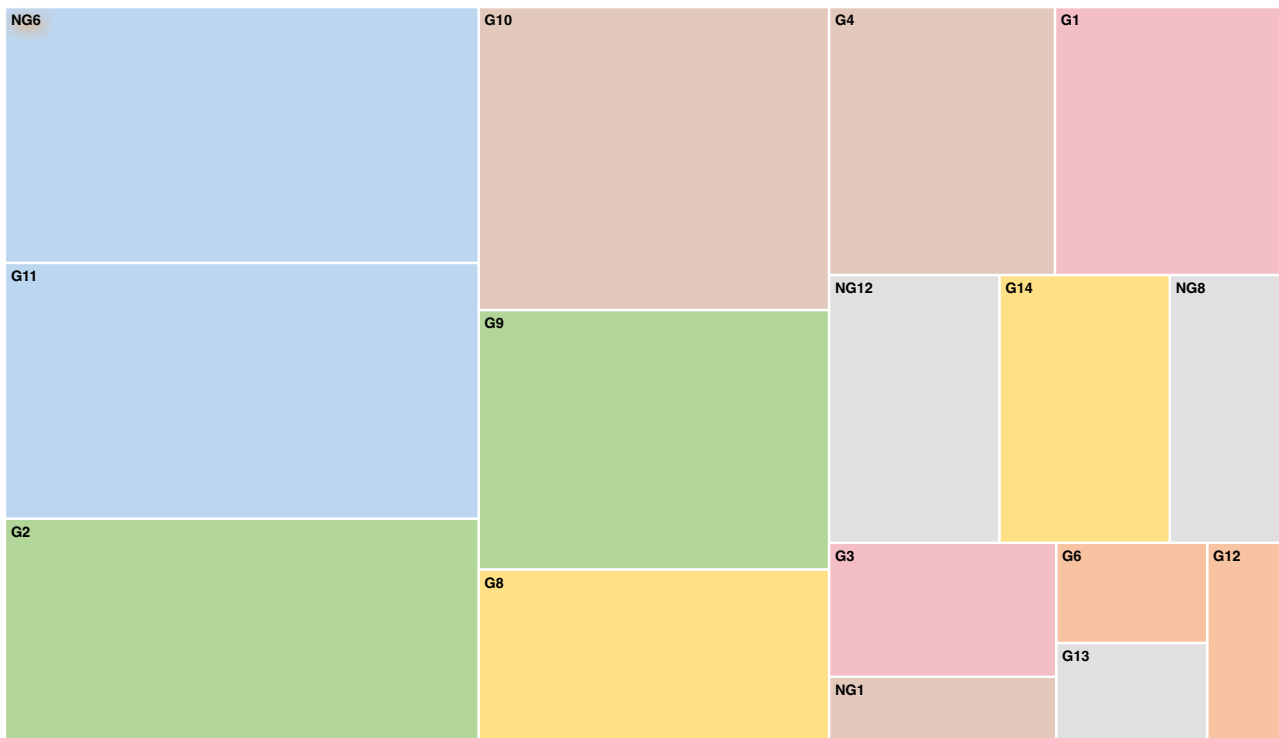
Note. The larger the square the more steps a participant has taken to reduce their mobility consumption.

On the contrary of the above type of participants – although there is some overlap - , are the following participants, that have shown any of the codes related to *unlikely to reduce consumption* and therefore seem to have taken weaker steps towards action: G-12, 3, 5, 6, 7; NG-1, 10, 2, 3, 4, 5, 6, 7, 9. Figure 5 shows how these participants are represented in the references to *unlikeliness to reduce consumption.* An explanation for the observation that they have taken weak steps towards action could be based on their attitude on their personal responsibility, as they acknowledge that they *do not take climate change in consideration for location or mobility mode* (G-3, 5, 6, 7; NG-10, 2, 3, 5, 7, 9). Examples of these are the following:

> "When I'm flying? No, I don't think like that in a way that others think about that. I fly-, I would also-. I have a wedding in October in Southern Italy, and that's a weekend and then I also fly, so it's not-. It doesn't stop me from doing those things."[9]

(G5)

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[9] G5: "Als ik vlieg? Nee, ik denk niet in de manier dat anderen daar over nadenken. Ik vlieg-, ik zou ook-. Ik heb een trouwerij in Oktober aan de aan-, in Zuid-Italië, en dat is een weekend en dan vlieg ik ook, dus het is niet-. Het stopt me niet van die dingen te doen."

"I notice that concerning my flying behavior that it is not-, that I don't consciously make choices to do or not do things for the environment. I think I am just at a point where I'm just not going away as much or fly at the moment, but that can vary a lot from year to year."[10]

(NG3)

G-12 and NG-1, 4 have no reference to not considering the environmental impact, but NG-1 and 4 are not willing to change behaviour *unless external factors change,* and G-12 acknowledges that they *should take steps but probably won't.*

Figure 5

Relative distribution of references of codes related to having taken moderate to strong steps towards change per participant
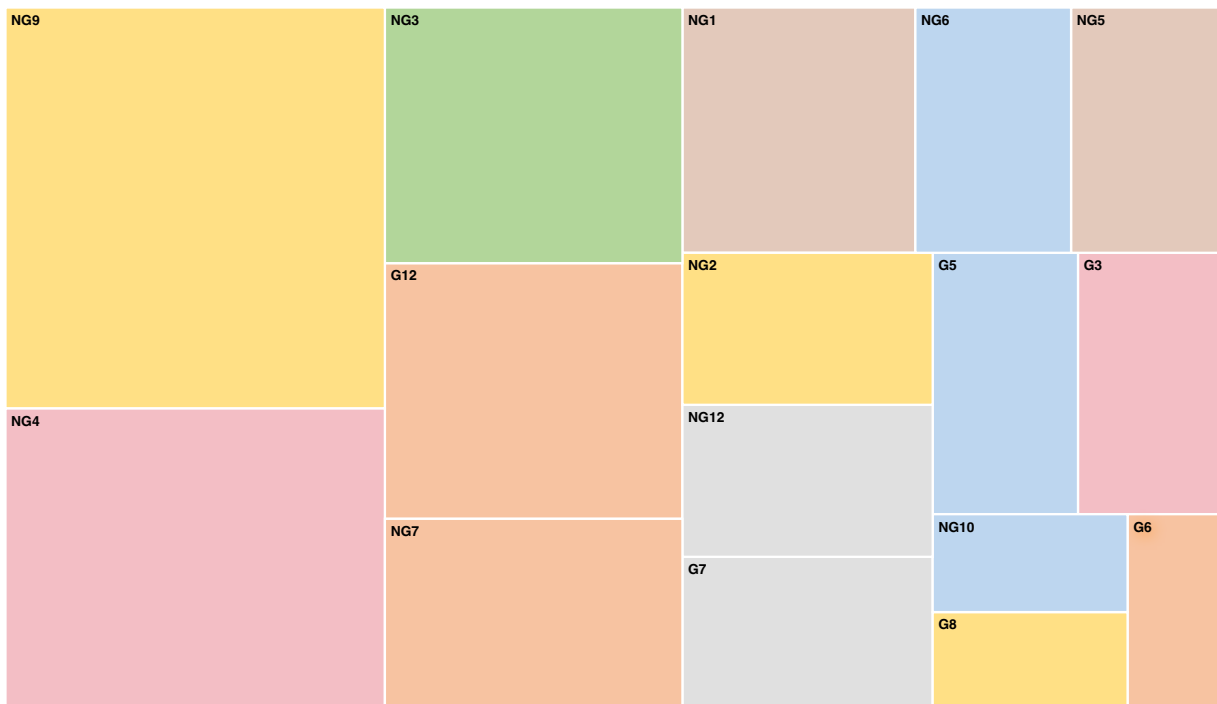
In summary, a great difference can be observed between individuals that have taken moderate to even strong steps to reduce mobility consumption, for some also resulting a n actual lower footprint as discussed in the results on the first sub-question. Figure 6 and Figure 7 show how the references of codes related to steps taken to reduced consumption are distributed over Gs and NGs. Showing a clear difference of how within this sample, the Gs have taken more steps.

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[10] NG2: Ik merk dat ik mijn vlieggedrag daar niet, dat ik niet bewust keuzes maak om dingen wel of niet te doen voor het milieu. Ik denk dat het gewoon op een punt zit dat ik gewoon niet zo heel veel wegga, dan wel vlieg op het moment, Maar dat kan heel erg wisselen per jaar.

Figure 6

Number of references related to having taken moderate to strong steps towards change by Gs vs NG

Have taken moderate to strong steps

Figure 7

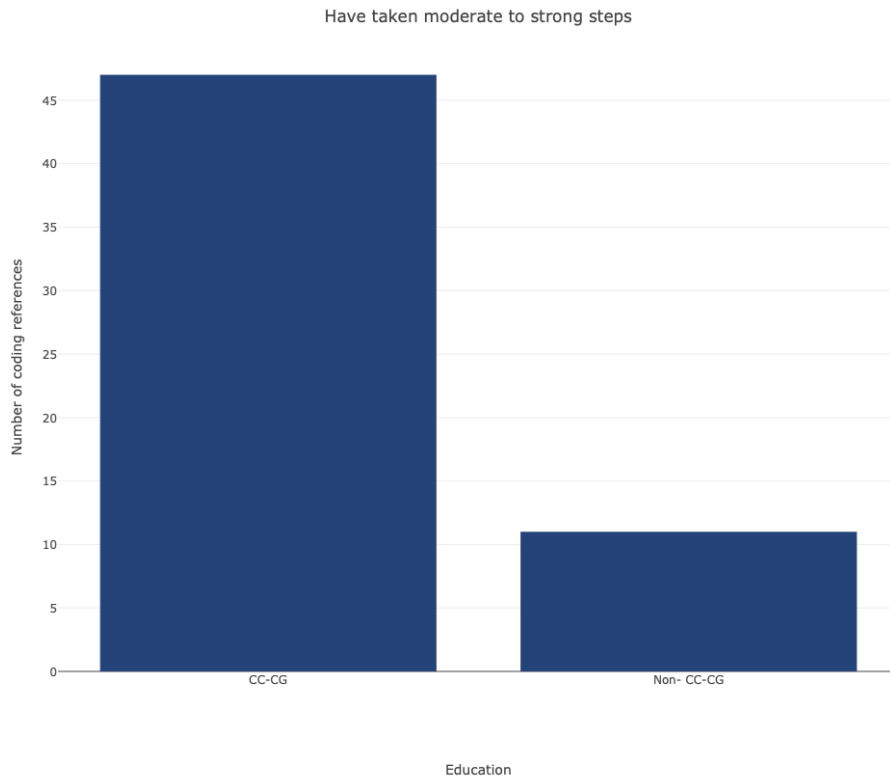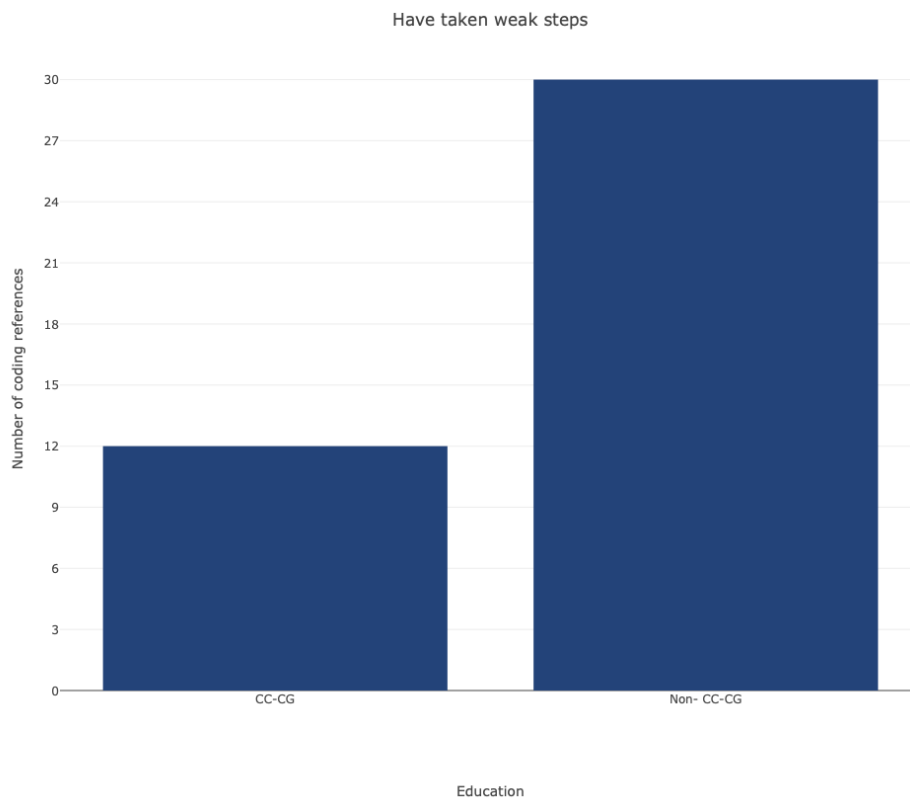*Number of references related to having taken weak steps towards change by Gs vs NGs*

Have taken weak steps

Perception on Frequent Flying Behaviour and Long-distance Travel

As mentioned before, there is an interesting finding on the perception of what is frequent flying behaviour or what is perceived as not that much. On one hand, there are individuals that perceive certain behaviour, like flying 2 or 3 times per year as "not that much" or think about restricting their flying to a maximum of 3 times (see examples below). On the opposite are some examples, of Gs, that perceive their own behaviour as too much, although in their case that is flying ones every 5 years (G1), or like G10 and G11, who both feel bad about the one flight they had in a time period of 5 years. Examples of the participants that have a perception on frequent flying behaviour which is still above the average of the Netherlands are the following:

"I think, I've been with Company X for 4 years now, I think I've gotten on a plane 3 times since, so actually that's negligible." [11]

(NG4)

"I've never really thought about it that directly before, but I, I can actually relate to that. Maybe at some point, you do find yourself saying, 'I, I, I'll just fly a maximum of 3 times a year, and I'll choose those instances very carefully, maybe 2 times or I don't know, perhaps even just 1 time."[12]

(NG9)

"And well, longer vacations, well, I don't do that much, it is also a matter of budget. I think 2, 2 or 3 flying vacations a year, something like that."[13]

(G6)

"Yeah, I do have a certain opinion, but not-. I think I focus more on the individuals themselves. I mean, it's like, it's just unnecessary, you know? You know, well, then you see on Instagram again, like, someone's in one place and then they're flying to another, and then they're off to another, and like, six months later they're back there. And I'm thinking, why not just take one big trip a year instead of eight times a year? Maybe it's jealousy, perhaps Instagram has a role to play. Social media might actually encourage flying."14

(NG10)

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[11] NG4: Ik denk, ik zit nu 4 jaar bij Company X, Ik denk dat ik 3 keer In het vliegtuig ben gestapt, dus eigenlijk is dat wel te verwaarlozen.

[12] NG9: Ik heb daar nooit echt zo direct over nagedacht, Maar ik, Ik kan me best wel vinden, om dat je Misschien op een gegeven moment inderdaad tegen jezelf zegt, van ik ik, ik vlieg gewoon Max 3 keer per jaar en en die kies ik heel zorgvuldig of 2 keer of I don't know, Misschien zelfs maar 1 keer.

[13] G6: En ja, langere vakanties, ja, doe ik niet zo heel veel, is ook een kwestie van budget. Ik denk 2, 2 a 3 vliegvakanties per jaar, zoiets.

[14] NG10: Ja, ik heb wel een bepaalde mening, maar niet-. Heb Ik denk ik meer op De individuen zelf. Dat Ik denk, Het is toch, het is toch niet nodig. Weet je, Ja, dan zie je weer op Instagram, zie je weer van, De een zit daar en die vliegt door naar daar, en die vliegt door naar daar en en een half jaar later zit weer daar daar daar Ik denk van, ja, je kan toch ook een keer per jaar een leuke reis maken? En niet 8 keer per jaar? Misschien is het wel jaloezie, misschien speelt Instagram er wel een rol in. Misschien stimuleert Instagram wel, of sociale media wel, vliegen

Aside from the perception on frequent flying behaviour, the interviews also gave some interesting insights in the differences in attitude towards short- versus long-distance (air) travel. Some argued that they are willing to reduce short-range flying, but *probably won't change long-distance (G-12, 14; NG-2, 6, 7, 9).* Others argue how their attitude has changed towards long-distance flying and that they will *only travel long-distance for longer period (G-10, 11, 2, 9; NG-6, 8). Underneath are two examples of these intentions.*

"I do have plans to take a long trip again, but well, I wouldn't quickly fly to another continent for less than 3 weeks."[15]

(G2)

"Actually, personally for myself, I just won't fly within Europe anymore. And if I were to travel for an extended period, I would fly, but I would want to spend at least 3 months there or something."[16]

(G10)

Perceived Hypocrisy & Cognitive Dissonance

SQ3: How do climate change-conversant graduates, compared to other highly educated individuals, perceive the potential disparity between their knowledge and their personal mobility consumption?

The interviews have shown several examples of individuals experiencing any of the indicators for cognitive dissonance. Feelings of distress, anger, guilt, and shame are experienced among both groups, as well as the perception of their own hypocrisy. By sharing the total carbon footprint of the participants in the interview, their response and emotion towards their mobility footprint was triggered. Within this sample, the different types of emotions are not easily correlated to the sample group they belong to. Only the *acknowledgment of lack of knowledge* is found in the NGs group (NG-10, 12, 2, 3, 4, 6, 7). The following paragraphs provide examples of why, in which way and by whom these indicators were recognised.

Perceived hypocrisy is recognised among both groups (G-1, 13, 12, 5; NG-1, 10, 2, 4, 5, 8, 9). Examples of these are about the purchase of an electric bicycle, about wanting to travel to explore beautiful

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[15] G2: Ik heb wel plannen om weer eens een lange reis te maken, maar dan ja, ik zou niet zo snel naar een ander continent vliegen voor minder dan 3 weken.

[16] G10: Eigenlijk voor mezelf persoonlijk wil ik, Ik ga gewoon gewoon niet meer in Europa vliegen. En Als ik op reis zou gaan voor langere tijd, dan zou ik wel vliegen maar dan zou ik wel minstens 3 maanden daar willen zijn ofzo

places but knowing that with travelling these places get destroyed, or when they say that individuals should

contribute but acknowledge that they personally don't, like in the quote below:

> "And that, so that's difficult for me to say because I know it's good if people contribute their part to combat climate change. But when I look at myself and whether I actively do that and make choices to contribute to it, then I actually think hardly. And yes, maybe I'm going too deep into that now, but if the question is why? I also find it difficult to answer because I feel like I, as an individual, cannot make a difference."[17]

<div align="right">(NG2)</div>

> "Yes, I do think about that, I do think about that, it doesn't stop me from doing it, apparently, so what you're seeing is, even though I have the rational information that I'm still acting irrationally."[18]

<div align="right">(G12)</div>

Participants of both groups experience negative feelings towards mobility choices. Either they *experience(d)*

anger (G-1, 9; NG-8), frustration (G-11, 4, 8; NG-6, 8) or *distress about mobility choices* (G-11, 14, 12, 4, 6;

NG-11, 6), others *feel bad about past and current behaviour* (G-12, 7, 8; NG-3, 4, 6, 7, 9).

> "And, well, the feeling about it is perhaps a somewhat pessimistic approach, but yes, it has also been somewhat neutralized over the past 6 years because, well, since I've been dealing with it for so long, the anger does diminish a bit."[19]

<div align="right">(G1)</div>

> "But I have indeed travelled a lot by plane in the past year. It's been, I think, about 6 or 7 times, maybe even more. That's really not good."[20]

<div align="right">(G7)</div>

Shame is experienced by G-1; NG-4, 5, 6, 8 and not experienced by G13 and NG2. The concept of shame is

more used in the context of social relations and for some only experienced when flying behaviour is discussed

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[17] NG2: En dat-, dus dat vind ik lastig om te zeggen, omdat ik weet dat het goed is als mensen dus hun steentje bijdragen om klimaatverandering tegen te gaan. Maar als ik dan naar mezelf kijk of ik dat zelf ook actief doe en of ik keuzes maak om daar dus aan bij te dragen, dan denk ik nou eigenlijk nauwelijks. En ja. Misschien ga ik dan nu te diep daar al op in, maar als de vraag dan waarom? Dat vind ik ook moeilijk te beantwoorden, omdat het m-, dus het gevoel heb alsof ik als individu niet het verschil kan maken.

