



Bachelorthesis Thijs Oost

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Supervisor: dr. Farzaneh Bahrami

The influence of environmental awareness on car usage in the North of the Netherlands



university of
 groningen

faculty of spatial sciences

Summary

Car usage contributes to the emission of greenhouse gasses. Reducing these emissions helps to slow down rising of the global average mean temperature. Environmental awareness could influence the mobility of people. This research aimed to gain an understanding of whether residents in the North of the Netherlands are willing to stop using their cars due to environmental considerations. The central research question addressed in this study is: How does environmental awareness affect anticipated car ownership in the North of the Netherlands? The hypothesis is that environmental awareness will reduce people's future car use in the near future. A questionnaire has been conducted among car owners living in the North of the Netherlands. They were asked, amongst others, about their willingness to stop using their car in the future because of environmental concerns. The data from the questionnaire has been analysed using statistical tests. The most important finding is that people who believe the environment is in poor condition, and people who are willing to change their lifestyle, are on average more willing to get rid of their car if the alternative mode of transport is significantly better for the environment.

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1. Introduction

1.1 Background

The car is the most popular mode of transport in the Netherlands (Central Bureau of Statistics (CBS), 2016). Unfortunately, the mobility sector contributes to greenhouse gas emissions. The share of greenhouse gas emissions originating from the transport sector in the Netherlands was 18.9 per cent in 2018 and 19.2 per cent in 2019 (CBS, 2020). As a result, there is an increasing attention to high emitting sectors, such as the mobility sector (Sustainable Development Solutions Network (SDSN), 2014).

In the North of the Netherlands – the provinces of Groningen, Drenthe and Friesland – citizens travel 40.99 kilometres a day on average, compared to 36.16 kilometres in the Netherlands as a whole (CBS, 2018). In other words, it appears that the population in the North of the Netherlands travels more per day than the average of the Netherlands. A longer commuting distance could be a possible cause. The inhabitants of the North of the Netherlands travelled in 2018 on average 26.9 kilometres to work (CBS, 2020). The average Dutch citizen has a commuting distance of 22.5 kilometres. Besides, car ownership in the North of the Netherlands is increasing. In 2019 car ownership rose by 5.84 per cent compared to a 0.34 per cent population growth (CBS, 2020). How this trend will develop in the future is uncertain, as a result of globalisation, economic instability, climate change, technological innovation, changing consumer preferences (Lyons & Davidson, 2016) and the COVID-19 pandemic. The pandemic might reduce mobility needs, because of the digitalisation of work and other daily activities. Kanda & Kiuimaa (2020, p.3) also state in their research: “the reduction of travel overall and the move to homeworking and virtual meetings ... make the ownership of a car seem unnecessarily expensive or redundant”.

Several studies have been conducted on people’s preferred mode of transport (Brunton et al., 2006; Syam, 2014; Beirão & Sarsfield Cabral, 2007; Kim & Ulfarsson, 2008), but less research has been put into whether people are willing to stop using their car in the future because of the negative impact on the planet.

In 2019 research was conducted by the Dutch Central Bureau of Statistics to investigate which people were disposing their cars in 2017 and their reasons (CBS, 2019). Unfortunately, only life-changing events – such as moving away or a change in household composition – were considered. They did not investigate other reasons for people to get rid of their car, such as environmental concerns.

When the relationship between environmental concerns and people their reasons to get rid of their car is examined, the gained knowledge can contribute to a faster mobility transition – ensuring that people use their car less – because new knowledge can be used in new policies by planning authorities such as municipalities, provinces and national governments to reduce the impact of cars on the environment.

1.2 Research problem

This study aims to gain an understanding of whether residents of the North of the Netherlands are planning to stop using their cars in the near future due to environmental reasons. This understanding was acquired by conducting a questionnaire among car owners in the North of the Netherlands. Besides, a distinction was made in the results by age group, to investigate whether there is a difference between different age groups in their willingness to stop using their car.

The central research question addressed in this study is: *How does environmental awareness affect anticipated car ownership in the North of the Netherlands?*

Sub-questions that help to answer the research question are:

- What is the current car usage and what are the estimates of future car usage?
- How do environmental concerns affect mobility behaviour?
- Are car owners in the North of the Netherlands willing to stop using their car?
 - To what extent do car owners in the studied group attach importance to the environment?
 - What, according to the studied group, is the reason to stop using their car?
 - In how many years is the studied group willing to stop using their car?
 - Is there a generational effect in planning to stop using a car within the studied group?

1.3 Structure

In this research, literature on motives for car use, environmental awareness, the impact of the COVID-19 pandemic on environmental awareness and travel behaviour are discussed. Thereafter, the method of data collection is described and the results are presented. Finally, this study concludes with an answer to the research question, recommendations for future research, and constraints encountered during the investigation.

2. Theoretical framework

2.1 Motives for car usage

Steg (2005) and Koning (2017) both identified instrumental motives – resulting from the technical characteristics of the mode of transport – and symbolic and emotional motives for car usage. Examples of instrumental motives are speed, flexibility, and convenience. Examples of symbolic and emotional motives are control, power, social status and self-esteem. Koning's (2017) research in the Netherlands shows that feelings play a major role in the choice of mode of transport. The mode of transport choice is therefore influenced by symbolic and emotional motives. This means that the image one wants to project or derive from a mode of transport is very important, just as the effect of a mode of transport has on the mood of the person travelling.

Car usage depends on three factors (Steg et al., 2001). The first factor is the locations of human activities. Examples of different locations of human activities are living, working, shopping, recreation and education. The second factor is about people's needs and desires. These are related to socio-economic, cultural and motivational features, like income, individualisation and preferences. This also includes environmental considerations, which is the focus of this research. The third factor are transport barriers, such as monetary costs, travel times, comfort, availability, reliability, and other characteristics of car alternatives.