[18] G12: Jawel, daar denk ik over na hoor dat dat daar denk ik wel over na, het weerhoudt me niet om het niet te doen, Blijkbaar hè, Dus wat je ja dus dan zie je toch ook wel, ookal heb je de rationele informatie dat ik alsnog irrationeel handel eigenlijk

[19] G1: En, maar het gevoel erbij is een beetje misschien pessimistische insteek, maar ja, ook wel een beetje geneutraliseerd in de afgelopen 6 jaar, omdat het ja, omdat ik er al zo lang mee bezig ben vlakt het toch een beetje af, de woede.

[20] G7: Maar ik heb wel echt veel In het vliegtuig gezeten afgelopen jaar. Dat is wel, afgelopen jaar, is denk ik wel 6/ 7, nee wel vaker waarschijnlijk, dus Dat is echt niet goed.

with friends (G-13; NG-1). In the following example, shame causes social groups to choose for a sustainable travel mode:

> "And in general, there is quite a bit of flight shame, I think. So, in group settings, like when I go somewhere with my year club or a group of friends from Amsterdam, it's often like, 'Oh, can we take the train instead? Because otherwise, I'd rather not go.' Or 'Shall we all rent a car together?' So, that is quite common, and it can be discussed."[21]

> (G1)

One very interesting example of shame is the following, where the following participant used to be ashamed by trying to make climate conscious choices and she would adapt to her surrounding because of it.

> "In the beginning, I was really accommodating, but now I really just think, like, sorry, but as a society, we have reached a point where I don't need to be ashamed anymore if I care about the climate."

> (NG6)

A similar code is when participants shared their *frustration about trying to do what feels right* (G-4, 8; NG-6, 8)*,* they sometimes even feel like a 'nag' when trying to convince others to consider taking a more sustainable mobility mode or change the holiday destination if it is not reachable by train.

> "Well, either keep insisting on your point or simply make a different choice. Yeah, but you always feel like a nag."

> (G4)

> "Yes, because sometimes you're perceived as a nag, and also because now, for example, with those 6 people going to Italy and those going to Spain, nobody goes with me, and I just find that annoying because, of course, I would prefer to travel with someone else."

> (NG6)

For some, the guilt (experienced by G-12, 4, 7; NG-10) does not withhold them from making a certain mobility choice, because other factors play a bigger role in the decision-making process, more on this in SQ4. It is mainly NGs that acknowledge they do not experience any guilt at all when making certain mobility choices (G-11,14; NG-11, 12, 2, 9). Among these participants, the Gs and NG-12 and 11 have already taken steps to reduce their consumption and explain decisions to be well-considered, therefore don't feel guilt.

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[21] G1: En over het algemeen is er wel redelijk wat vliegschaamte denk ik, dus er wordt wel vaak gezegd in groepsverband als ik met mijn jaarclub of een groep vriendinnen uit Amsterdam ergens heen ga, is het vaak wel oh maar kunnen we ook met de trein, want anders wil ik liever niet. Of zullen we met zn allen een auto huren? Dus dat is wel redelijk, dat kan wel besproken worden.

"Uhh. I think in that case I'm really deflecting it and mostly thinking something like, they should have arranged it better or they should have made it cheaper, or let's say, I place the blame outside myself. I can't feel very guilty about it then."[22]

(NG12)

Moreover, as mentioned in the introduction, the response of the participants to hearing their own carbon footprint was captured based on whether it surprised them or not. The majority of Gs is not surprised by hearing their footprint (G-1, 10, 11, 13, 14, 2, 3, 4, 5, 6, 9; NG-11, 12, 5, 7, 8, 9), while the majority of NGs is surprised or even shocked by hearing their results (G-12, 7, 8; NG-1, 10, 2, 3, 4, 5, 6). The Gs that were surprised have a higher footprint than the Dutch average and the NGs that were not surprised have also shown likeliness to have reduced their mobility consumption or intention to. Most participants that were surprised, were mainly surprised by the large carbon footprint of flying, both the Gs and the NGs in this group. Underneath are a view example quotes of responses to hearing and seeing their carbon footprint:

"Yes, I do find it unfortunate, I do find it unfortunate, and also a bit surprising. I knew that flying had a significant environmental impact, but not that it was so intense."[23]

(G7, surprised)

"Yes, I feel really bad about it. I feel genuinely bad that I have such a strong feeling that I'm putting in effort, but in reality, and especially, I find it a stark confrontation with the Amsterdam bubble. Because, as I mentioned to you, I thought, "Compared to my friends, I'm doing a lot." But when you see this, it's really not the case at all. It's like, it's true for my friends, but it's just not the same. It's like, you think you're doing well, and then you realize that you're actually doing much worse than the rest of the Netherlands."[24]

(NG6, surprised)

"Yes, I've done this before too, and I know it always turns out higher, or that it... and I think that's also... that's obviously not a surprise. I don't think I lead a lifestyle that aligns with, what I'm saying in terms

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[22] NG12: Uhh. Ik denk dat ik het dan heel erg van me afschuif en vooral zoiets denk, hadden ze het maar beter moeten regelen of hadden ze het maar goedkoper moeten maken of het-, zeg maar dan zoek ik de schuld buiten mezelf. Ik kan me daar dan niet heel schuldig over voelen.

[23] G7: "Ja vind ik wel jammer, vind ik wel jammer ja dat, en verbazing toch ook wel een beetje. Ik wist dat het vliegen zwaar telde, maar niet tot het zo heftig was ook."

[24] NG6: "Ja, Ik vind het echt heel erg. Ik vind het echt heel erg dat ik zo, dat ik dat ik zo erg het gevoel heb dat ik mijn best doe en dat het dus eigenlijk en dat ook vooral, ik vind het ook een heel erg confrontatie met de Amsterdamse bubbel, want dat ik dus ook tegen jou zei Van ja, in vergelijking met mijn vrienden doe ik heel veel en Als je dit dan ziet, dan is het dus echt helemaal niet. Of zeg maar, Het is dus waar voor mijn vrienden, maar dan is het dus helemaal niet alsin, Dan denk je dus dat je goed bezig bent en dan zie je dat je echt veel slechter bezig bent dan de rest van Nederland."

of education and financial opportunities, perhaps the average for the Netherlands. Well, I'm not sure how to put that politely. But I'm already aware of that."[25]

<div align="right">(G5, not surprised)</div>

"Um, yeah. I don't know, I find it relatable. It's not very surprising to me, but also, what I think is, "Oh yeah, I am, indeed, putting in effort, so I am, in fact, below that average." That does make sense."[26]

<div align="right">(G9, not surprised)</div>

"Yeah. No, those numbers don't sound familiar, but I don't find it surprising that I am indeed well above the Dutch average, considering my flying behavior."[27]

<div align="right">(NG9, not surprised)</div>

Lastly, the perceived hypocrisy of some of the participants is sometimes recognised and *acknowledged as a privilege and entitlement* (G-1, 12, 14, 2, 4, 5, 6, 8; NG-12, 2, 4, 5, 7). There is no clear relation, however, with those that have reduced their mobility consumption and those that have not.

"You know, it was a real privilege to be able to do and see all of that, but yeah, I didn't feel entirely comfortable with it or something."[28]

<div align="right">(G6)</div>

Justification Strategies

SQ4: What are the underlying factors and reasoning that climate change-conversant graduates, compared to other highly educated individuals, provide as justifications for their mobility consumption?

The interviews have resulted in a wide range of factors and reasons that the interviewees consider in their mobility decisions. They have been divided *in external factors*, like *comfort, time, social factors* and *costs*, and *internal factors*, such as motivational *drivers* and *barriers*. The following paragraphs are structured

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[25] G5: Ja, ik heb dit ook wel eens gedaan en ik weet dat het altijd hoger uitkomt, of dat het-, en ik denk dat dat ook-, dat is natuurlijk geen verrassing. Ik denk ook niet dat ik een levensstijl leid, wat ik zeg qua opleiding en qua financiële mogelijkheden, wat het gemiddelde van Nederland wellicht is. Ja, ik weet niet hoe ik dat nou netjes moet zeggen. Maar, daar ben ik nu al bewust van.

[26] G9: Uhm. Ja. Ik weet niet, Ik vind het wel herkenbaar. Ik vind het niet heel verrassend, maar ook wat Ik denk, Oh ja, ik zit, doe er inderdaad mijn best voor, dus ik zit inderdaad al onder dat gemiddelde. Dat klopt dan ook

[27] NG9: Ja. Nee komen niet bekend voor, maar Maar dat ik inderdaad dubbel het Nederlandse average ben, vind ik niet vreemd gegeven het vlieggedrag.

[28] G6: Weet je het was een heel erg privilege om dat allemaal te mogen doen en zien, maar ja, ik voelde me er niet helemaal comfortabel bij of zo.

in a way that first general findings among all participants are presented, then some remarkable differences between Gs and NGs, followed by differences within Gs, and lastly some odd exceptions.

The practical factors like costs and comfort prevailed in the justifications of all participants. Examples of these are the *comfort of a car for travel within Europe*, which is sometimes seen as a substitution for air travel, but other times used as justification for not choosing to travel by train. Mostly NG's (-10, 11, 12, 2, 4, 6) and two G's (14, 2) are saying that *mobility is mostly a financial consideration* and there is a general understanding among both groups that *European trains* (G-12, 13, 12, 2, 4, 5, 7, 9; NG-11, 12, 2, 4, 7) and *national public transport* (G-14, 5, 6, 7; NG-12, 6) *are too expensi*ve. This code has some similarities with the *attribution of blame* (G-11, 14, 2, 9; NG-11, 12, 4, 9), where individuals blame their job/boss for travelling or blame it on other external factors like prices, their number of vacation days or the fact that as long as it's this easy and affordable to fly it is not their responsibility to choose another option. Another justification, where the interviews have placed the responsibility elsewhere is when they *describe the consequences of their mobility choices as needs* (G-1, 10, 11, 3, 4, 5, 8; NG-1, 10, 12, 2, 3, 4, 5, 7, 8, 9) is an important justification used by many. They 'need' to go to work, or they have/had to travel for their job.

In terms of internal factors, the majority of the participants relied on the following set of justifications, were *one's own comfort and desires are more important than the environment* (G-11, 12, 3, 5, 6, 7, 8; NG-1, 10, 11, 12, 2, 3, 4, 6, 7, 9). Within this theme, there are different barriers to reduce mobility consumption at all or more than they already do. Considerations in this are the negative effects on one's happiness due to not being able to see certain family members that live abroad (G5) or not being able to explore new countries. The justification that *family or friends or partner lives abroad* also accounts for G-1, 11, 12, 13, 14, 5, 6, 8 and NG-11, 2, 6*. Other strategies used are that *life is too short (*NG-10, 4)*, participants *want to explore the world* (G-11, 12, 3, 7, 8; NG-10, 12, 4, 6, 9)*, are *working hard to enjoy holidays* (G-8; NG-10), and *don't want to miss out on anything* G-7; NG-3, 4, 6).

> "That's it. I do want to contribute, but I'm not going to completely revamp my life for it. And that's the tricky part, you know, that's what everyone says. So, I do try to do things where I can, like I seriously considered buying an electric car, we have renewable energy sources, we eat less meat. I really try to

take these things into account. But I do notice that when someone says, 'Hey, let's take an awesome trip to South America,' I just go, 'Okay, sounds good,' and I don't even think about the flying or its impact."[29]

(NG3)

Within this strategy, there are some participants that do not use a specific justification for their behaviour and are simply accepting the self-centredness of these choices: *I know it's selfish, but I will still do it* (G-6, 7; NG-1, 10, 2)

"Yeah, you know what's annoying? I mean, I've learned it all, know exactly what I can do, you can go vegan, you can, well, do bike vacations indeed. There are so many possible options, but in the end, I still enjoy just doing things the way I always have. And I don't want to give up too much, ultimately, it's just a bit of selfishness. So. I know what I can do, and yet I don't do it."[30]

(G7)

In the following paragraph some distinctions in reasoning between the two groups are outlined. To begin with justifications that have mainly been used by NGs. Starting with the perception on time efficiency. G-5, 6, 7; NG-1, 10, 12, 4, 5, 7, 8, 9 all consider the *time efficiency of flying the most important barrier to a more sustainable travel mode*. Especially *European train travel times are seen as an important barrier* (G-5, 9; NG-1, 10, 11, 12, 2, 3, 4, 7, 9). Opposed to this are, mostly Gs who advocate for the *possibility to work on public transport,* so don't see longer travel times as a justification. The first two quote show an opposite perception on travel time to London and the second two on travelling a longer distance in Europe.

"But I think, yeah, a train to London might sound nice. However, if it takes 8 hours and is very expensive, then of course people would opt for a plane. But then again, if there's a viable alternative that's not much more expensive and takes a bit longer, that's okay, you know. When I was going to Copenhagen, I looked into taking a train, but it was not feasible. It wasn't affordable, and it took so long. At that point, you think, "Yeah, I'm only going for 3 days. I might as well spend an hour on a plane."[31]

(NG4)

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[29] Dat is die, Ik wil wel bijdragen, Maar ik ga er niet mijn leven op aanpassen. En Dat is Natuurlijk het lastige, hè, dat is wat iedereen zegt, dus ik Ik probeer wel op plekken waar dat kan dingen te doen, dus Ik heb echt wel overwogen een elektrische auto gekocht, we hebben van de bron energie, ik probeer, weet je, we eten minder vlees. Ik probeer echt met dit soort dingen wel rekening te houden. Maar ik merk wel dat als iemand zegt, hé, Laten we een vette trip maken naar Zuid-Amerika, dat ik dan denk ik, oké, is goed en dat ik dan echt niet nadenk over de vliegen over het vliegen.

[30] G7: Ja, ik, ja, weet je wat het lullige is, ik bedoel, Ik heb het allemaal geleerd, weet precies wat Ik kan doen, je kan vegan worden, je kan, nou ja fietsvakanties gaan doen inderdaad. Er zijn zoveel mogelijke opties, maar uiteindelijk vind ik het toch wel leuk om gewoon dingen te blijven doen. En Ik wil niet teveel inleveren Uiteindelijk ook, Het is gewoon een beetje egoïsme. Dus Ik weet allemaal wat Ik kan doen, en toch doe ik het niet.

[31] Maar ik denk ja, leuk hoor zo'n trein naar Londen. Maar ja, Als het 8 uur duurt en heel duur is, Ja tuurlijk kiezen Mensen dan voor het vliegtuig, maar ja, wanneer daar gewoon een goed alternatief ligt die niet heel veel duurder is en ietsje langer is oke, maar zeg maar. Ik heb toen ik naar kopenhagen ging gekeken voor een trein, was niet te doen. Niet te betalen, duurde Super lang en dan denk je, ja, Ik ga maar 3 dagen, Ik kan ook een uur on het vliegtuig zitten.

"I often chose the train too. Whenever possible, I would opt for the train, primarily because those short flights don't make sense environmentally, but also because the train is just incredibly relaxing, in my opinion. You can travel from Amsterdam to London in 4 hours, from city centre to city center. I think door-to-door, the train doesn't take much longer, and I find it a peaceful way to travel. You can just sit back, get some work done, or read a book."[32]

(G12)

"Yeah, I find that really cool, and I'm actually debating whether I'll do that or not, because it would take me 3 days instead of just 1 day to get somewhere. And, from a selfish standpoint, that means I'd have to use up two more of the 25 vacation days I have, just for traveling."[33]

(NG1)

"Yeah, what worked out really well and what I also appreciated was that it took a day to travel each way, both there and back. And we just worked on that day, all three of us. So, that was quite chill."[34]

(G2)

Interesting justifications, only recognised among NGs who have taken less steps to change their mobility consumption, is that *nobody in surrounding is committed to not flying* (NG-4, 7, 9) and that *mobility choices perceived as a habit* (NG-1, 2, 3, 9) for themselves or for people in their surroundings. The following two quotes by the same participant exemplify these justifications.

"They don't even think for a second about considering an alternative. Maybe they also dutifully click on CO2 compensation due to a sense of guilt, but maybe not even that." [35]

And:

"Yeah, it's like, for a part, it's just habit, you know? You find it completely normal to hop somewhere for a long weekend. In September, I'm going with my dad to Rome to watch the Ryder Cup golf matches. Yeah, we're flying to Rome for a weekend, and we don't even think about it because in the excitement of 'We're going there,' we just click on those flights, and then it's done, you know? It's become such a

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[32] G12: Ik pakte ook vaak de trein, Als het kon, pakte ik de trein, omdat het Natuurlijk hè, Die korte vluchten die slaan nergens op wat betreft het klimaat, maar ook omdat de trein gewoon super relaxed is, vind ik, Je kan vanaf Amsterdam naar Londen met 4 uur van Van centraal naar midden In de stad en Ik denk deur tot deur dat je er niet langer over doet met de trein en Ik vind het relaxed reizen omdat je gewoon lekker kan gaan zitten, gewoon wat werk kan doen, of een boekje kan lezen.

[33] NG1: Ja, dat vind ik heel cool en ik zit, ik zit te twijfelen of ik dat ga doen of niet, want het kost me wel 3 dagen in plaats 1 dag, om ergens te komen. En, dat betekent nogmaals vanuit egoïstisch perspectief dat ik gewoon twee dagen meer moet opnemen van van de 25 die ik heb, om te reizen.

[34] G2: Ja wat echt super goed beviel en ook waarvan ik dan, dat was wel een dag reizen heen en, zowel heen als terug. En die die dag hebben we dan gewoon een werkdag allebei, alle drie gepakt. Dus dat was echt heel chill.

[35] NG9: "Denken er geen seconde over na om om naar een alternatief te kijken. Klikken Misschien wel allemaal ook braaf vanuit een soort schuldgevoel CO2 compensatie aan, maar Misschien zelfs dat niet eens."

routine, like, for 25 or 30 years, to just fly everywhere for fun. So, it takes quite a while to break out of that and start giving up things due to the impact it has." [36]

<div align="right">(NG9)</div>

There are still quite some justifications undiscussed, where it is especially interesting to look at the differences within Gs. It seems like the reasoning and justifications differ for those that have taken moderate to strong steps to reduce their mobility consumption (seen in the results section SQ2) and those that have mere intentions or acknowledge to have taken weak steps in reducing consumption. An example of the former is those who justify that their *mobility is for a higher cause* (G-10, 14, 2, 8; NG-11, 8), like helping local organisations in Liberia to protect them against floods (G-10) or going to climate conferences (G8). Those that have showed less likeliness to reduce consumption feel like they are *acting according to the limit of their agency* (G-11, 3, 5, 6; NG-11, 3, 5), or are *minimising, ignoring, misconstruing consequences* (G-12, 6; NG-4, 7).

> "And if you only focus on what I personally do and what my impacts are, and how can I reduce them, it becomes such a negative narrative, like, yeah, it has to be less, less, less. And I think, well, there's just a certain threshold you need to set for yourself, like, I'm doing enough."[37]

<div align="right">(G6)</div>

A similar code to this is for participants to *have a lack of conflicting response efficacy* (G-11, 12, 13, 5, 6; NG-10, 2, 8), meaning that they don't feel their personal action is going to make enough difference. In case of G11, who has a low footprint and had showed to deliberately reduced their mobility for the environment, this was used as justification for the one flight they did for the first time in 4 years.

> I've managed to somewhat justify it to myself by extending the trip by an additional week, given that it's a social thing and, ultimately, this flight isn't going to solve the climate issue or make a significant impact."[38]

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[36] NG9: "Ja, Als je voor een deel Natuurlijk gewenning, hè dat je het heel normaal vindt om een lang weekend even ergens naartoe te vliegen. In september ga ik met de met met pa, mijn vader naar naar Rome om naar de Ryder Cup golfwedstrijden te gaan kijken. Ja, dan vliegen wij voor een weekend naar Rome en daar denken we allebei niet over na, want In de excitement van "We gaan daar naartoe", We klikken gewoon die vluchten aan en dan is het al gebeurd hè, dus het zit zo in je in je ritme al 25, 30 jaar lang om maar altijd overal naartoe te vliegen voor het plezier, dat, dat duurt wel even om dat eruit te krijgen en dingen te gaan Laten vanwege de impact die het heeft."

[37] G6: En als je alleen kijkt naar van wat doe ik persoonlijk en wat zijn mijn impact, impacts en hoe kan ik die verminderen? Dan wordt het zo'n negatief verhaal, van ja, het moet minder, minder, minder. En ik denk van, ja, er is gewoon een bepaalde grens die je voor jezelf moet stellen van ik doe genoeg.

[38] Ik heb het, Ik heb het enigszins voor mezelf kunnen Verdedigen door inderdaad een week langer te gaan, doordat het een sociaal ding is, doordat uiteindelijk deze vliegreis niet het klimaatprobleem gaat helpen, gaat gaat oplossen.

(G11)

Again, there are some individuals that have a less common reason or justification for their mobility

consumption. The first example is of two participants saying that reducing their consumption to combat

climate change is just *not the sort of thing they do* (G-6; NG-3).

> "No, that's just not really in me, I'm not really the principled fighter. And I have no desire to be that. I'm
> quite glad to have people around me who are, who do engage with that. I have other qualities, but this
> is just me. Yeah, I don't think I'll change much in that regard."[39]

(NG3)

Although most of the participants show both in the calculator as well as in the interviews to engage in

sustainable consumption in other aspects like diet, shopping, and home, most do not use or see this as

compensation for their mobility consumption. There are some exceptions that do feel like they or others

compensate their consumption by something else (G-10, 11, 12, 5, 6, 8; NG-10, 6, 8, 9). Among the

compensation methods the financial compensation stood out. G-10, 11, 12, 6, and NG-8, 9 explain how

financial compensation gives them or the company they work for peace of mind. Examples of these are

selecting CO_2-compensation when booking a flight, donating money to WREN, an organisation that

compensates for user's footprint by investing in sustainable projects around the world, and lastly one

participant explains how he pays off his CO_2-footprint by taking it out of the ETS-system.[40]

Effective Policies & Interventions

SQ5: What do climate change-conversant graduates, compared to other highly educated individuals,

perceive as effective policies and interventions to reduce the environmental impact of mobility

consumption?

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[39] NG3: Nee, dat zit gewoon niet heel erg in mij, ik ben niet echt de principiëler principiële strijder. En daar heb ik ook
geen behoefte aan om dat te zijn. Ik vind het, ik ben heel blij dat ik Mensen om me heen heb die dat wel zijn die daar wél
zich heel erg mee bezighouden, ik heb weer andere kwaliteiten, maar Dit is gewoon. Ja, Ik denk niet dat ik daar zelf heel
erg in in zal zal veranderen.

[40] "The EU ETS works on the 'cap and trade' principle. A cap is set on the total amount of certain greenhouse gases that
can be emitted by the operators covered by the system. The cap is reduced over time so that total emissions fall. Within
the cap, operators buy or receive emissions allowances, which they can trade with one another as needed." (EU
Emissions Trading System (EU ETS), n.d.)

The interviewees were asked about what they think is needed and who is most responsible for reducing the environmental impact of mobility consumption. Aside from retrieving their attitude toward individual choices, these answers also gave interesting insights on what is needed in their opinion to reduce mobility emissions.

To start with the government, there is a common understanding among the sample about the role *institutional and structural factors* play in the transition to more sustainable individual consumption. The participants for example argue that *politics needs to set boundaries* (G-1, 11, 12, 14, 2, 3, 5, 7, 9; NG-1, 10, 11, 2, 9), to shape the context in which industries and individuals can manoeuvre. Both groups advocate for - both nationally and internationally - *the need for stimulation and financial incentives for sustainable mobility* (G-10, 11, 13, 14, 2, 4, 6, 7, 9; NG-1, 12, 6, 7, 8, 9) and/or that *a sustainable alternative should be more affordable* (G-10, 2; NG-1, 10, 3). It seems that within the sample, the Gs are more focus on the government, how they *should stimulate national public transport* (G-13, 4, 5, 6, 9), how *short-range flights should be forbidden* (G-5, 8; NG-3), they need to *stop subsidising fossil fuels* (G-1, 3, 4, 6, 7; NG-1, 12) and with that *increase prices of flying* (G-1, 11, 13, 2, 3, 4, 9; NG-10, 11, 2, 9). They argue that a more accurate price for flying should represent and include the environmental impact it has to it. One participant (G9) argues for making air travel prices cumulative, that the more you travel, the more you pay. However, two Gs (G-1 and 12) and NG-11 do stress that certain climate regulation cause inequality since increased prices of flying would make it even more - than it might already is – solely accessible for high-income individuals.

The focus of Gs seems less on businesses and the industry, due to the argument that *companies only care about money* (G-1, 11, 12, 14, 2, 5; NG-1, 10, 6) and therefore they have *little trust in companies to initiate change themselves* (G-1, 12, 2, 5; NG-1). Although some of the NGs also relate to the arguments above, almost all are more focused on the hope that *innovation and technology should be the solution* (G-12, 3, 7, 9; NG-1, 10, 11, 3, 4, 6, 8, 9), so people can still do what they want, but then in a more sustainable way. In addition to the role business play in reducing their environmental impact by innovating their products or services to be more sustainable, the interviewees have also discussed how *employers are responsible for conscious mobility among employees*. This includes encouraging sustainable commuting behaviours for reaching the workplace and not obliging employees to undertake lengthy travels for job-related tasks (G-3, 4,

5, 8; NG-1, 12, 2, 4, 5, 8, 9). Offering increased compensation for choosing public transportation over private cars could serve as a strong incentive to encourage sustainable commuting between home and work.

One important question of the research is whether the education in climate science has influenced the graduates compared to other graduates in reducing their mobility consumption. The interviewees were also asked this question to see what their own view on this is and what they perceive the importance of education and raising awareness. The following quotes are some examples of where participants explain why *education and awareness raising is important* (G-1, 10, 11, 12, 14, 2, 3, 4, 5, 7, 8, 9; NG-11, 2, 3, 6).

> "Yes, I think that education, when people really understand how it works and get in touch with it, works better than just telling people how bad everything is. It doesn't resonate that well with them."[41]

(G1)

> "Well, it's just that you had a bit of an idea before about flying not being great, but through your education, you know exactly what's wrong with it. And why it's not good and what the impact is." [42]

(G4)

> "I think education is a significant factor because it teaches you the statistics, so you see how your carbon footprint is composed and how much, for example, a flight contributes to it in a year. So, I believe that has been a major realization for me."[43]

(G9)

However, in contrast with the above, some have also stressed that they perceive the *peer students' influence big (ger than the programme itself)* (G-1, 10, 11, 13, 8, 9; NG-1; NG-6), or their current work experience and surroundings.

> "I do think that education, in any case, plays a role because you learn about how serious it is. However, it remains academic, so it's often very objective, and I can't say that I feel that way solely because of the education itself. But yes, the things that came my way through that education, like meeting people, fellow students with a certain behaviour, you really share a certain passion with each other. And some are better at it, for example, inspiring each other and getting involved in certain volunteer work or things

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[41] G1: Ja, ik denk ik denk dat de educatie, dus dat mensen echt weten hoe het werkt en daarmee in aanraking komen, beter werkt, dan zeggen tegen mensen hoe erg het allemaal is. En dat dat niet zo binnenkomt.

[42] G4: "Nou, het is gewoon veel meer, je had er ja een beetje een idee van of vliegen is niet super goed, maar door je opleiding weet je exact wat er niet goed aan is. En, waarom niet en waaraan niet en wat de impact is."

[43] G9: Ik denk dat de opleiding een sterk aanwezige actor is, Omdat je de statistieken leert, dus dat je ziet hoe je voetprint is samengesteld en hoe groot deel daarvan bijvoorbeeld een vlucht in een jaar is. Dus Ik denk dat dat wel een grote realisatie is geweest.

like that, which is all in the sustainable sector. So, I believe that this bubble has contributed a lot to my behaviour."[44]

(G8)

Continuing on the importance of education, participants have argued that there is a *lack of transparency* from companies and the governments *and disinformation* (G-1, 5; NG-10) or that you can't hold individuals accountable due to the lack of transparency (G-1, 14), which for some. This causes for example, people to be unaware of the true carbon footprint of electric vehicles (G-12; NG-6).

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[44] G8: Ik denk wel sowieso opleidingen, want je leert over hoe erg Het is, Maar het blijft ook academisch, dus Het is vaak wel echt objectief, dus Ik kan niet zeggen dat ik vanuit de opleiding zelf echt zo-. Maar ja, de dingen die op mijn pad kwamen door die opleiding, zoals Mensen, studiegenoten met een bepaald gedrag, je deelt wel echt zo een bepaalde passie met elkaar. En de een is er beter in, bijvoorbeeld ja, dus elkaar een beetje aansteken en bijvoorbeeld ook dan bepaald vrijwilligerswerk of zo, wat ook allemaal In de duurzame sector was, dus Ik denk dat die bubbel wel Ja veel bij heeft gedragen.

Discussion

This section offers a critical review of the results of this research, and their relationship with the scientific literature. Moreover, this chapter discusses the limitations of the study and the suggestions for further research. The discussion is divided into the following three main findings, which eventually lead to the newly proposed categorisation in Table 4 and operationalisation of justifications in

Table 6.

First of all, it is found that on average individuals with an education in climate change (Gs) are more conscious and have taken more steps to reduce their mobility consumption than other highly educated individuals (NGs)

It was also found that on the individual level, it is not only knowledge, but a sense of personal responsibility about making conscious choices is a stronger indicator for whether an individual has effectively reduced, or intends to reduce, their mobility consumption. This is in contrast to the framework used by Taylor et al (2017) describing Hypocrites as those with a high level of climate change knowledge who do not exhibit sustainable conservation practices[45]. Table 4 therefore proposes an adapted categorisation of steps taken to reduce mobility consumption based on the sense of personal responsibility. The results have shown that individuals stating in interviews that they have a stronger sense of personal responsibility have taken moderate (Strugglers) to strong steps to reduce their mobility consumption (Dedicated Reducers). Strugglers have an increased inconsistency between their attitude and behaviour (Festinger, 1962). Individuals that stated to experience a weaker sense of personal responsibility, are likely to align their attitude with the external behaviour, having taken weak steps to reduce their mobility consumption (Sceptics). Sceptical Reducers also experience a weak sense of responsibility but have taken more steps to reduce their mobility consumption than Sceptics, a category barely recognised within the sample of highly educated individuals.

Additionally, Table 5 shows how the number of participants referring to each justification strategy is distributed based on the steps they have taken towards change. Finally, Table 6 provides an overview and an example of the main justification strategies used by each category in Table 4. More visualisations supporting

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[45] For the original framework by Taylor et al. (2017) see Figure 12 in Appendix G

these findings can be found in Appendix I . The following sections go deeper into these findings in relation to the existing literature.

Table 4

Categorisation Sense of Personal Responsibility vs Reducing Mobility Consumption

	Sceptical Reducers	Dedicated Reducers
Mobility consumption	*Individuals with a weak sense of personal responsibility taking moderate steps to reduce their mobility consumption*	*Individuals with a strong sense of personal responsibility taking strong steps to reduce their mobility consumption*
	Sceptics	Strugglers
	Individuals with a weak sense of personal responsibility taking weak steps to reduce their mobility consumption	*Individuals with a strong sense of personal responsibility taking moderate steps to reduce their mobility consumption*

Sense of personal responsibility

Note. Adapted from Taylor et al. (2017)

Table 5

Number of participants referring to each justification strategy based on the steps they have taken to reduce mobility consumption

Codes	Steps taken to reduce mobility consumption = Weak (n=12)	Steps taken to reduce mobility consumption = Moderate (n=9)	Steps taken to reduce mobility consumption = Strong (n=5)	**Total (n=26)**
(Exonerative) comparison	4	0	0	4
Acting according to their limits of agency	4	2	1	7
Attribution of blame (Costs)	9	5	0	14
Attribution of blame (Time)	11	3	2	16
Compensation	5	4	1	10
Describe consequences of choices as needs	9	5	3	17
Family or friends or partner lives abroad	4	5	2	11
Lack of conflicting response efficacy	5	3	1	9
Minimising, ignoring, misconstruing consequences	4	0	0	4
Mobility choices are perceived as a habit	4	0	0	4
Moral justification	0	5	1	6
My own comfort and desires are more important than the environment	11	4	2	17
Not the sort of thing I do	2	0	0	2
Powerless feeling	2	3	1	6

Works best to balance and not be too strict	0	5	5	10
Total (Unique)	12	9	5	26

Table 6

Categorisation and type of justifications based on sense of personal responsibility and steps taken reduce mobility consumption

Steps taken to reduce mobility consumption	Main types of justification strategies	Example quote
Dedicated Reducers *Individuals with a strong sense of personal responsibility taking strong steps to reduce their mobility consumption*	Allowing oneself some exceptions/ works best to balance and not be too strict	"Because I, because I find it unfortunate when people consider it as a given [that they can] fly. I believe it should be a given not to, and exceptions can be made, like 'saying no, unless'. Um, well, so I think my starting point is that I don't do it, and when considering an exception, I ask myself if there's a valid reason to do it and if so, yes, I make an exception." G9[46]
Strugglers *Individuals with a strong sense of personal responsibility taking moderate steps to reduce their mobility consumption*	Moral justification	"I really want to do volunteer work in the rainforest in Costa Rica, that's high on my list. But then, as I was thinking about it, at some point I had this moment where I thought, well, I'd be flying to the other side of the world to help the rainforest there, while producing emissions by traveling. That felt a bit ironic. But now I'm more like, yes, I actually want to visit that continent, and maybe it's a bit of rationalizing, but I'd rather go there and do volunteer work than just go on a vacation." NG8[47]
	Family consideration	"But because I have indeed lived on the other side of the world for the past 9 years, I've had to deal with a long round trip once a year. And those, well, those were due to family reasons. It wasn't a short, purely leisure decision, but rather influenced by a lot of factors."[48] G14

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[46] G9: Omdat ik het, Omdat ik het jammer vind als Mensen er-, Het vanzelfsprekend vinden om het wel te doen. Ik denk dat het vanzelfsprekend zou moeten zijn om het niet te doen en daar uitzonderingen op kunnen maken, dus zovan nee, tenzij. Uhm, Ja, dus Ik denk dat mijn uitgangspunt is dat ik het niet doe en dat ik hierbij dacht, is dit een goed goede reden om daar Een uitzondering op te maken. Ja.

[47] NG8: Ik wil heel graag in Costa Rica nog een keer In het regenwoud vrijwilligerswerk doen, dat staat hoog op mijn lijstje, maar toen, toen zat ik daar over na te denken en toen had ik op een gegeven moment wel een soort moment dat ik dacht van, ja, maar dan ga ik zeg maar naar naar de andere kant van de wereld vliegen om het regenwoud daar te helpen, terwijl ik allemaal uitstoot produceer door er heen te gaan. Dat was dan een soort van wrang, Maar ik heb Ik heb nu meer zoiets van, ja, Ik wil eigenlijk graag dat continent bezoeken en dan kan ik beter, misschien is het ook een beetje rationaliseren hoor, maar dan kan ik beter daarheen gaan en ook vrijwilligerswerk doen dan dat ik gewoon op vakantie ga.

[48] NG14: Ja echt wel de afgelopen 9 jaar aan de andere kant van de wereld heb gewoond, heb ik wel te maken gehad met een keer per jaar een lange. Ja round trip. Die die dan ja, Dat was familie redenen, Dat is gewoon dat niet een een soort korte, soort van puur leisure beslissing was, maar die gewoon gevoeld was door heel veel dingen.

Sceptics *Individuals with a weak sense of personal responsibility taking weak steps to reduce their mobility consumption* & **Sceptical Reducers** *Individuals with a weak sense of personal responsibility taking moderate steps to reduce their mobility consumption*	Displace responsibility/ Attribution of blame (Costs and Time)	"But then I decided, due to the high costs and the inconvenience of the journey, to fly, just for myself. So, she's going alone. Because you have to take the train to Paris, then transfer, then go to another station, take the train to Barcelona, transfer again; hours later you can finally take the train to Valencia and then be picked up by car. Well, that's a trip that takes a total of 16, 17, actually more like 20 hours, I think, and it's also twice as expensive as flying, so I thought, no, it's not worth it, yeah."[49] NG2 "Uhh. I think I tend to deflect it from myself and mostly think, they should have arranged it better, or they should have made it cheaper, you know, then I place the blame outside of myself."[50] NG12
	Describe choices as habit	"It has become so normal for me now, such a convenience, but if I didn't have it, I would definitely consider the options of taking the train to Paris and Berlin, which I don't even look at right now because I just think: car. So, yeah, I think if the alternative is there, then I'll just take that car, but if I don't have the car at all, then I'll definitely consider the train." NG2[51]
	Exonerative comparison	"There are people going on a cruise ship for 3 weeks, and a cruise ship is equivalent to a million cars per hour. Per hour! And here I am feeling guilty about driving to work? That's something I find really difficult." NG10[52]
	Minimising the consequences	"And well, longer vacations, well, I don't do that much, it is also a matter of budget. I think 2, 2 or 3 flying vacations a year, something like that."[53] G6
	Own wishes and desires more important than environment	"Well, yeah, I do make them consciously, so in the sense that I just go ahead and do it because I enjoy it and want to do it, making the climate aspect subordinate. It's not like I'm not aware of it, but it's just low on my priority list, and then I kind of make up for it by clicking on the CO2 compensation, which still gives me a bit of a sense of doing something good, although, well, that's not entirely..."[54] NG9

[49]NG2: Maar dan toch besloten, dat vanwege de hoge kosten en het-, de onhandigheid van de reis, te vliegen, voor mezelf. Dus zij gaat alleen. Omdat je-, je moet met de trein naar Parijs, dan moet je overstappen, dan moet je naar een ander station, moet je met de trein naar Barcelona, overstappen; uren later kan je dan weer met de trein naar Valencia en dan nog opgehaald worden door de auto. Nou, dat is in totaal dan een trip van 16, 17, nou denk ik eigenlijk wel 20 uur, dan denk ik ja en dan ook nog twee keer zo duur als vliegen, dan denk ik toch, nee, dat is het me niet waard, ja.

[50] NG12: Uhh. Ik denk dat ik het dan heel erg van me afschuif en vooral zoiets denk, hadden ze het maar beter moeten regelen of hadden ze het maar goedkoper moeten maken of het-, zeg maar dan zoek ik de schuld buiten mezelf.

[51] NG2: Het is nu zo een-, zoiets normaals voor mij geworden en zo'n gemak, maar als ik hem niet zou hebben, zou ik wel kijken naar de mogelijkheden van de trein naar Parijs en naar Berlijn, waar ik nu überhaupt niet naar kijk omdat ik gewoon denk: auto, dus ja, ik denk wel als je-, als het-, als het alternatief er is, dan, dan, dan neem ik gewoon die auto, maar als ik die auto helemaal niet heb, dan denk ik, ja, dan kijk ik wel naar de trein.

[52] NG10: Dan stapt er wel weer zo iemand op een cruiseschip voor 3 weken en een cruiseschip is gewoon 1 miljoen auto's per uur. Per uur! En dan zit ik nu mij schuldig te Voelen dat ik naar mijn werk rijd? En, dat vind ik heel moeilijk.

[53] G6: En ja, langere vakanties, ja, doe ik niet zo heel veel, is ook een kwestie van budget. Ik denk 2, 2 a 3 vliegvakanties per jaar, zoiets.

[54] NG9: Nou, ja ik, ik maak ze wel bewust, dus In de zin van dat ik het gewoon doe Omdat ik het dus leuk vind en en dat wil doen en dan dus klimaat daar ondergeschikt aan maak hè. Het is niet alsof ik me er niet bewust van Ben, Maar het het het Het is dan dus gewoon te laag op mijn prioriteit en dan koop ik het af door de CO2 compensatie aan te klikken hè, dat geeft me dan nog een beetje een soort van goed gevoel, terwijl ja, Dat is Natuurlijk, nou niet helemaal...

	Not the sort of thing I do	"No, that's just not really in me, I'm not really the principled fighter. And I have no desire to be that. I'm quite glad to have people around me who are, who do engage with that. I have other qualities, but this is just me. Yeah, I don't think I'll change much in that regard."[55](NG3)

[55] NG3: Nee, dat zit gewoon niet heel erg in mij, ik ben niet echt de principiëler principiële strijder. En daar heb ik ook geen behoefte aan om dat te zijn. Ik vind het, ik ben heel blij dat ik Mensen om me heen heb die dat wel zijn die daar wél zich heel erg mee bezighouden, ik heb weer andere kwaliteiten, maar Dit is gewoon. Ja, Ik denk niet dat ik daar zelf heel erg in in zal zal veranderen.

Table 7

Operationalisation of main justifications used by all categories

Justifications used by all	Example quote
Describes consequences of choices as needs	"Well, I think at some point, I'll have to fly for work, and then... And then, I find it really difficult, but I think I will distance myself from work behaviour, from work-related flying, I think. If I have to fly, I think that's what will happen because then it's very clear, oh, but I'm not doing this personally, it's for work. And I already find that behaviour very, very unpleasant because I think it's very easy for a lot of people to shift that responsibility when it comes to work."[56] G11
Lack of conflicting response efficacy (see KiM)	"And I am aware that I do fly a lot, but I don't consider that to be the solution, I don't think that's going to be the answer in the long run." G5[57]
Wanting to explore the world	"Well, it's a wanderlust, you know? But I don't think I could let go of the fact that there are certain places I really want to see, unless very strict policies were put in place, or if there were a need for more responsible travel, then I could easily set those dreams aside. But as it stands now, I don't want to entirely take that away from myself."[58] G8
Powerless feeling	For example, I find it incomprehensible that we still haven't been able to stop massive deforestation in the Amazon. We've known about it for 30 years, so that can really make me angry. It just seems impossible to tackle, and you also feel a bit powerless, you know, not knowing what more you can do yourself"[59]NG8

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[56] G11: Nou, Ik denk dat ik voor werk op een gegeven moment wel moet gaan vliegen, en dan. En dan vind ik het heel moeilijk om daarin-. Ik denk ik, ik ik distantieer een beetje van werk Maartje, werk vliegt Maartje denk ik, Als ik Als ik moet gaan vliegen, denk ik dat Dat is wat er gaat gebeuren, want dan is het heel erg duidelijk, oh, Maar dat doe ik niet persoonlijk, doe ik voor werk en Ik vind dat nu al heel, heel kut gedrag, want Ik denk dat dat heel erg. Ja, Ik denk dat dat voor heel veel Mensen makkelijk is om die verantwoordelijkheid af te schuiven op het moment dat het over werk gaat.

[57] G5: En ik ben me bewust dat ik wel veel vlieg, maar ik vind dat niet iets-, ik denk niet dat dat de oplossing gaat zijn tot-.

[58] Nou, Het is wel een reislust, zeg Maar ik zou het niet denk ik kunnen loslaten dat ik bepaalde plekken heel graag wil zien, tenzij er heel streng beleid zou komen op uh, dat het niet meer mogelijk is of dat je daar meer verantwoord mee moet omgaan, dan kan ik prima die dromen opzij zetten eigenlijk, Maar het kan zodanig wel nog In de huidige wereld, dat ik dat dan niet helemaal van mezelf wil afnemen.

[59] NG8: Ik vind bijvoorbeeld onbegrijpelijk dat we het nog steeds niet in staat zijn om massale ontbossing In de Amazone tegen te gaan. Dat weten we dan al 30 jaar, Dus daar kan ik ook wel eentje kwaad om worden. Wat gewoon niet mogelijk is om om schijnbaar aan te pakken en en je voelt je ook een beetje machteloos of zo je, je weet ook niet wat je zelf meer kan doen.

Climate Change Education & Mobility Consumption

The first critical aspect to explore is the strength of evidence indicating whether climate change education has resulted in reduced mobility consumption compared to peer groups with similar income levels and the average of the Netherlands. Overall, the evidence here is rather limited, suggesting no relationship between climate change education and lower individual mobility footprints. However, some evidence and basic observations indicate that climate change education can influence the consumption patterns of specific individuals compared to those without such education.

Firstly, the most prevalent evidence based on the descriptive quantitative analysis of the survey results is that within the sample: 7 (all Gs) out of the 26 interviewees had a lower footprint than the Dutch average; the average footprint of Gs is lower than of NG; Gs have on average taken more steps to reduce consumption than NGs; Gs own less cars than NGs.

Secondly, the results of the interviews have indicated that Gs are more conscious of the impact of their mobility consumption and although it does not always affect their decision, it is often considered in the decision-making process. However, this is not the case for all, raising the question on what is needed besides knowledge to increase consciousness in mobility choices, discussed in the discussion sections on attitude and justifications.

Thirdly, some, not all, Gs seem more willing to pay more, which aligns with the findings of Whitmarsh et al. (2020), that 'climate change experts' expressed greater willingness to pay more for alternatives to air travel in comparison to 'non-experts'. It is also found that Gs are more willing to travel longer for a more sustainable travel mode.

Fourthly, while this research has mostly considered 'climate change education' in terms of the delivery of a curriculum within educational settings, findings from the sample group emphasise the lasting significance, for Gs, of debate and discussion with fellow students during these courses. This shared critical reflection on the link between climate knowledge and mobility consumption, both in and out of the classroom, have, for many, lasted to the present day. This is in line with previous research done by Dütschke et al. (2020, p.124), who claimed that: "People who were more convinced of the availability of alternative ways to get there, were more likely to have used or to intend to use more sustainable travel modes." Indicating that

hearing and learning from others on alternative destinations or travel modes has had a significant influence on those who have also taken steps to reduce their mobility consumption.

However, a number of important observations on mobility consumption within the sample are not connected to do the differentiation between Gs and NGs. Dividing the sample objectively according to the stated mobility footprint derived from the carbon calculator reveals other factors that causes individuals to have a lower carbon footprint relative to the average carbon individual carbon footprint for people living in the Netherlands. It is essential to recognize these observations within the sample that challenge the notion that climate change education is the sole differentiator. Examples of these factors are that some of the low emitters were raised with climate awareness and have never travelled that much either before they started their programme. Another difference among individuals is whether they have the need to travel far away, enjoy camping and/or have a car at their disposal to travel within Europe. As for many the train is perceived as a huge barrier, and a car is perceived needed as a more sustainable mobility mode for travel within Europe. Another critical note can be made on the argument of social influence during the programme, questioning whether the education itself or the surrounding has had a bigger influence on the choices of Gs.

In conclusion, these findings emphasize that climate change education is just one piece of the puzzle and does not always lead to a reduced mobility consumption. Understanding the nuanced interplay of various factors, including individual experiences and external influences adds to existing literature on knowledge and behaviour.

Individual Responsibility: High- and Low-responsibility Groups

The link between climate change education and reduced mobility consumption is not always straightforward, as evidenced in the previous section. I therefore propose a separate differentiation between individuals that have a strong sense of personal responsibility about making conscious choices ('high responsibility'), associated with having taken moderate to strong steps to reduce mobility consumption; and individuals that have a weak sense of personal responsibility about making conscious choices ('low responsibility'), which is aligned with taken weak steps to reduce mobility consumption.

The high-responsibility group consists of individuals who state in interviews that they feel a strong sense of personal responsibility, who are differentiated based on their attitude that individual action is important, they are motivated to make a positive impact, to practice what they preach or have an activist mindset, and they experience distress with their mobility choices. Their attitude is not always consistently mirrored in their mobility choices, as there is a differentiation within this group of individuals that have taken strong steps to reduce mobility consumption (Dedicated Reducers) and those that have taken moderate steps to reduce mobility consumption (Strugglers). Dedicated Reducers are identified by their low mobility footprint, their willingness to travel longer, pay more and choose locations based on the time they have and for them justifiable mobility modes (G-1, 11, 2, 4, 9). Strugglers are identified by the fact that they have taken similar steps as those above but are still associated with a higher footprint than average (G-10, 13, 14, 6, 8; NG-11, 12, 6, 8). Moreover, they are mainly recognised by a similar set of reasoning used for their mobility, which will be discussed in the next discussion section on justifications.

The low-responsibility group consists of individuals who state in interviews that they feel a limited sense of personal responsibility. Low-responsibility is almost always aligning with having taken weak steps to reduce mobility consumption (Sceptics). Just one participant has seemed to belong to the Sceptical Reducers group, indicating a low-responsibility, but moderate steps taken to reduce mobility consumption. Sceptics and Sceptical reducers are mainly indicated by their results on displacing responsibility and the finding that they do not take climate change in consideration for their mobility choices. As the displacement of responsibility is also seen as a justification mechanism in literature, more on this is discussed in the next section. The results have shown that Sceptics acknowledge that concerning their mobility consumption, they don't do as much as they could, they know they should change but probably won't, consider 'not flying' not as an option and are only willing to take steps if external factors change (G-12, 3, 5, 6, 7; NG-1, 10, 2, 3, 4, 5, 7, 9).

The significance of a sense of personal responsibility cannot be overstated, particularly in the context of climate awareness and mobility emission. The awareness that individuals possess regarding the environmental impact of their choices can motivate them to take steps to reduce their mobility consumption. This sense of responsibility can act as a catalyst for a willingness to for example travel longer or pay more for a more sustainable mobility mode.

Possible Explanations

A possible explanation recognised in the study suggests that despite recognising the importance of being critical about decisions and making certain eco-conscious choices, choices may be influenced by incomplete information or a lack of awareness regarding the actual environmental impact of their consumption. The discrepancy could stem from a variety of factors, such as misinformation and other external factors. An external factor that potentially contributes to sense of personal responsibility is the influence of prevailing social norms of for example extensive flying and car ownership (McDonald et al., 2015; Schrems & Upham, 2020). In such cases, low-responsibility individuals might not fully recognize the environmental implications of their decisions, given that their consumption aligns with that of those around them (Dutschke, 2022). The presence of shared consumption within their social circle might minimise the true environmental consequences of their choices. The same applies for the high-responsibility group, as they are also influenced by social norms in their surroundings, aligning with prevailing social norms could stimulate their sense of personal responsibility. When their sustainable choices align with those of their peers, it can validate their environmentally conscious decisions. However, this alignment could also potentially lead to contentment, where they feel that their efforts are enough because they are in line with the social norm.

Table 8 shows how the indicators for high-responsibility relate almost exclusively to those participants that have taken moderate to strong steps. Two exceptions can be noticed (G-12, 6) that show similarities with both Strugglers and Sceptics, which made a more complex to fit them in the framework. However, for simplicity and due to the Socially Desirable Responding (SDR) bias (further explained in Limitations), they have been categorised as Sceptics in the further discussion on justification strategies.

Table 8

Number of participants referencing to indicators for a sense of personal responsibility based on their steps taken reduce their mobility consumption

Codes **Indicators for a strong sense of personal responsibility**	Steps taken to reduce mobility consumption = Weak (n=12)	Steps taken to reduce mobility consumption = Moderate (n=9)	Steps taken to reduce mobility consumption = Strong (n=5)	**Total (n=26)**
Activist minded	0	2	1	3
Distress about mobility choices	2	3	3	8

Feels good about making conscious choices	0	4	0	4
Frustrated about trying to do what feels right	0	3	2	5
Individuals are not privileged to fly as much	0	0	2	2
Individuals have a large responsibility	0	1	1	2
Motivated to make a change	0	4	3	7
Practice what you preach	0	0	2	2
Total (Unique)	2	8	5	15

Perceived Hypocrisy & Cognitive Dissonance

The first critical aspect to explore is how CC-CGs fit into existing literature concerning the behaviour of individuals with substantial climate change knowledge. From one perspective, it was expected that CC-CGs would align with framework found in the literature on 'climate hypocrisy' (Cass et al., 2023; Higham & Font; Gunster et al., 2018; Schrems & Upham, 2020; Taylor et al., 2017). This literature suggests that individuals with high levels of climate change knowledge might experience cognitive dissonance, either leading to changes in their attitudes, behaviours, or rationalizations to justify any inconsistencies (Weder et al., 2020). Conversely, some authors argue that heightened guilt and shame don't necessarily translate into reduced mobility consumption (Dutschke et al., 2020).

Within the sample, no equivalent relation was found on how cognitive dissonance among individuals with high levels of climate change knowledge has influenced their decision-making. First of all, shame (4 out of 26 participants) and guilt (5 out of 26) are not that much felt or acknowledged by the interviewees and there is no clear differentiation between Gs and NGs. However, within the sample, the feelings of cognitive dissonance were recognised in terms of distress and frustration toward mobility choices by especially high-responsibility groups. Offering a possible explanation as Schrems & Upham (2020) argue that frustration is more likely to results in increased efforts to translate intentions into actions, in contrast to negative emotions like sadness and hopelessness.

Consistent with Gössling et al. (2020) and Dütschke et al. (2022), flying shame has become a more prevalent subject among the participants but does not have a significant effect on their actions. One noteworthy finding in this regard is how some low-responsibility individuals experienced tension when they felt shame despite having a low sense of responsibility or when they perceived their attitude as hypocritical when they expressed that the individual has responsibility although they do not sense that responsibility

themselves. However, again aligning with Gössling et al. and Dutschke, this feeling of shame did not affect

their choices. One very clear example describing this category together with the tension is the following

quote:

> "And that, so that's difficult for me to say because I know it's good if people contribute their part to
> combat climate change. But when I look at myself and whether I actively do that and make choices to
> contribute to it, then I actually think hardly. And yes, maybe I'm going too deep into that now, but if the
> question is why? I also find it difficult to answer because I feel like I, as an individual, cannot make a
> difference."[60]

(NG2)

The average findings on this oppose the argument of other authors, arguing that inducing cognitive dissonance

by creating shame would open up discussion and behavioural change (Gunster et al., 2018; Goodwin, 2020).

On the opposite is only one participant (G1), who acknowledged that shame is a reason for them and their

friends to look for sustainable mobility alternatives. Also, two participants (both Dedicated Reducers) argued

the importance to 'practice what they preach', indicating that an education in climate change and increased

personal responsibility would stimulate individuals to align their attitude to their own individual behaviour.

Justification Strategies for High-responsibility Groups

The results have shown that high-responsibility individuals perceive their mobility choices more often

as a dilemma and take different factors into consideration before making a decision. The following tensions

and justification mechanisms are recognised among these individuals, in particular among Strugglers since

Dedicated Reducers' consumption aligns more closely to their sense of responsibility.

Social Situations

The first example of when these participants experience distress is in social situations. Tensions could

arise in social groups about choosing holiday destinations, as these individuals would prefer a destination

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[60] NG2: En dat-, dus dat vind ik lastig om te zeggen, omdat ik weet dat het goed is als mensen dus hun steentje bijdragen
om klimaatverandering tegen te gaan. Maar als ik dan naar mezelf kijk of ik dat zelf ook actief doe en of ik keuzes maak
om daar dus aan bij te dragen, dan denk ik nou eigenlijk nauwelijks. En ja. Misschien ga ik dan nu te diep daar al op in,
maar als de vraag dan waarom? Dat vind ik ook moeilijk te beantwoorden, omdat het m-, dus het gevoel heb alsof ik als
individu niet het verschil kan maken.

were they can travel to in an accessible destination using a means of transport that they feel they can justify. For some this is even a precondition, as they claim not to join in if this is not the case. Another example is of when the location is decided upon without considering the availability of a sustainable mobility mode and the willingness to travel much longer and pay more is different for the individual inclined to minimize their mobility consumption compared to the rest of the group. Lastly, these individuals could experience a dilemma when the location is not accessible at all by any sustainable means of transport (for example, transoceanic travel), and the individuals are in a dilemma on whether they are joining or not.

Existing literature lacks a comprehensive examination of the difficult position faced by individuals with a strong sense of personal responsibility in navigating social change, particularly in the context of mobility consumption (Dutschke, 2022; Ruhrort & Allert, 2021). An example within the sample is one participant explaining how it is easier to influence family members concerning holiday locations or modes but breaking social barriers with peers is more challenging. Future research could explore the challenging dynamics of social situations involving Dedicated Reducers and Strugglers, who play a crucial role in shaping and transforming social norms related to mobility consumption. This is particularly essential as the discourse around sustainable mobility intensifies, highlighting the pressing need to comprehend the impact of structural contexts on individual mobility consumption and how individuals actively contribute to the dynamics of social change in this context.

Moral justification & Describe the Consequences of Choices as Needs

The next tension is due to ethical dilemmas. Parallel to the moral disengagement theory of Bandura (1986), Strugglers tend to feel tension in their choices when they can morally justify their mobility consumption. Examples of these within the sample are going to climate conferences or going to developing countries to do volunteer work or help these countries prepare for major environmental disasters that are a consequence of climate change. Strugglers also justify this type of travels by displacing responsibility, as they describe their choices as compelled consumption when they go on work-related travel (Cass et al., 2023). Another example of moral justification within this group has seemed to be family considerations (Whitmarsh et al., 2020; Dutschke, 2022; Eriksson et al., 2022). Although these individuals are often also willing to travel longer for this, due to external factors – e.g., a funeral - they sometimes give in to the tension to fly. Other

tensions arise for these individuals due to changing circumstances as they describe the consequences of their choices as needs, like switching to a different job for which travelling is required, having a long-distance relationship, or mobility issues that are beyond one's control (Cass et al., 2023; Higham & Font, 2019). An example of the last is a participant who travelled to Spain by public transport but when she wanted to go back there were strikes in France. She chose to take a flight back because the alternative would be to spend a week on travelling back and paying hundreds of euros.

Limits of Agency

Lastly, some of these individuals have the perception that they are already acting within the limits of their agency (Cass et al., 2023). An example of this is that several Gs have argued that they are already working 40 hours per week on combatting climate change and therefore allow themselves to sometimes make exceptions for their individual lives. Mostly Dedicated Reducers argue that it works best for them to find a balance in their decisions, because being too inflexible could become counterproductive. However, it is important to note that both Dedicated Reducers and Strugglers emphasize the importance of reducing their own mobility consumption and also see it within the limits of their agency to adjust certain behaviour accordingly. As one participant said: "Yes, it feels good to make a responsible choice. Especially because at one point, I thought, okay, it only costs a few tens more, let me just do that instead of always choosing the cheapest or the easiest option for myself. I just think it feels good to do something for the greater good, for, let's say, beyond yourself"[61].

All of the above indicate that individuals aiming to decrease their air travel are employing diverse criteria to determine which flights to eliminate from their routines and which to make exceptions for. They are prioritizing different aspects in their decision-making process and perceive certain decisions as outside the limits of their agency or experience certain tensions that cause distress about their mobility choices.

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[61] NG12: Ja het is toch goed om een goede keuze te maken of zo. En ook vooral Omdat ik dan toen wel een keer dacht, oké, het scheelt gewoon een paar tientjes, Laat ik dat nou gewoon wel doen, in plaats van altijd het goedkoopste of het makkelijkste voor mezelf te kiezen. Ik denk gewoon dat het goed voelt om iets te doen voor de Greater good voor zeg maar boven je.

Justification Strategies for Low-responsibility Groups

      The next sections are on the main justification strategies recognised among low-responsibility groups: Sceptics and Sceptical Reducers.

Displacement of Responsibility and Attribution of Blame

      The first and foremost reasoning used by the sample fall under certain categories widely recognised in existing studies under different names: denial of control/ responsibility (Schrems & Upham, 2020), redirect responsibility (Cass et al., 2023), displacement of responsibility & attribution of blame in Bandura's disengagement theory (Higham & Font, 2019) and justifications related to the travel product/ context (McDonald et al, 2015). Predominant examples in this study are blaming the government and industry for not innovating fast enough and/or implementing policies in favour of sustainable mobility. Sceptics blame the lack of available, time efficient and affordable sustainable alternatives for driving and flying on governments and businesses. Also, the sample displaces responsibility by saying that not individual consumption, but big industry is responsible for most of the emissions causing climate change and it is therefore their responsibility to reduce emissions. They argue that the Netherlands is only a small country and therefore is limited in achieving big agreements. They displace the responsibility to other countries like the US and apply the exonerative comparison strategy by saying that their environmental impact is much worse (Higham & Font, 2019). The exonerative comparison strategy is also operationalised by comparing their own consumption to individuals that travel much more for their job or others that make more frequent holiday trips. Also, these individuals might deny their responsibility in relation to the travel context and describe the consequences of choices as needs, as for example they need to travel for their job (Cass et al., 2023).

Putting Justifications in Existing Context

In many of these papers, these strategies are described as discourses and justification for inaction. However, as discussed by Eriksson et al. (2022), some of these arguments could also be justifiable given the existing context.[62] Take for example the travel times in Europe. A study by Royal HaskoningDHV (see).

Figure 8) pointed out the at the time difference in door-to-door travel time by train compared to airplane from Amsterdam to locations in Europe (Donners, 2018). The study showed that only to Brussel and Paris the train is quicker, to 9 other cities it is less than 2 hours longer, but for the other 20 cities it takes more than 2 hours longer by train. They have also found that the choice for taking the train would increase 1.5 times if travel times would be optimised and double if a complete high-speed rail network would be constructed. Another study done by Greenpeace has pointed out that on average international trains in Europe are twice as expensive as flights, based on tickets booked well in time and last-minute tickets (Greenpeace Central and Eastern Europe, 2023). The study analysed 8 connections (London, Nice, Stockholm, Copenhagen, Prague, Ljubljana, Berlin, and Warsaw) to and from Amsterdam, which were on average 1.5 times as expensive as the available flights. None of these trains were cheaper than taking the trip by aeroplane. However, as argued by some of the participants as well, individuals that are able to pay more, could be expected to do it, for example NG6: "Also, I don't think the people around me should complain about how expensive something is because they have good incomes, so I would mainly say it's about time and connection"[63]) The same participant argued that, when booked in time, trains are not more expensive than planes ("And sometimes it's a bit more expensive, but honestly, some of my friends use that as an argument, and I just don't really see it as a valid argument because if you book in advance, it's just as expensive as flying"[64]).

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[62] "Placing of responsibility elsewhere can be interpreted as an evasive strategy, avoiding behavioural change, but it can, on the other hand, be rational given the existing funding context. Furthermore, it can be a starting point of dialogue for change." (Eriksson et al., 2022, p.176).

[63] NG6: En Ik vind trouwens ook niet dat de Mensen om mij heen mogen klagen over hoe duur iets is, want ze hebben gewoon goede inkomens, dus ik zou eigenlijk vooral zeggen, tijd en connectie.

[64] NG6: en soms is het ook wel duurder, maar ik vind dat eerlijk gezegd, dat gebruiken sommige van mijn vriendinnen ook als argument en dat vind ik gewoon niet echt een argument, want Als je op tijd boekt, is het net zo duur als vliegen.

Figure 8

Door-to-door travel time comparisons for train and air travel departing from Amsterdam in 2018 (Donners, 2018)
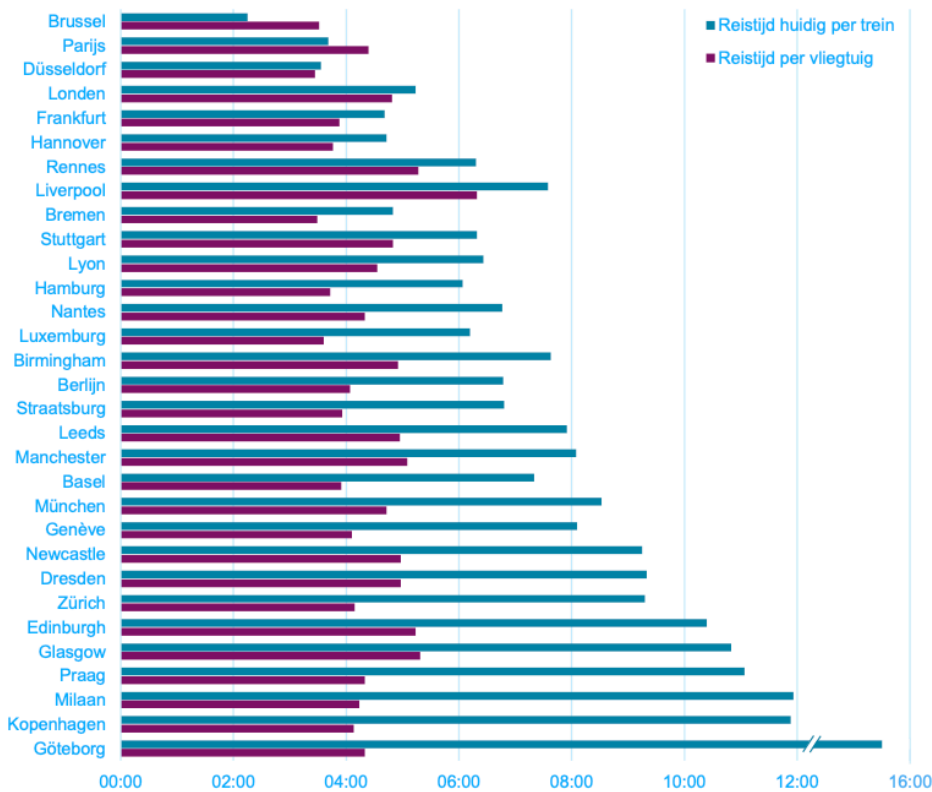
Limits of Agency, Compensation, Desires, and Habits

Moreover, Sceptics also claim to be acting within the limits of their agency in certain considerations (Cass et al., 2023). Actions that are perceived within the limits of their agency for this category are, in terms of mobility aspects, e.g., buying an electric car and travelling by train within 700 km's (for example to Brussels and Paris), and for non-mobility aspects examples are getting a renewable energy contract or solar panels themselves and eating less meat. In literature this is also often referred to as the compensation mechanism or compensatory green beliefs (Higham & Font, 2019, Schrems and Upham, 2020; Mattioli et al., 2023). They perceive certain decisions outside the limits of their agency, such as putting more effort, time, and money into getting somewhere a more sustainable way. They also see it outside the limits of their agency to give up on certain wishes and desires. Most important reasoning is that they want to explore the world and although they often acknowledge it is selfish, they perceive their own happiness and desires as more important than the environment. Those with a car, perceive their own comfort more important for travelling within the Netherlands and blame the lack of accessibility to certain places in the Netherlands by public transport. Their

reasoning can again be explained by the fact that they do not feel like anything they do will help, referred to in literature as the lack of conflicting response efficacy (Cass et al., 2023). Lastly, only individuals from this group describe their choices as bad behaviour patterns, as they perceive their mobility choices as a habit (Cass et al., 2023).

Remaining Findings in Relation to Literature

Besides the findings on education, attitude and justifications that are used for the categorisation, there are some separate findings that concur or oppose existing literature and therefore worth mentioning.

Compensatory Green Beliefs

First of all, the findings oppose Dütschke (2022) in the statement that people who travel for business are also more likely to travel for leisure. This research has shown examples of individuals that because they need to travel for work, they try to reduce their personal travel. On the contrary, individuals taking sustainable mobility modes for business-related travels, taking, e.g., the train to Paris, London, or Brussels, 'allow' themselves to fly for leisure. Or the other way around, individuals who reported not flying for their profession, tended to minimise the carbon footprint of their leisure mobility. This is in accordance with Mattioli et al. (2023), who discussed that that individuals tend to underestimate the environmental impact of air travel, which is true for most of the NGs, who reacted with shock to their carbon footprint results. However, the authors also argue that individuals reducing their mobility in their daily and work-home commute, make an exception for air travel. The results of this research point out that on the contrary, individuals owning a car are also more often associated with more flying behaviour. A possible explanation for this could be that individuals with a low responsibility tend to justify their local mobility consumption the same way they justify international mobility consumption.

As mentioned above, it has seemed that, although highly educated individuals still tend to underestimate the impact of flying, they do not use the sustainability of their local mobility consumption (biking, taking the train) as a compensation for air travel. Also, participants, mostly Gs, have shown to be more willing to adjust in non-mobility aspects, such as eating less meat, reducing shopping consumption, and

reducing (non-renewable) energy use. However, they do not perceive these choices as a compensation for their mobility consumption, opposing with other studies stating that (climate conscious) individuals use compensation as a justification strategy (Cass et al., 2023; Schrems & Upham, 2020; Mattioli et al., 2023; McDonald et al., 2015). This finding could be explained by an argument made by Kaklamanou et al. (2013), who have found that individuals with a higher education level, age, annual income, or greater concern about climate change are all less likely to endorse compensatory green beliefs.

'Climate Awareness and Less Flying'

During the data generation of this study, the following report by KiM was published in July 2023 on '*Klimaatbesef en minder vliegen'* (Kennisinstituut voor Mobiliteitsbeleid (KiM), 2023). Their research has shown that, within their sample of Dutch adults, climate knowledge increases climate awareness and increases their intention to fly less. Moreover, in accordance with above findings, their sample had trouble understanding the impact of flying compared to other travel modes. They especially underestimated the climate impact of long-distance flying. The report also presents five main justifications of air travels despite climate awareness in the order of most respondents to least: *sense of helplessness, the need to explore the world, compensation, does not contribute anything to the solution of climate change and exonerative comparison.* Although the sense of helplessness was not as much recognised in this study, the other justifications confirm some of the findings of this study. Their research operationalised 6 main justification strategies found in existing literature and used a quantitative research approach to find which strategies people apply most often. This research contributes to the field by using a qualitative approach, which led to newly discovered operationalisation of justifications and nuance in personal situations.

Technology and Innovation

One of the discourses of delay discussed by Cass et al. (2023) is technological optimism, as individuals tend to focus on current and future technologies. This research has also shown a considerate number of participants (12/26) who argued that technology and innovation should the solution, stating that in that way individuals can keep doing what they want to but in a more sustainable way. For some, this is used as

a justification strategy for claiming the low responsibility of an individual, for others, improving technologies is accompanied by individual change.

Limitations

In this qualitative research it's crucial to acknowledge certain limitations inherent in the study that influence the validity of the results. First and foremost, the subjectivity of the researcher can play a role in various stages of the research process, from the design of interview questions to the interpretation of findings. Despite efforts to minimize bias, the researcher's perspectives and choices may have influenced the data collection and analysis. Additionally, due to the specific and diverse nature of the participant pool, the findings may not be readily generalizable to a broader population. Furthermore, it's important to acknowledge the potential influence of Socially Desirable Responding (SDR) among the participants. SDR prompts respondents to offer answers that they believe researchers anticipate and seek, along with responses that align with societal preferences (Tracey, 2016). Given the utilization of convenience sampling, the majority of respondents were connected within the researchers' network, which could potentially increase the presence of the SDR bias. This could have affected the results on e.g., guilt and shame. These limitations are important to consider when interpreting the results and recognizing the context within which they were obtained.

There are two practical limitations that should be considered in relation to the research methodology and data gathered. The first limitation is that the reliability has decreased due to change during the interviewing process. After 4 interviews it was noticed that the participants found it difficult to comment on their footprint without fully understanding the context. Therefore, in all of the interviews that followed the division over the different categories was shared instead of only the total footprint. Moreover, the carbon footprint calculator was mostly a snapshot, not considering the average mobility footprint over time. Also, it should be noted that the generalisation in the discussion does not include the survey results on justification strategies due to the absence of some of the main strategies recognised in the interviews. Therefore, the survey is mostly used as a way to have let the participants think about their attitude, consumption, and reasoning instead of integrating all of the results with the interview data.

Finally, when it comes to the generalisability of the findings, it is important to note that the study focuses solely on Amsterdam. Some of the findings might be generalisable to other European cities and countries with similar economic, societal, and political conditions, but they probably will not be comparable to countries with different conditions.

Suggestions for Further Research

Building upon the findings of this study, further research can take a three-fold approach with the goals of generalisation, implementation, and deeper exploration. These goals will not only help expand the understanding of the topic but also contribute to practical solutions for addressing climate change.

One of the primary directions for further research is to quantify the results obtained in this study. For instance, the KiM report (2023) lacked an in-depth analysis of moral justifications, the significance of family considerations, and describing the consequences of choices as needs. Researchers can expand upon these aspects and perform a more comprehensive quantitative analysis. This would allow for the generalisation of findings to a broader population, ensuring that the insights gained from this study are applicable to a wider context. By incorporating moral justifications, family considerations, and need perspectives into the analysis, a more holistic understanding of mobility choices can be achieved.

Another avenue for further research lies in the exploration of effective policies aimed at reducing mobility emissions. There is a need for research to explore potentially effective policies which offer more restrictive measurements as decreasing mobility emissions reaches further than individuals consumption and ask for institutional, societal, and technological initiatives. Researchers could conduct a comparative analysis of initiatives in different regions or countries to assess the effectiveness of various approaches as exampled in Implications for Policies & Organisations. This could involve studying the impact of government policies, awareness campaigns, or managerial initiatives on individuals' mobility choices. By identifying successful strategies, this research could contribute to more targeted and effective interventions to reduce mobility emissions. Contiguously, further research should monitor how individuals' intentions evolve and whether they align with their actual consumption over time should external factors change the way participants argued they should.

Finally, existing literature is too much focused-on understanding and explaining the climate hypocrisy among for example CC-CGs instead of understanding the challenges they face in their mobility choices (Cass et al., 2023; Higham & Font; Gunster et al., 2018; Schrems & Upham, 2020; Taylor et al., 2017). There is a need for research to shift its focus towards understanding the challenges these individuals face in aligning their attitudes with their actual mobility consumption. Research could contribute to understanding how for example certain social barriers can be overcome, so individuals can help and stimulate each other to reduced mobility consumption and increased use of sustainable alternative mobility modes.

Conclusions

Answers to the Research Questions

To conclude, the goal of this research was to answer the following research question: *How do climate change-conversant graduates' knowledge, attitude and justifications relate to their actual mobility consumption, compared to other highly educated individuals?* The significance of examining this particular demographic, highly-educated individuals with potentially higher-than-average carbon footprints due to increased income and mobility consumption, cannot be overstated. These individuals possess the potential to effect substantial change by reducing their mobility consumption. Such change can play a crucial role in contributing to a more sustainable future, given the considerable influence they wield over their own mobility consumption and their potential to inspire broader societal impact through their credibility and social influence on those around them. With the guidance of theory on cognitive dissonance, moral disengagement and other justification strategies, in-depth interviews were conducted with climate change-conversant graduates and other highly educated residents of Amsterdam, with the goal to understand the influence of climate change knowledge on individual mobility consumption and the potential perceived hypocrisy and reasoning behind these choices. In summary, the research has shown that climate change knowledge alone is not enough, and other factors should be considered like a sense of personal responsibility and the challenges individuals face to align their intention with their actions. This study has contributed to existing literature by differentiating and operationalising justification strategies based on climate change knowledge, sense of personal responsibility and steps taken to reduce mobility consumption to better understand the challenges highly educated individuals face in reducing their mobility consumption. These findings contribute to more accurate and impactful recommendations for managers and policy makers to reduce emissions among this demographic, such as creating more awareness on- and improving accessible sustainable mobility alternatives. The following section gives an answer to the research question by elaborating on the above findings and explaining how highly-educated individuals compare in the different aspects of knowledge, attitude, and justifications, followed by a section on implications for policies and interventions.

Mobility Consumption: Knowledge versus Attitude

First and foremost, on average, those with an education in climate change have shown to have lower carbon footprints, are more consciously thinking about the environment in their decision-making process and have shown more intention to take steps to reduce their mobility consumption. Within this sample, they are more willing to pay more and travel longer for a sustainable mobility mode and are more likely to financially compensate for their consumption. In terms of their attitude towards individual responsibility, the two groups (Gs/NGs) show more similarities. They both perceive individual choices as being of some importance, arguing that individuals can take little steps, but they do not think the individual should be the starting person in combatting climate change and stress an important role for governments and the industry. However, in terms of their own consumption, this attitude does not always align with their personal sense of responsibility, causing signs of cognitive dissonance due to feelings of distress and frustration. This is where a difference can be observed in high- and low responsibility individuals, leading to a newly found categorisation based on the sense of responsibility and the steps taken to reduce mobility consumption (see Figure 4).

High responsibility individuals are more motivated to personally contribute and experience more distress about mobility choices, e.g., they are frustrated about trying to do what is for them justifiable. The high-responsibility group (Strugglers and Dedicated Reducers) deal with these feelings of dissonance by having reported taking moderate to significant steps to reduce their mobility consumption, like choosing their travel destination based on whether they feel able to justify the travel mode they will use to get there or deciding not to go somewhere due to the lack of a sustainable travel mode.

The low-responsibility group is mostly likely related to taking weaker steps to reduce their mobility consumption (Sceptics). This group reported that they should, but probably won't change, and report being unsure if their behaviour has actually changed, although they claim to be more aware of their impact and argue that they will only change if external factors change. Sceptical Reducers are individuals that experience a low responsibility but have taken steps to reduce mobility consumption. This category is barely identified within the sample, thus implying a possible positive relationship between responsibility and steps taken within the demographic.

Although the majority of climate change-conversant graduates have reported a high responsibility, this was not true for all. Simultaneously, other highly-educated individuals have expressed a high responsibility,

thus implying a more accurate categorisation than the levels of climate change knowledge. Recognising the significance of personal responsibility as a driver for reducing mobility consumption allows for more effective and impactful strategies and policies. It acknowledges the complex interplay of knowledge and motivational factors that underlie individual choices, moving beyond a purely educational approach. Acknowledging the role of personal responsibility can help design interventions that increase a sense of personal responsibility while supporting individuals in aligning their actions with their beliefs.

Justification Strategies

The next point of interest of this study, are the justification strategies used by individuals for their current mobility consumption. Dedicated Reducers have shown fewer justifications as their behaviour aligns with experiencing high responsibility. When these individuals make an exception to, e.g., fly once in five years, they argue that it works best to find a balance and allow oneself some exceptions. These exceptions are mostly made for family reasons, or by describing the consequences of their choices as needs. Strugglers experience greater tensions that run counter to their desire and intention to reduce mobility consumption, causing feelings of cognitive dissonance. Aside from the steps they have already taken to reduce this distress, they also apply more justification strategies. On top of family considerations and describing choices as needs, they more often apply the compensation strategy and moral justification. Lastly, Sceptics and Sceptical Reducers are characterised by strategies like exonerative comparison, minimising the consequences, perceiving choices as habit, prioritising their own comfort and desires, and arguing that taking action is not the sort of thing they do. They often do acknowledge the privilege and selfishness of their choices, but this admission does not move them to make changes, therefore showing a greater alignment in attitude and behaviour. Unrelated to the specific category, highly educated individuals tend to describe the consequences of their choices as needs, and - except for Dedicated Reducers - they displace responsibility by attributing blame to governments and industry due to the lack of availability, high costs and time inefficiency of sustainable alternatives.

Recognising the different justification strategies applied by different type of consumers is relevant for more targeted interventions and policies that address the specific internal and external barriers that individuals experience. It has shown that despite experiencing high responsibility and expressing more willingness to

reduce consumption, it is still challenging for individuals to align their attitude with their external choices recognised in the range of justification strategies applied. This highlights the limitations of individual responsibility and stresses the need for structural changes in mobility systems and policies to achieve substantial reductions in mobility consumption as some of these barriers have shown to be legitimate giving the existing context. The next section therefore offers implications and recommendations for policy makers and managers.

Implications for Policies & Organisations

Understanding that personal responsibility plays an important role in the willingness to reduce mobility consumption allows policymakers, organisations, and educators to target their interventions more precisely. Instead of merely providing information, efforts can be directed towards creating a sense of responsibility and addressing the justifications strategies and tensions individuals face in translating intention into action. Moreover, it is important to note that knowledge and sense of personal responsibility alone does not always lead to a reduced mobility footprint. It may result in a willingness to reduce consumption, but external factors play a crucial role in the actual translation of intention into action. Should external factors related to sustainable alternatives improve, this has the potential to lead to a decrease in overall consumption within this demographic. Subsequent sections will detail the actions that policymakers, organisations, and educators can take in this regard.

Increasing Awareness

First of all, the results have shown implications for awareness raising campaigns. There is a potential to increase a sense of personal responsibility by creating awareness on the impact of individual actions to reduce the lack of conflicting response efficacy among individuals. For example, campaigns can educate individuals about the environmental consequences of long-distance flights, a factor often underestimated. Moreover, targeting highly educated individuals is crucial, as their perception of what constitutes frequent flying may be skewed when compared to national or global averages. Furthermore, a subset of the sample emphasized the importance of applying a constructive and transparent communication approach regarding

individual contributions. Expressing disapproval of specific behaviours by only emphasising the negative aspects or resorting to public shaming can yield contradictory outcomes (Goodwin, 2020; Eriksson et al. 2020). On the contrary, promoting sustainable alternatives, showing when and where to book tickets, and encouraging pro-environmental behaviour may lead to a more positive outcome. However, it should be considered that although the sense of personal responsibility and climate knowledge have some effect on mobility choices, among those that show willingness, there are still several tensions that are more challenging to reduce with creating awareness, like the desire to explore the world.

Reducing Air Travel

Secondly, the study has revealed that highly educated individuals support institutional changes to reduce overall mobility emissions and facilitate the translation of intention into action. Examples that participants mentioned in relation to legislature were banning advertisement on short-range flights and city trips and or altogether banning flights in short-range travel within 700 km. The latter on the condition that there already is an existing sustainable alternative of which the capacity could be increased. Many respondents argued for increasing air travel prices and reducing governmental subsidies for air travel, as airlines and airports are now often subsided by governments (Gössling & Peeters, 2007). Dütschke in 2022 found that air travel is positively associated with higher incomes. This suggest that higher prices could lead to a reduction in air travel (KiM, 2023). In this study, it was found that respondents, even though they supported an increase in travel fares, would still continue flying given that they would be able to afford to do so. This is in line with Dutschke (2022) who found that in the same light, an increase in air travel fares would even increase the attractiveness of flying due to an increase in perceived exclusivity. Increasing prices for air travel would therefore increase inequality among society, because flying becomes even more only for a high-income class (Ecorys, 2022.

The perspective shared by many participants on technologies and innovations also have significant implications. Firstly, the belief that technology and innovation should be the key drivers for reducing mobility emissions underscores the importance of investing in and promoting sustainable technological advancements. Especially among this demographic, where the individuals have a high need and desire to explore the world, continued research, and investments in the development of sustainable mobility are essential in mitigating

emissions. However, the earlier discussed report argues that the increase of air travel is growing faster than the efficiency improvements, offering a counterargument to the technological optimisms of this argument (KiM, 2023).

Increasing Use of Sustainable Alternatives

To address the justification mechanisms related to the attribution of blame to governments and industry due to, lack of availability, high costs and time inefficiency of sustainable alternatives, this study highlights the need for greater focus on enhancing the time-efficiency and affordability of sustainable alternatives, especially for travel within Europe. Policies and organisations should prioritize the development of efficient and well-connected public transportation systems, as well as promote active modes of travel such as cycling and walking. Should sustainable options be made more accessible and visible, this demographic would be more likely to replace less sustainable methods of transportation. Financial considerations also play a significant role in mobility choices. To further encourage sustainable travel, governments and organisations should explore financial incentives such as tax benefits, subsidies, or reduced fares for public transportation (Gössling & Peeters, 2007). When individuals feel like it is within the limits of their agency to, for example to purchase an electric car, financial incentives could increase a sense of personal responsibility among this demographic. By making sustainable alternatives more financially attractive, individuals are more likely to opt for them. Nevertheless, it's essential to bear in mind that, due to Socially Desired Responding (explained earlier), expressing the intentions to opt for a more sustainable alternative does not guarantee external behaviour. Additionally, the report by KiM (2023) refers to other studies explaining that decrease in individual flight intentions and increased intentions for sustainable alternative do not immediately result in fewer passengers and aircrafts departing from the Netherlands. This is partly due to environmental factors such as economic development and capacity constraints at airports. This implies that policies should be put in place that increase the use of sustainable alternatives while decreasing the carbon emissions from air travel.

Reducing Work-related Consumption

Lastly, the results have indicated that companies have a large responsibility to be critical about work-related travel among their employees. Offering (financial) incentives to travel more sustainably is a great

stimulus to reduce overall work-related mobility consumption. An example of how the government also plays a role in this is the policy that is supposed to go into effect in 2023 which obligates companies to report on their employees home-work commute (*Rapportageverplichting Werkgebonden Personenmobiliteit*, 2023). The same type of policy but then also for international travel would reduce emissions even more.

Concluding Remarks

In conclusion, addressing the environmental impact of highly educated individuals' mobility consumption requires a multifaceted approach which combines individual awareness and sense of personal responsibility, enhanced availability and affordability of more time-efficient sustainable alternatives, and a critical re-evaluation and stimulation of more sustainable work-related travel. By implementing these recommendations, policymakers and organisations can effectively reduce mobility emissions among this demographic, contributing to a more sustainable and environmentally friendly future.

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Appendices

Appendix A

Theoretical framework

Table 9

Overview of Existing Theoretical Justifications/ Disengagement Mechanisms

Paper	Justifications/ disengagement mechanisms
McDonald et al., 2015	• Related to travel product, context or personal identify
Schrems & Upham, 2020	• Denial of control or responsibility • Comparisons • Compensation through benefits
Higham & Font, 2019	• Moral justification • Exonerative comparison • Euphemistic labelling • Minimising, ignoring, misconstruing the consequences • Dehumanisation • Attribution of blame • Displacement of responsibility • Diffusion of responsibility
Cass et al., 2023 (based on others)	• Redirect responsibility • Emphasize downsides • Push non-transformative solution • Surrender • Internal factor barriers • External behaviour barrier • Internal behaviour barrier • External internal behaviour barrier • Situational variables • Psychological variables • Environmental values • Determined • Describe consequences of choices as needs • Humour

	• Luck/ merit
	• Limits of agency
	• Compensation

Appendix B

Initial coding categories

Table 10

Theoretically Inspired Themes

Overarching themes	Individual themes
Moral disengagement	Moral justification
	Denial of responsibility
	Minimisation
	Misconstruction
	Ignoring
	Comparison
	Compensation
	Limits of agency
	Surrender
	Government
	Policies
	Technology
	Trust
	Power
	Costs/ price
Socio-demographics	Age
	Gender
	Income
	Household structure
	Employment
	Residential situation
	Education
Climate change knowledge	Environmental consequences
	Climate change
	carbon footprint/ emissions
	Emotions/ thoughts/ feelings
	Concern
	Morals
	Attitude

	Intention
	Justice
Cognitive dissonance (idiographic) or (nomothetic)	Shame/ embarrassment
	Guilt
	Discomfort/ conflict
	Anxiety/ emotional distress
	Confusion
	Hypocrite
	Frustration
	Norms
	Peers
	Society
Behavioural change	Self-sanctions
	Reduction
	Elimination
	Active transportation

Appendix C

Operationalisation

Table 11

Operationalisation of Theoretical Concepts

Concept	Indicators	Questions/ Measurement
Levels of climate change knowledge	Norms, opinions, attitude, knowledge, emotions	- CC-CG education - Interview questions about the importance of climate change, how they would describe their knowledge/attitude on climate change
Hypocritical behaviour	Car ownership, kilometres driven, public transport usage, average flying behaviour, home-work commute, (E)-bike usage	- Background research - Average personal carbon emissions - Respondents carbon footprint calculator results - Interview questions
Cognitive dissonance	Discomfort, conflict, confusion, distress, anxiety, feeling hypocritical, *frustration, guilt, depression, anger, resentment, shame,*	Interview questions about how they feel about their mobility consumption, ask them to evaluate their own choices
Justifications	Any of the mechanisms recognised in literature and more	Interview questions about why they do what they do, how they feel about their consumption compared to their surroundings
Reducing mobility consumption	Reducing/ eliminating flying, not buying a car, taking public transportation, active transportation, lower emissions than average	Interview questions about what choices to have made or intent to make to reduce their consumption

Appendix D

Participants Questionnaire

Informed consent form

In this study we want to learn about the mobility consumption of residents of the Amsterdam Metropolitan Area. Participation in this questionnaire and interview is voluntary and you can quit both at any time without giving a reason and without penalty. Your answers to the questions of both the questionnaire and interview will be shared with the research team. We will process your personal data confidentially and in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act). Please respond to the questions honestly and feel free to say or write anything you like.

Everything you say or write will be confidential.

I confirm that:
- I am satisfied with the received information about the research;
- I have no further questions about the research at this moment;
- I had the opportunity to think carefully about participating in the study;
- I will give an honest answer to the questions asked.

I agree that:
- The data to be collected will be obtained and stored for scientific purposes;
- The collected, completely anonymous, research data can be shared and re-used by scientists to answer other research questions;

I understand that:
- I have the right to see the research report afterwards.

Do you agree to participate?
- o   Yes
- o   No

What is your full name? (This is only used to match the questionnaire with the interview, the results will be anonymous)

_____

What is your age? In numbers.

_____

How do you see yourself?
- o   As male
- o   As female
- o   Other, namely _____
- o   Prefer not to tell

What is your city/town of residence?

_____

What is your highest achieved degree?
- o   MBO (intermediate vocational training)
- o   HBO bachelor (higher vocational training)
- o   HBO master
- o   WO bachelor education
- o   WO master educaton
- o   Phd/ candidate
- o   Else, namely _____
- o   Prefer not to tell

How much did your education cover aspects of the causes and effects of climate change?
- o   None at all
- o   A little
- o   Somewhat
- o   A lot
- o   A great deal

Which of these topics were discussed in your education/ phd?
1. GHG emissions
2. Planetary boundaries
3. Climate Agreements (like Paris agreement)
4. Sustainability
5. Renewable energy
6. Waste management
7. Circular economy
8. Climate migration
9. Social & Environmental impact assessments
10. Innovation
11. Natural disasters
12. Global warming/ 1.5 degree target
13. Ecosystems

14. Biodiversity
15. All of the above
16. Others, namely _____
17. None

Which of the following categories best describes your employment situation?
o   Employed, working 1-35 hours per week
o   Employed, working more than 35 hours per week
o   Unemployed, searching for a job
o   Unemployed, not searching for a job
o   Else, namely _____

Display This Question:
  If Which of the following categories best describes your employment situation? = Employed, working 1-35 hours per week
  Or Which of the following categories best describes your employment situation? = Employed, working more than 35 hours per week
  Or Which of the following categories best describes your employment situation? = Else, namely

In which city/town is your work located?

_____

What was your income in 2022 before tax?
o   < 20.000
o   20.000 - 29.999
o   30.000 - 39.999
o   40.000 - 49.999
o   50.000 - 59.999
o   60.000 - 69.999
o   70.000 -80.000
o   > 80.000
o   Prefer not to tell

End of Block: Default Question Block

Start of Block: Footprint Calculator

The next section includes questions concerning your own lifestyle, behaviour and consumption. These questions will be used to calculate your personal carbon footprint, so try to answer them as precise and truthful as possible. You can take your time and use external resources like a calculator. If you have any questions, please consult the researcher.

A carbon footprint is a measure of the total amount of carbon dioxide (CO_2) emissions that is directly and indirectly caused by activities or is accumulated over the life stages of products. It includes other Green House Gas emissions, calculated to a CO2-equivelent.

How would you describe your flying habits? (Short range is 1-3 hours, mid range is 4-7 hours, long-range is 8-16 hours)
- o I fly rarely or never (this assumes 1 short-range roundtrip flight per year)
- o Occasionally (this assumes 1 mid-range and 2 short-range roundtrip flights per year)
- o Regurarly (this assumes 1 long-range, 2 mid-range, and 4 short-range roundtrip flights per year
- o Enter custom amount. For example: 2, 0, 1. Meaning 2 short-range flights, 0 mid-range flights, 1 long-range flight. _____

Which best describes your diet?
- o Vegan
- o Vegetarian
- o Pescetarian
- o I try to eat less meat
- o I eat everything

How far do you drive per year (as a driver or passenger)? Enter kilometers if possible.
- o I don't drive or have a car
- o Up to 5000 km
- o 5000-10000
- o 10000-15000
- o Enter kilometers _____

What kind of fuel does your car/ the car your drive use?
- o Electric (green energy)
- o Electric
- o Natural gas
- o Gasoline, diesel, or hybrid
- o I don't know

How far do you travel per week on public transport or by train?
- o More than 600
- o 360-600
- o 240-360
- o 80-240
- o 60-80
- o Less than 60
- o I don't use public transport

Do you use any other motorized transportation mode?
- o Electric bicycle
- o Electric motor scooter/ motorcycle
- o Gas or diesel motor scooter/ motorcycle
- o No
- o Other, namely _____

How much do you shop?
- o Rarely (you only buy new items when it's necessary. You try to fix broken devices and wear clothing for multiple years)
- o Average (you like things that last a while, but don't say no to the casual upgrade)
- o Shopper (you enjoy shopping the latest and greatest. Whether it is clothing or electronics, you've got to have it)
- o Luxury shoppers (your budget allows for frequent upgrades and fast consumption. The thrill of it all is a part of your life)

How big is your home?
18. Studio
19. One-bedroom
20. Two-bedroom
21. Three-bedroom
22. Enter square meters _____

How many people live in your home?
- o Just me
- o Two people
- o Three people
- o Four to six people
- o Seven or more people

Do you have renewable electricity at home?
- o Yes
- o Not yet
- o Not sure

End of Block: Footprint Calculator

Start of Block: Reasons and justifications

The final set of questions concerns your attitude towards changing your behaviour and combatting climate change. These questions will be discussed in more detail in the interview.

Page Break

How satisfied are you with what's being done to combat climate change?

o   Extremely dissatisfied
o   Somewhat dissatisfied
o   Neither satisfied nor dissatisfied
o   Somewhat satisfied
o   Extremely satisfied

Page Break

How much responsibility do each of the following have in terms of combatting climate change? (1 = none at all, 2 = a little, 3 = a moderate amount, 4 = a lot, 5 = a great deal)

	1	2	3	4	5
Politics					
Business & Industry					
Each individual person					
The society as a whole					
The industrialised/developed countries					
The developing countries					
Others, namely					

Page Break

What do you consider the importance of reducing individual mobility consumption?
o   Not at all important
o   Slightly important
o   Moderately important
o   Very important
o   Extremely important

How much have you done to reduce your own mobility? (Think about not driving a car, reducing flying behaviour)
o   None at all
o   A little
o   A moderate amount
o   A lot
o   A great deal

How likely are you to reduce or abandon certain climate change-damaging mobility activities? (Think about not driving a car, reducing flying behaviour)
o   Extremely unlikely
o   Somewhat unlikely

- o   Neither likely nor unlikely
- o   Somewhat likely
- o   Extremely likely

Can you shortly describe why, or why not?

_____

Do you agree with the following statements? 1 = strongly disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree, and 5 = strongly agree

	1	2	3	4	5
My mobility/flying is for a higher cause (e.g., a congress, going to developing countries)					
Others have worse mobility consumption than me					
My personal mobility has direct impact on climate change					
I am already doing everything I can					
There is nothing we can do about climate change					
I have to travel for my job/ employer					
Everybody else using the same mobility as I am, so why can't I					
Climate change is not my responsibility, but companies/governments/ someone else					
I compensate my mobility by something else (e.g., eating vegan, owning solar panels)					
It is not in my power to change my mobility (others plan my trips, company bought car, etc)					
It is already too late, so changing won't matter					
I don't want to miss out on anything					

Page Break

Interview Guide

Introduction (Socio-demographic information)

1. Can you tell me some things about yourself, your work, where and with whom you live and about your education

2. How did your education cover aspects of climate change?

(*Structuring*) I would like to start with some questions on your perception of the causes and effects of climate change. Do you have any questions for me beforehand?

Main topics

Topic: Climate Change knowledge, attitude (&justifications)

3. What is your current understanding of whether climate change is happening and whether it is caused by natural forces or by humans?

4. What human actions do you think amplify climate change?

5. What do you consider the impact of mobility on climate change?

    a. (*Specifying*) How about cars/ car ownership? How about flying?

6. If you think something should be done to combat climate change, or more than what has been done so far, who ideally should do it/ describe in your own words and as detailed as possible who, realistically, will do something to combat climate change?

7. What do you consider the importance of reducing mobility consumption?

(*Structuring*) I would now like to move onto some questions about your own mobility and the carbon footprint calculator you have just filled in.

Topic: (Hypocritical) mobility behaviour (&justifications)

8. Please can you tell me about your daily and weekly mobility– so how and why you travel day to day, and week to week?

9. Please can you tell me about your holidays, short breaks, weekends away? Either last or a typical year.

    a. (*Specifying*) why? How do you choose destinations etc?

Topic: Behavioural change (&justifications)

10. Has your mobility changed much over the years?

    a.   What has changed and why? How was your mobility prior to that?

11. Have you taken any actions as an individual to reduce your mobility deliberately?

    a.   (*Probing*) If so, what have you done and why?

    b.   (*Probing*) How do you think this is influenced by your education?

    c.   (*Probing*) If not, why not and how do you feel about this?

12. How do you think that is influenced by your education compared to other aspects?

13. Are you planning to change your mobility soon or eventually?

    d.   (*Probing*) *If so*, what and why?

    e.   (*Probing*) *If no*t, what holds you back?

14. Did you ever confront situations in which you had to make a difficult decision, or that you perceived to be a dilemma in mobility use? What did you do and what were your feelings about it at the time?

    a.   (*Probing*) How do you feel about your actions looking back at it?

Topic: Justifications

1. How do you perceive your mobility consumption compared to your colleagues, family, friends, society?

    a.   How does it make you feel that you restrict yourself and others in your surroundings maybe don't?

I would now like to share with you the results of the carbon footprint calculator based on the questions you answered in the survey. Your total annual emissions are ... tons of CO2 per year. Relative to a national average of 10.08 tons of CO2 and a world average of 4.5 tons of CO2

(*Structuring*) The last part of the interview is focused on your feelings and emotions concerning your mobility choices. Please don't hold back on anything you feel comfort about sharing.

Topic: Cognitive dissonance (&justifications)

2. Does this say anything to you, these numbers?

3. Where you aware of your emissions before?

    a.   Did that have any influence on your behaviour?

4. How did you feel filling in the carbon footprint calculator?

    a. (*Specifying*) Where do you think that feeling is coming from? <u>Towards whom?</u>

    b. (*Probing*) In what ways do you find this discomforting/ conflicting?

5. (Follow-up if not discussed) And looking at your footprint compared to the national average of 10.08 tons, why do you think that is?/ How does that make your feel?

Closing

We have come to the end of the interview. Is there anything you would like to add still, anything you feel is undiscussed? Anything you want to ask me?

Appendix E

Average Emissions in The Netherlands

Table 12

Average Mobility Emissions in The Netherlands (Fight Climate Change., n.d.)

Transportation	Unit of measurement	Type	Average consumption
Flying	Yearly	Short-range flights (1-3 hours)	Between 1 and 2 single
		Mid-range flights	None
		Long-range flights	None
		Cabin class	Between Economy Business class
		Cruise ships	Not recently or ever
Car	Yearly	Mileage	9200 km
		Fuel	Between gas, diesel, or hybrid
		Fuel economy	6-9 (roughly 20 kWh/100 km)
Public transport & trains	Weekly	Distance	+/- 60 km
Motorbike	Yearly	Distance	No motorbike
Motorboat	N/a	Distance	No motorboat
Light aircraft	Monthly	Hours	None

Table 13

Total Emission Averages per Segment (Fight Climate Change., n.d.)

Segment	Tons CO_2
Travel	0.57
Diet	1.91
Mobility	1.98
Shopping	1.94
Home	2.91
Pets	0
Public sector	0.78
Total	*10.09*

Figure 9

Total average Tons CO$_2$-e in the Netherlands and the averages per category[65] (Fight Climate Change., n.d.)
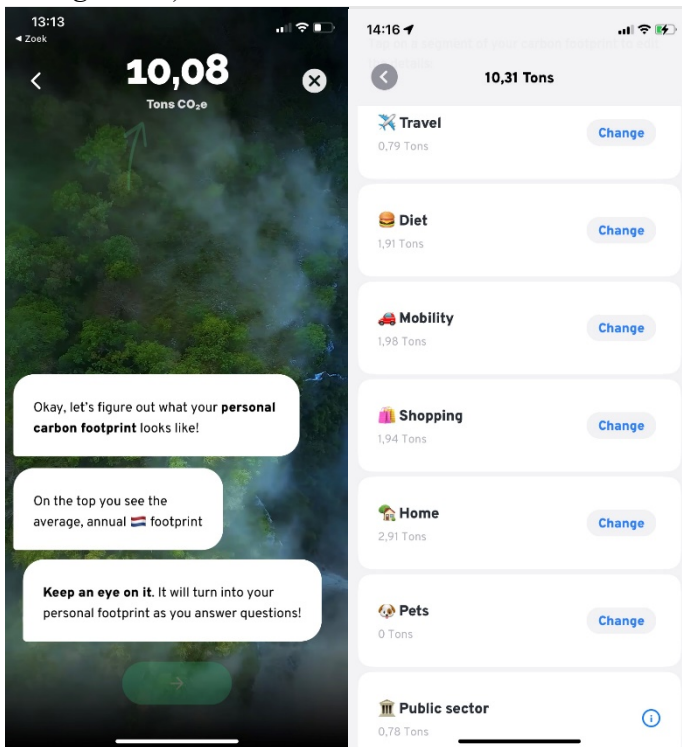

Figure 10

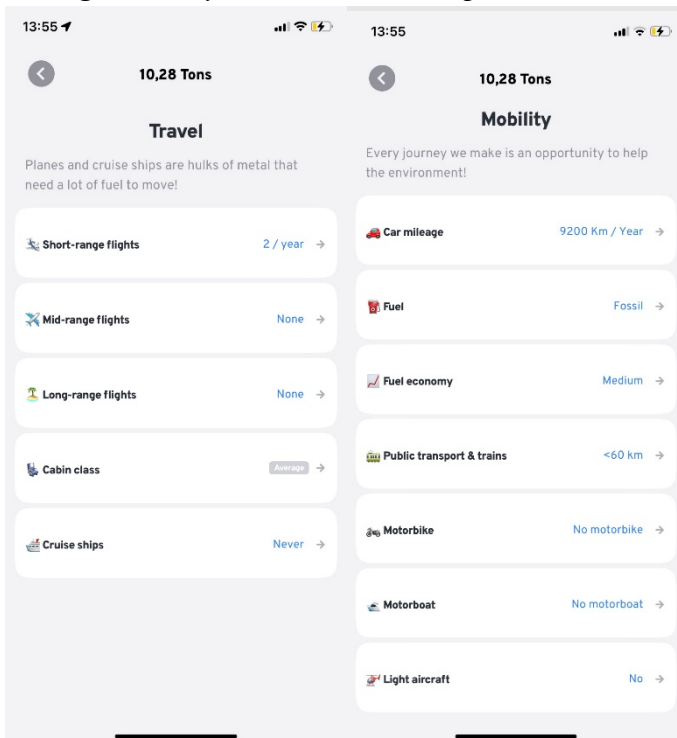*Average mobility and travel consumption in the Netherlands (Fight Climate Change., n.d.)*

Figure 11

Proof that average number of short-range flights is between a single and one roundtrip per year (Fight Climate Change., n.d.)

Appendix F

Informed Consent

Informed consent form
In this study we want to learn about the mobility consumption of residents of the Amsterdam Metropolitan Area. Participation in this questionnaire and interview is voluntary and you can quit both at any time without giving a reason and without penalty. Your answers to the questions of both the questionnaire and interview will be shared with the research team. We will process your personal data confidentially and in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act). Please respond to the questions honestly and feel free to say or write anything you like.

Everything you say or write will be confidential.

I confirm that:
- I am satisfied with the received information about the research;
- I have no further questions about the research at this moment;
- I had the opportunity to think carefully about participating in the study;
- I will give an honest answer to the questions asked.

I agree that:
- The data to be collected will be obtained and stored for scientific purposes;
- The collected, completely anonymous, research data can be shared and re-used by scientists to answer other research questions;

I understand that:
- I have the right to see the research report afterwards.

I understand that:
• I have the right to see the research report afterwards.

Do you agree to participate? o Yes   o No

Information sheet
Introduction
You are invited to take part in this study on the mobility consumption of residents of the Amsterdam Metropolitan Area. The study is conducted by Pien Simons who is a student in the Msc programme Sustainable Business and Innovation at the Department of Sustainable Development, Utrecht University. The study is supervised by Brett Petzer.

Participation
Your participation in this interview is completely voluntary. You can quit at any time without providing any reason and without any penalty. Your contribution to the study is very valuable to us

and we greatly appreciate your time taken to complete this interview. We estimate that it will take approximately 60-90 minutes to complete the interview. The questions will be read out to you by the interviewer. Some of the questions require little time to complete, while other questions might need more careful consideration. Please feel free to skip questions you do not feel comfortable answering. You can also ask the interviewer to clarify or explain questions you find unclear before providing an answer. Your answers will be noted by the interviewer in an answer template. The data you provide will be used for writing a Master thesis report and may be used for other scientific purposes such as a publication in a scientific journal or presentation at academic conferences. Only patterns in the data will be reported through these outlets. Your individual responses will not be presented or published.

Data protection
The interview is also audio taped for transcription purposes. The audio recordings will be available to the Master student and academic supervisors. We will process your data confidentially and in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act).

In case audio recordings will be deleted: Audio recordings will be deleted when data collection is finalised and all interviews have been transcribed.

Appendix G

Relevant Figures and Frameworks

Figure 12

Categorisation Climate Change Knowledge vs Conservation Behaviours (Taylor et al., 2017)

	Coverts	Believers
Conservation Behaviors	*Individuals holding low levels of climate change knowledge but exhibit positive conservation practices*	*Individuals holding high levels of climate change knowledge and exhibit positive conservation practices*
	Diehards	Hypocrites
	Individuals holding low levels of climate change knowledge and do not exhibit positive conservation practices	*Individuals holding high levels of climate change knowledge but do not exhibit positive conservation practices*

Climate Change Knowledge

Figure 13

Bandura's Moral Disengagement Theory (Voigt et al., 2016)
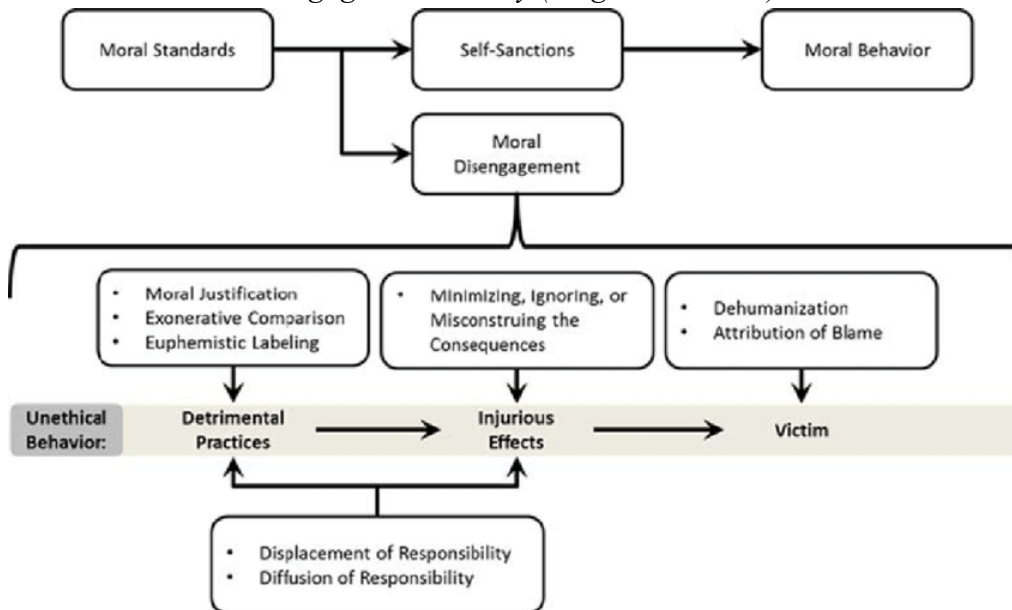
Figure 14

Emissions by income class between 1990-2019 in the Netherlands (Ecorys, 2022)
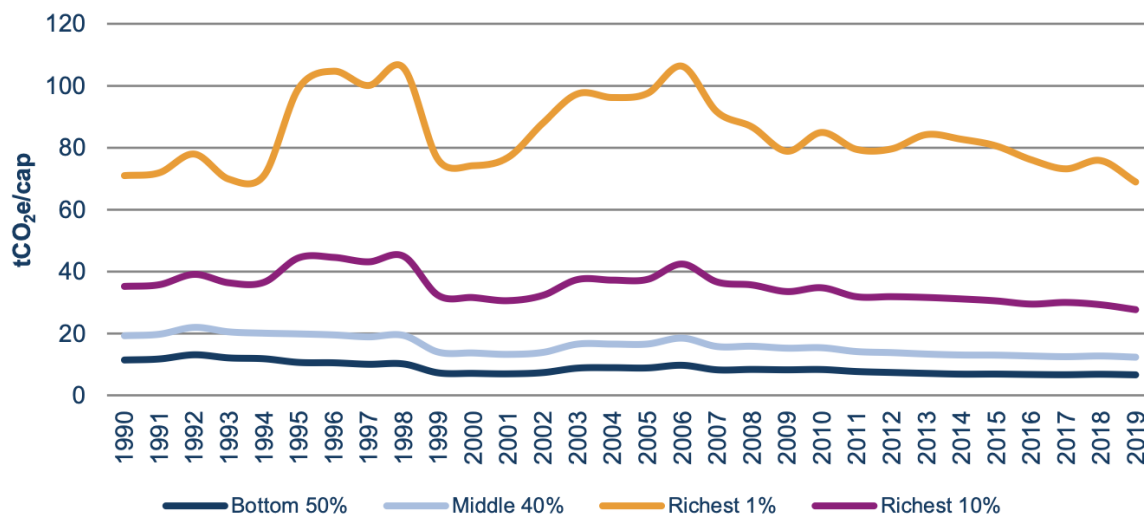
Figure 15

Emissions by income class and consumption category 2018 (Ecorys, 2022)
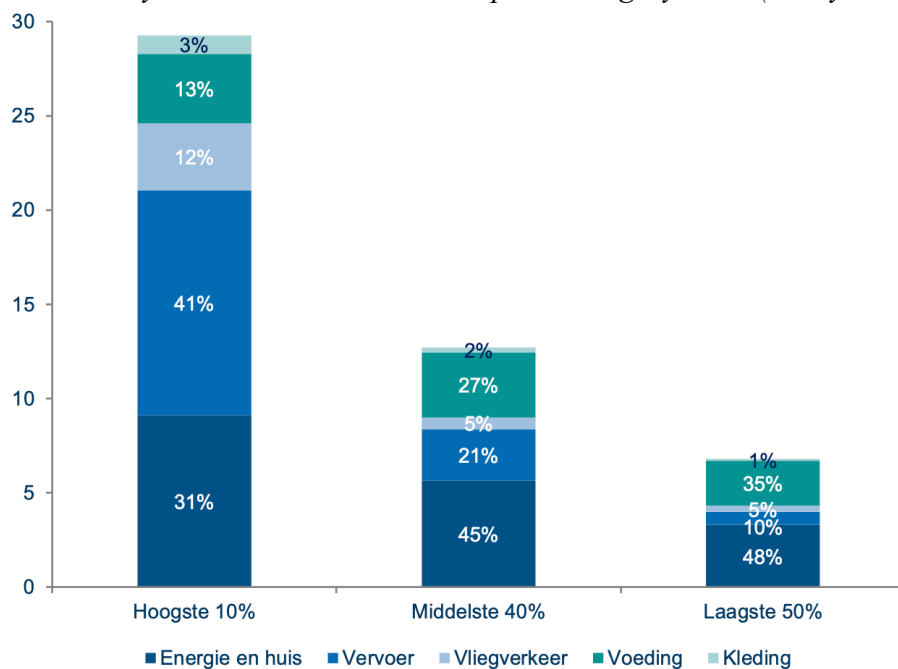
Figure 16

Average income per age category

Leeftijdsgroep	Heeft een inkomen uit arbeid	Gemiddeld maandinkomen (bruto)	Gemiddeld jaarinkomen (bruto)	Verschil t.o.v. vorige leeftijdsgroep
15 t/m 24 jaar	84%	€ 1.225	€ 14.700	-
25 t/m 34 jaar	88%	€ 3.833	€ 46.000	213%
35 t/m 44 jaar	87%	€ 4.767	€ 57.200	24%
45 t/m 54 jaar	84%	€ 5.075	€ 60.900	6%
55 t/m 64 jaar	72%	€ 4.592	€ 55.100	-10%
65 t/m 74 jaar	19%	€ 1.917	€ 23.000	-58%
75 t/m 84 jaar	4%	€ 1.042	€ 12.500	-46%
85 jaar en ouder	1%	€ 1.083	€ 13.000	4%

Figure 17

Average income based on education class

Hoogst behaald opleidingsniveau	Gemiddeld bruto maandinkomen	Gemiddeld bruto jaarinkomen	Toename t.o.v. vorige opleidingsniveau
Laag: Basisonderwijs, Vmbo, havo, vwo-onderbouw, mbo 1	€ 2.125	€ 25.500	-
Midden: Middelbaar onderwijs, mbo 2, mbo 3, mbo 4	€ 2.900	€ 34.800	+36%
Hoog: Hbo, wo	€ 4.675	€ 56.100	+61%

Table 14

Overview of average income levels based on the education level and the expected emissions

Average income per education level (2017):	Average income per education level Knap (2023):	Yearly income levels in the Netherlands (2021):	Emissions per income level (2018):	Average income for age group 25-34	Starting salary WO
Lower: €23,200 Intermediate: €28,800 Highly: €45,100	Lower: €25,500 Intermediate: €34,800 Higher (HBO, WO): €56,100	Lowest 50% (1-5): €2.800 - €25,200 Middle 40% (6-9): €31.200 - €59,000 Highest 10% (10): €109,000	Lowest 50%: +/- 7-ton CO_2 Middle 40%: +/- 12.5-ton CO_2 Highest 10%: +/- 29-ton CO_2	€46,000 (Average is already within middle 40%)	€32,400. (As starter already part of middle 40%, therefore expected to have on average 12.5 tCO_2)

Appendix H

Codebook

Table 15

Top-Level, Parent and Child-Codes with their Description and the Number of Files and References Codes

Name	Description	Files	References
Reduce mobility consumption	*Participants' efforts to reduce their consumption,, their personal intentions, preferences, and commitments, as well as the challenges they face in decision-making and the incentives that drive their actions.*	*26*	*219*
Likely to (have) reduce(d) mobility consumption		*20*	*47*
Cho(o)se electric car out of environmental perspective		*3*	*6*
Consciously think about mobility behaviour at holiday location		*2*	*2*
Decided not to go somewhere due to lack of sustainable travel mode		*5*	*6*
If it's not necessary to fly, why would I		*4*	*4*
Possibility to get lease car but don't because of sustainability		*2*	*2*
Took public transport even though difficult to reach		*5*	*6*
Used to drive more		*1*	*1*
Used to fly more		*14*	*20*
Personal intentions and preferences	*Attitudes and inclinations towards different mobility choices, both the intention to engage in certain behaviour as well as the preferability to reduction of others*	*24*	*131*
Allowing oneself some exceptions		*9*	*16*
Always try to carpool		*3*	*4*
Choose locations based on time and justifiable travel mode		*7*	*10*

Name	Description	Files	References
Financially compensate more for flying behaviour		*4*	*13*
I 'hope' my flying behaviour will decrease		*4*	*5*
I prefer not to fly anymore		*8*	*12*
I will think about my decisions more		*5*	*7*
If I don't need a car I don't want one		*11*	*14*
Look for alternatives for flying for short-distance travel		*10*	*11*
More work and less need to travel		*2*	*2*
No desire for many long-distance flights		*3*	*6*
Only long-distance travel for longer duration		*6*	*8*
Prefers to have job within biking distance		*2*	*3*
Prefers to take train or drive within Europe		*9*	*13*
Try to delay buying a second car		*2*	*2*
Try to take train instead of borrowing car		*3*	*3*
Would prefer to borrow or share a car instead of buying		*1*	*2*
Unlikely to change certain behaviour		*17*	*41*
I should, but I probably won't		*7*	*11*
Not as much as I could		*3*	*3*
Not flying is not an option		*6*	*6*
Only if external factors change		*7*	*7*
Probably won't change long-distance flying behaviour		*6*	*9*
Think about it more, but unsure if flying is actually less		*5*	*5*
Climate knowledge and awareness	*Related to individuals' education, understanding, consciousness, and awareness of climate change and its implications*	*23*	*73*

Name	Description	Files	References
Climate change has a significant role in our and future lives		*3*	*3*
Climate change is common knowledge		*3*	*6*
Climate change is entirely human-caused		*6*	*7*
Data and news about climate change is increasing		*8*	*11*
Education and awareness rising is important	*The influence of education, education level and raising climate awareness in society Proven by quotes of interviewees how their education has influenced their behaviour*	*16*	*31*
Lack of transparancy and disinformation		*3*	*5*
Literal interpretation and perceived obviousness	*Participants' tendency to interpret questions or statements in a literal sense and their perception of certain information as being self-evident or obvious*	*4*	*7*
People are unaware of true impact of electric vehicles		*2*	*3*
Contexts		*26*	*357*
Environmental impact	*Statements participants make about the impact of certain industries, activities, etc.*	*20*	*74*
Consuming, capitalism,...		*13*	*22*
Electrification	*Comments about batteries, EV's*	*8*	*14*
Energie consumption and fossil fuels in general		*4*	*10*
Flying and mobility		*10*	*17*
Food		*9*	*11*
Mobility contexts		*26*	*230*
Biking infrastructure	*Comments on the Dutch biking infrastructure*	*4*	*4*
Daily and work commute	*To separate home-work commute etc and leisure mobility*	*26*	*104*
Owns a car		*13*	*17*

Name	Description	Files	References
European train system	*Whenever individuals talk about the train systems, the considerations of price, comfort etc are also in separate codes*	14	28
Leisure mobility	*To separate daily mobility and leisure mobility*	26	94
Non-mobility contexts		19	53
Food, Diet		15	23
Home, Energy		9	12
Mixed		2	3
Shopping		9	15
Demographics	*Both the demographics of participants as well as the role of demographical factors*	26	114
Education	*The education the participants have had*	26	69
Employment	*The employment situation of the participants*	25	43
External factors		26	469
A private car is needed for broader mobility		5	8
Car dependency to travel more sustainable in Europe		3	3
Comfort	*The importance and interpretation of comfort and convenience*	17	45
Comfort of car for travel within Europe		7	12
Comfort train for shorter distance deciding factor		2	2
Electric cars have short-distance range		1	2
The comfort of a car important driver for national mobility	*When the comfort of taking a car is the most important reason to choose this type of transport*	12	28
Comfort and time efficiency important driver for electric bike		2	3
Costs	*The importance of the costs of certain mobility choices*	25	94
As long as people can afford it, they'll do it		3	4

Name	Description	Files	References
Choosing flying eventhough more expensive		1	2
Don't want to buy a car and leasing is too expensive		1	1
Electric cars are (too) expensive		5	10
European trains are too expensive		13	22
Mobility is mostly a financial consideration		9	12
National public transport too expensive		6	8
Prices of flying could be increased	*Bringing the 'real' price into flying, where the price is reflected by the impact it has.*	11	15
Sustainable alternative should be more affordable		6	8
Taking the train eventhough more expensive		6	8
Willing and able to afford more sustainable mode		4	4
COVID 2		8	14
Less (leisure) flying behaviour during and since COVID		3	4
Less mobility due to remote working		4	7
Rebound effect after COVID		1	1
Socially accepted to not be everywhere physically		2	2
Easier for older generations to limit flying behaviour	*Reason for the average of young people to be higher than for example grandparents*	1	2
Older generations have a harder time adapting	*The perception on the role age plays in mobility consumption and individual change "Older people are more used to certain things and standards, habits. More likely to stay with certain mobility modes"*	7	13
Responsibility		21	51
Attribution of blame	*Blame someone or something else for the fact that, e.g., the more sustainable mode is not affordable or quick enough*	8	11
Describe consequences of choices as needs	*Theory Have to travel for job for employer Denial of responsibility*	17	39

Name	Description	Files	References
Responsible for CO2 footprint of employees		*1*	*1*
Social factors		*25*	*158*
(Exonerative) comparison	*(Theory) Comparison both to what others do but also to what other options there might be that would be worse "Others are worse"*	*4*	*6*
'Bubbel' perceives extensive and long distance flying as normal		*1*	*1*
Don't want to be above average	*If Participants stress that do not want to have an above average carbon footprint*	*4*	*6*
Everybody at work travel same or more		*4*	*6*
Family friends or partners are less concerned about environment		*8*	*10*
Nobody in surrounding does not fly due to financial reasons		*1*	*1*
Nobody in surrounding is committed to not flying		*3*	*4*
Perceives own behaviour as comparable to surrounding		*9*	*13*
Perceives own behaviour as less than average and or surrounding	*Whenever individuals perceive their behaviour as not that much and 'downplay' their own behaviour by comparing to others*	*9*	*15*
Perceives own behaviour as more than average		*3*	*4*
Challenging others caused conflict with friends and family		*1*	*2*
Colleagues or friends or family are more aware of environmental impact		*3*	*5*
Conscious behaviour is due to zeitgeist (more than education)		*2*	*2*
Difficult to communicate with individuals that do not consider environment		*1*	*2*
Discussions have hardened around certain topics		*2*	*4*

Name	Description	Files	References
Distress about weddings abroad		1	1
Driving a car is the 'norm'		3	3
Easier to influence family than friends		1	1
Family or friends or partner lives abroad		11	18
Flying has become a norm		2	2
Important to challenge eachother about behaviour		7	16
Judging others about their behaviour	*Opinionated about a certain action or what other should or could do. Normative evaluations.*	9	20
Others say they don't want to fly anymore		3	3
Positive influence of surrounding		14	31
Conscious friends raise awareness		3	6
Gladly comply to determination of others		1	2
Good experiences of others influenced decision		2	4
Partner stimulates train travel within Europe		1	1
Peer students influence is big(ger than programme itself)		8	15
Raised with climate awareness		2	3
Prefers not to lecture others		5	6
Social group is determent for choice of mobility		7	9
The importance of positive role models	*When individuals talk positively of the behaviour of someone else or the importance of certain role models*	17	27
Only possible to influence close social circle	*Who you can influence or by whom you are influenced*	3	3
Only public figures have exemplary role		1	1
Time	*The importance of the timespan of certain mobility choices*	25	78

Name	Description	Files	References
European train travel time is a disadvantage but not a barrier		*4*	*6*
Possibility to work on public transport		*5*	*6*
The duration of the holiday is deciding factor		*4*	*5*
Time as justification		*17*	*48*
European train travel time important barrier		*11*	*17*
Reachability by public transport in the Netherlands barrier	*Causes an extended travel time, which is a barrier*	*1*	*1*
Time efficiency of car most important		*6*	*8*
Time efficiency of flying important barrier to more sustainable mode		*11*	*22*
Willing to travel longer	*Longer travel time worth the difference of footprint*	*8*	*13*
Great quotes		*5*	*10*
Internal factors		*26*	*496*
Acknowledging privilege and entitlement	*Dynamics related to the assumption that certain mobility choices are only available to higher-income individuals and the associated societal privileges and entitlements. Socio-economic status.*	*13*	*23*
Climate activism has declined because of disappointments		*1*	*3*
Compensate my behaviour by something else	*Theory*	*8*	*29*
(Financial) compensation gives peace of mind		*4*	*10*
Environmental impact not deciding factor for location or more sustainable mobility mode		*8*	*13*
Experience(d) anger		*3*	*3*
Experiences (flying) shame		*8*	*15*
No		*2*	*3*
Only when discussed with friends		*2*	*2*
Yes		*5*	*10*

Name	Description	Files	References
Experiences guilt		*11*	*24*
No		*6*	*12*
Wants to be conscious but it is challenging		*1*	*1*
Yes		*5*	*12*
Feeling hopeful		*2*	*2*
Feelings towards mobility choices		*17*	*42*
(Used to) be ashamed by making conscious choices	*When individuals are ashamed by their climate conscious choices and (used to) adapt to others because of it*	*1*	*4*
Distress about mobility choices	*Fear, sadness*	*7*	*12*
Feels bad about choices and behaviour		*8*	*13*
Feels good about making conscious choices		*4*	*5*
Frustrated about trying to do what feels right		*5*	*8*
Hearing and talking about footprint as a good reflective exercise		*4*	*4*
Internal barriers		*23*	*133*
Acting according to their limits of agency	*Theory "Already doing everything I can"*	*6*	*9*
Climate change needs to be experienced before feeling the urge that something should happen		*2*	*3*
Conscious of justifying actions		*1*	*2*
Don't take climate change in consideration for location or mobility mode	*When a participant does not deliberately make a conscious choice about mobility. Not thinking about it deliberately.*	*9*	*21*
Lack of conflicting response efficacy	*Theory (Cass et al, "Nothing I can do will help")*	*5*	*8*
Minimising, ignoring, misconstruing consequences	*Theory Also: perception on what is flying or driving 'often'.*	*7*	*13*
Mobility choices are perceived as a habit	*Certain mobility choices perceived as a habit "I've always done it this way"*	*4*	*5*

Name	Description	Files	References
Mobility is for a higher cause	*Theory: moral justification "It's for a higher cause"*	*6*	*11*
My own comfort and desires are more important than the environment		*16*	*52*
Don't want to miss out on anything	*Or miss out on anything*	*4*	*6*
I know it is selfish, but I will still do it		*5*	*7*
I want to explore the world		*10*	*14*
Life is too short		*2*	*2*
Working hard to enjoy holidays		*2*	*3*
Not even considering taking a train		*2*	*3*
Not the sort of thing I do	*Lack of intrinsic motivation*	*2*	*3*
Part of personal identity		*3*	*3*
Internal drivers		*24*	*84*
Activist minded		*3*	*6*
Biking is healthy		*3*	*3*
Changing mindset about mobility is effective	*The importance of individuals mindset on certain mobility choices*	*5*	*7*
Consciously thinking about environmental impact	*Being conscious about climate change impact of mobility choices*	*12*	*19*
Does not feel as limiting oneself		*3*	*3*
Emotionally concerned about environment		*6*	*10*
Individuals need to be internally motivated to change behaviour		*3*	*3*
Intrinsic affinity with nature and injustice		*6*	*6*
Motivated to make a change	*Intrinsic motivation to change*	*7*	*10*
Never been interested in flying for a week(end)		*1*	*1*
Practice what you preach		*1*	*1*
Wants to have a good world for himself and future generations		*2*	*2*

Name	Description	Files	References
Works best to balance and not be too strict	*As well as: Focus on sphere of influence and let go of what is beyond*	*5*	*13*
Perceived hypocrisy	*When participants acknowledge a feeling of hypocrisy*	*12*	*21*
Powerless feeling		*5*	*7*
Surprised or shocked by results CO2		*26*	*44*
No		*17*	*25*
Yes		*10*	*19*
Uncertainty and ambiguity	*Unsure, finding it difficult what and/or who is responsibility, what are solutions, what should be done, etc.*	*17*	*49*
Acknowledging lack of knowledge of climate change		*7*	*14*
Climate change is scary and elusive		*3*	*5*
Uncertain about own contribution to climate change		*4*	*5*
Uncertain about positive impact carbon credits or carbon offsets		*2*	*2*
Uncertain about the impact of certain things and activities		*2*	*4*
Uncertain about what and by whom should be done about climate change		*6*	*11*
Uncertain about what to answer, to think		*4*	*8*
Other		*12*	*26*
E-bikes are pointless and lazy		*1*	*1*
Electric vehicles are a short-term solution		*5*	*5*
Emphasis of calculators is too much on flying		*1*	*1*
Important to consider substitution effects of mobility mode	*De Haas et al*	*2*	*2*

Name	Description	Files	References
Positive about use of shared mobility	*Individuals view on car-ownership, car-dependency, vs maybe shared mobility, alternative transportation*	*6*	*15*
Reducing plastic in health care is challenging		*1*	*1*
Satisfied with choice and availability of mobility		*1*	*1*
View on responsibility	*Participants' view on who is responsible for combatting climate change and reducing the impact of mobility consumption*	*26*	*454*
Biggest problem is everyone pointing fingers		*1*	*1*
Biggest responsbility lies with politics and the industry		*12*	*18*
Business responsibility	*The responsibility of the industry and businesses to act*	*25*	*102*
Businesses need boundaries		*8*	*10*
Capitalistic system is the problem	*Maximisation of stockholders etc*	*3*	*4*
Closing high-carbon industry will cause other problems	*For example closing Tata Steel will cause 40.000 jobs to be lost and a factory in another country that will still emit*	*1*	*1*
Companies have biggest responsibility		*4*	*5*
Companies only care about money		*9*	*14*
Companies should innovate, report and justify		*4*	*4*
Employers' are responsible for conscious mobility among employees	*Incentives to stimulate employees to make sustainable conscious mobility choices*	*12*	*32*
Innovation and technology should be the solution	*The perception of the importance of innovations and technology. Technological optimism (Cass et al.)*	*12*	*19*
Little trust in companies initiate change themselves		*5*	*6*
Positive about renewable energy developments		*2*	*2*
The importance of Innovation and technology		*3*	*5*

Name	Description	Files	References
Collective change is essential, can't act without eachother	*Participants' recognition of the systemic factors at play in shaping mobility behavior and their acknowledgment of the collective responsibility in addressing sustainability challenges.*	*6*	*13*
Developed countries have more responsibility than developing countries		*5*	*5*
Dissatisfied and pessimistic about what's being done about climate change		*18*	*38*
Individual responsibility	*The perception of the participants of the responsibility of individuals*	*25*	*159*
Individual is not starting person		*22*	*87*
Can't expect individuals to pay more for more sustainable option		*4*	*5*
Can't hold individual accountable due to lack of transparency		*2*	*3*
Difficult to expect from individuals not knowing their background		*8*	*17*
Individuals are lazy and don't read into it		*3*	*4*
Individuals are not going to make enough difference		*9*	*11*
Individuals feel victimised when expected to change behaviour		*3*	*3*
Individuals need to be guided and nudged		*6*	*8*
Responsibility individual depends on what they want to contribute		*5*	*7*
Too much responsibility is put on the individual		*3*	*7*
Individuals can be critical about behaviour to make little differences		*20*	*63*
Everyone plays a role in the system thus caries responsibility		*1*	*2*
Expects aware individuals to make climate conscious decisions		*6*	*10*

Name	Description	Files	References
Individuals are not priviliged to fly as much		1	2
Individuals can be expected to choose more sustainable option if choices are equal	In terms of time, costs and comfort	1	4
Individuals can contribute in their working life		8	11
Individuals should show governments sustainable behaviour is possible		1	2
Individuals who can afford sustainable option, should do it		2	3
Sustainable option should be easier option		5	9
Institutional and structural factors	*The responsibility of the government and the need for political boundaries*	26	114
Climate regulations cause inequality	*The effect of regulations against climate change are unequally distributed among different income classes*	3	4
Discussions about what to include in schooleducation		1	1
EU regulations are impactfull		5	5
Government has more impact than companies		8	8
Government needs to stop subsidising fossil fuels	*And start taxing it more*	8	11
Government should stimulate national public transport		5	8
Governments are limited because of democracy	*Participants that talk about the importance of the government but stress that it's dependent on voters and that it's complicated etc*	5	6
Lack of willpower to make decisions and stimulate change		4	6
Little believe in system change		3	3
Localisation important solution		2	4
Need for stimulation and financial incentives for sustainable mobility		16	30

Name	Description	Files	References
Other governments (China or US) more important than NL		1	2
Politics need to set boundaries	*Political boundaries are essential for companies and individuals to know how to 'behave'*	14	21
Short-range flights should be forbidden		3	3
Unsure about what governments can do		1	1
We are in a system lock-in		1	1
Short-range citytrips should receive less advertisement and stage	*City trips are too normalised and receive too much stage and attention in media*	1	4

Appendix I

Hierarchy charts used to support the categorization of justification strategies in Table 6

Figure 18

Relative number of participants that coded any of the justifications among those have taken weak steps
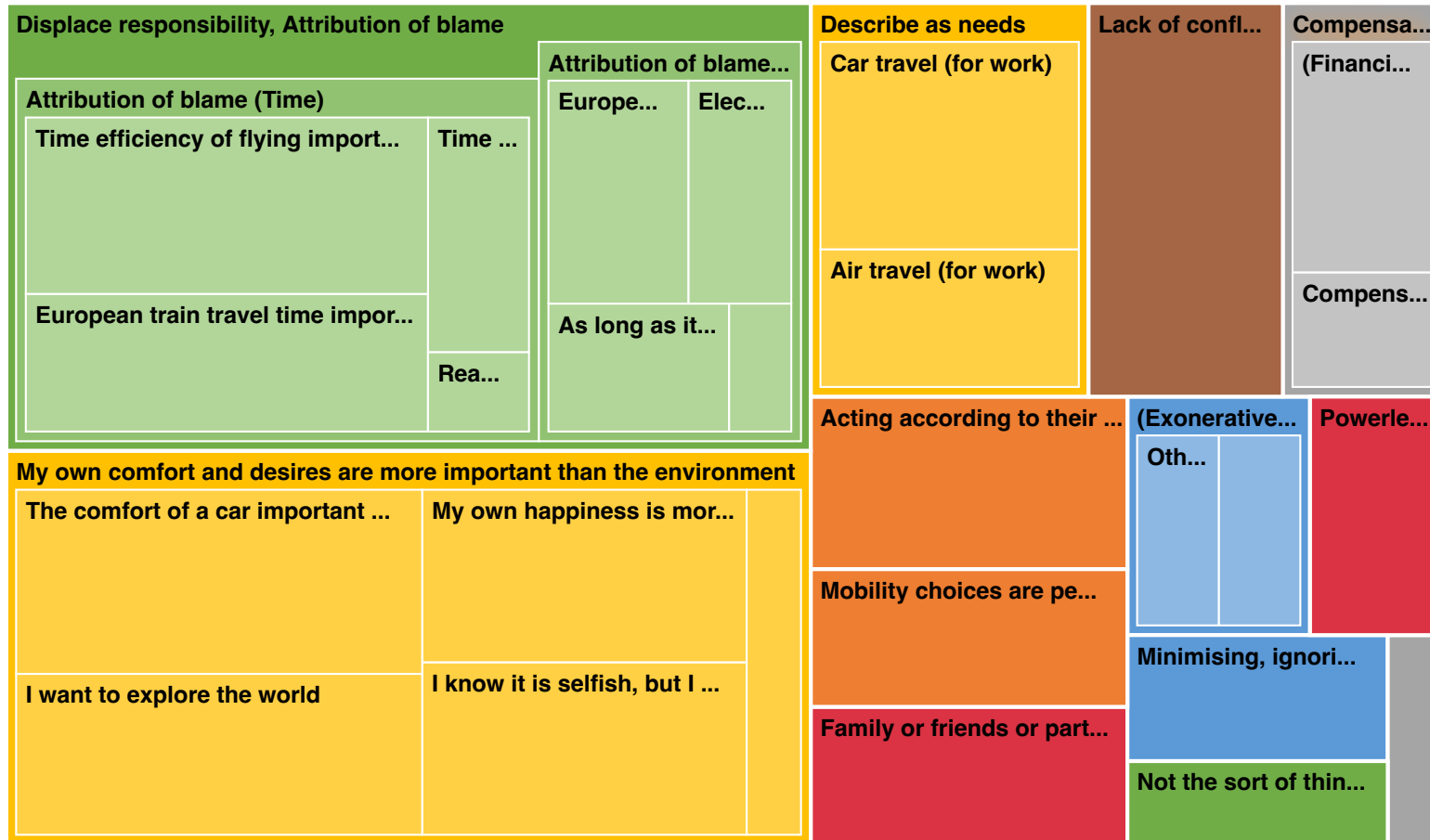
Figure 19

Relative number of participants that coded any of the justifications among those have taken moderate to strong steps

Figure 20

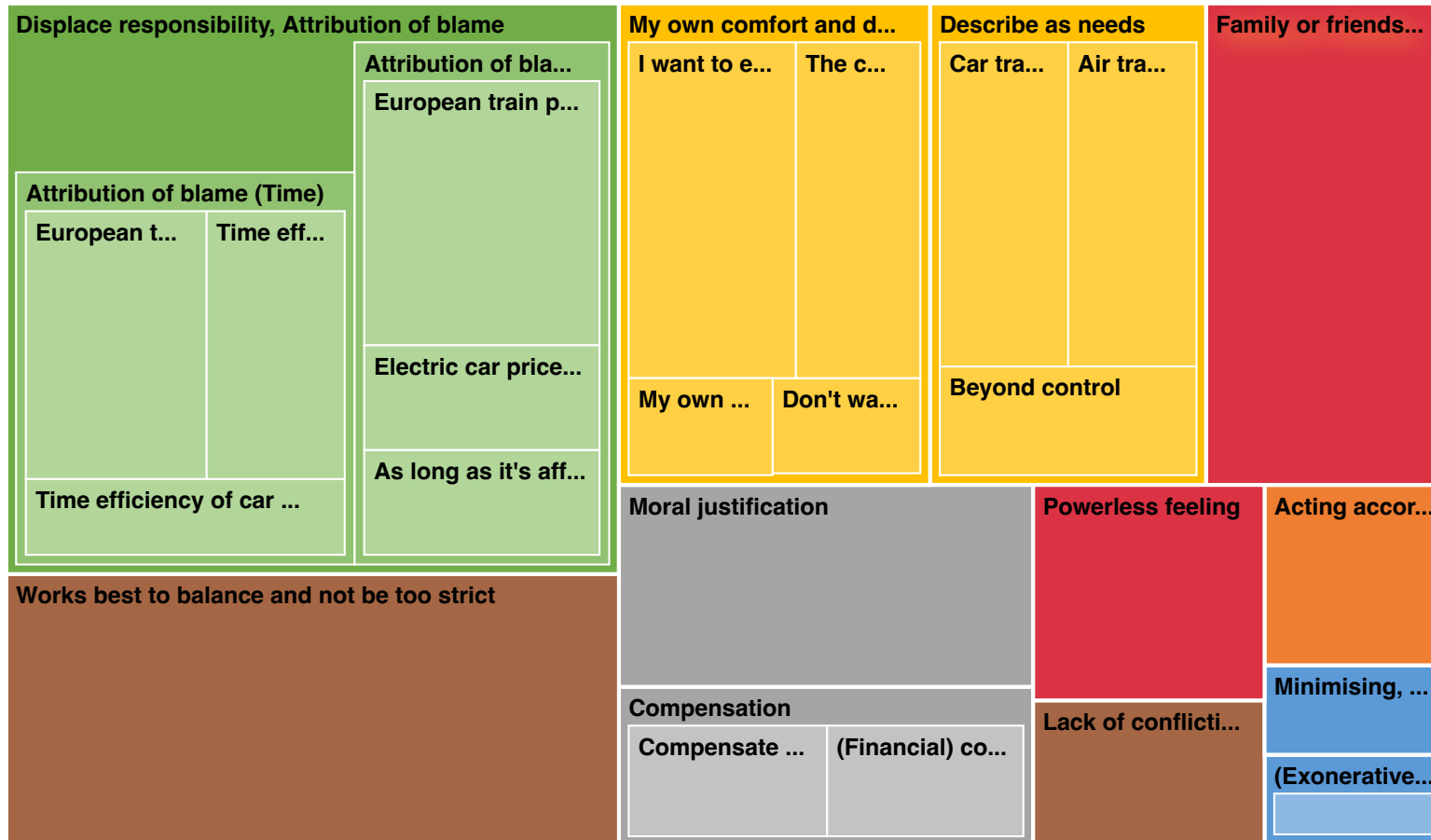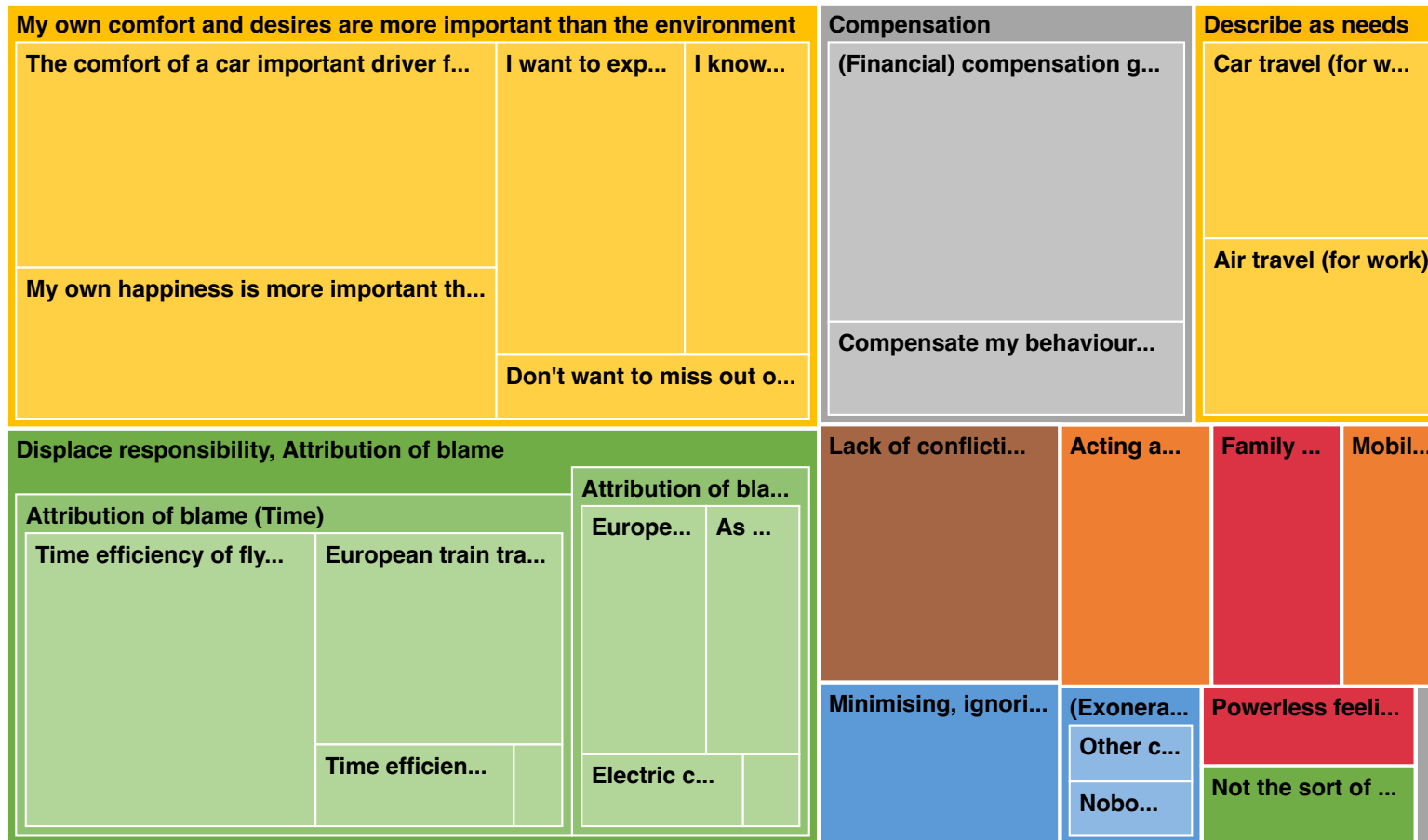*Relative references codes by participants taken weak steps*

Figure 21

Relative references coded by participants taken moderate to strong steps