2.1.1 Current car usage

The average car ownership in the three Northern provinces of the Netherlands is higher than in the Netherlands as a whole (Table 1) (CBS, 2020). The fact that inhabitants of Groningen, Friesland and Drenthe own more cars and travel larger distances compared to the rest of the Netherlands, suggests that they could be more dependent on their cars. This may be due to the fact that locations of activities in the North of the Netherlands are further apart than in other parts of the Netherlands.

Table 1. *Current car usage* (CBS, 2020).

	Kilometres travelled per day	Cars per 1.000 inhabitants	Driver's licence ownership
North of the Netherlands	41.2	516	66%
Netherlands	36.0	494	65%

Table 2 shows the kilometres travelled per mode of transport between 2010 and 2017 in the Netherlands, with the percentual change over this period given in the last column. All data is about personal mobility, so data about the transport of goods is not part of this dataset. Data on aviation and other means of transport such as mopeds are not included in this table. What can be determined, is the considerably higher growth in public transport and cycling, compared to car use.

Table 2. *Kilometres travelled ($\times 1,000,000,000$) in the Netherlands between 2010 and 2017* (Kennisinstituut voor Mobiliteitsbeleid (KiM), 2020).

	2010	2017	Change
Total	179.0	180.5	+0.8%
Car	91.5	93.0	+1.6%
Public transport	21.5	23.5	+9.3%
Bike	15.0	15.5	+3.3%
Walking	5.0	5.0	0.0%

2.1.2 *Estimations of future car use*

The Dutch Knowledge Institute for Mobility Policy (KiM, 2020) expects the total road traffic in 2025 to be 1.0 to 5.5 per cent higher than in 2019. This increase is mainly due to economic growth and the growing number of inhabitants. This means that – when adjusted for economic and population growth – the amount of road traffic will remain roughly the same and there will not be more road traffic. Thus, little change is expected in the number of kilometres driven in the next four years. The expectation is that as a result of the COVID-19 pandemic, working from home, meeting and learning digitally will remain the norm. This could slow down the growth in traffic volume and shorter travel time.

2.2 Environmental awareness

There is an increasing environmental awareness in the Netherlands (Motivaction, n.d.). The Dutch feel an increasing responsibility to leave the world in good condition for future generations. They feel the duty to consume less than average and are less attracted to unnecessary waste and luxury.

Kim & Ulfarsson (2008) identified “contributing to a better environment” as one of the factors that could influence people’s future mode of transport. In their study environmental concerns did not seem of importance in the travel mode choice of people living in Porto, Portugal. This corresponds to studies that suggest that environmental concerns are often not enough to change behaviour (Anabele, 2005; Hagman, 2003; Tertoolen et al., 1998). However, there is evidence that environmental concern could be targeted by, for example, advertising campaigns, to change behaviour (Chan et al., 2006). Moreover, these studies have been conducted more than ten years ago. At that time, sustainability may have been considered a less urgent problem than in 2020. This opens up opportunities to investigate whether environmental concerns still do not have an impact on people’s choice of transport or whether this has changed, which was examined in this study. As a result, when people care more about the environment they may be more willing to use their car less or get rid of it. There is strong evidence that young people have reduced their car use (Goodwin & Van Dender, 2013). However, there is still doubt about how younger people will travel as they age, or how the next generation will travel. A study on the influence of age on travel behaviour could provide new insights in the future.

An interesting finding by Steg (1996) is that the more people use a car, the more positive their attitude is towards car use. Besides, they also perceive problems arising from car use as less serious. This implies that people might perceive issues as the environmental impact of driving a car as less serious if they use their car often. This also applies the other way around for people who use public transport frequently: these people are more likely to support environmental policies (Steg et al., 2001). Subsequently, this can also be applied to electric cars: beliefs about the environmental efficiency of electric vehicles improve with experience in driving an electric car. This suggests that if people use public transport frequently or drive an electric car often, they are more willing to use their fossil fuel car less or get rid of it – if they still own one.

2.2.1 Theory of Planned Behaviour

When investigating people's behaviour, it must be taken into account that there is a difference between the intention and the actual behaviour of people (Ajzen, 1991). Environmental concerns can influence people's intentions, but this does not automatically mean that they will also change their behaviour. This research focuses on people's anticipated behaviour, which is therefore related to their intentions and not to their actual behaviour.

2.3 Impact of electric cars on the environment

Driving an electric car has the advantage of emitting less CO₂ while driving (Varga & Mariasiu, 2018). An additional environmental advantage of electric cars is the noise reduction. Contrary to these environmental advantages, there are also disadvantages to the use of electric cars. The use of electric cars can contribute to indirect pollution by the production of electricity (Varga & Mariasiu, 2018). Electricity is still predominantly produced by fossil fuels and thus affects the number of pollutants and greenhouse gas emissions. In the Netherlands, 74 per cent of the electricity produced between July 2019 and June 2020 came from fossil fuels (CBS, 2020). Only 22 per cent came from renewable sources like solar energy and wind energy. Alternative and renewable energy sources should be implemented in the future for the production of electricity, to ensure that electric cars become more environmental friendly.

The second point of attention is the recycling process for electric cars. Racz et al. (2015, p.438) states: "as the number of sold electric cars will increase, the number of electric motors and battery waste will increase. This leads to a greater impact on the environment". The recycling process of batteries and electric motors can be harmful to the people who work in the recycling process if the correct protocols are not properly executed. Furthermore, the rare elements needed to produce the batteries are available in limited quantities and are expensive (Racz et al., 2015). Fortunately, researchers are developing solutions for extracting as much as possible from discarded batteries.

In this research, electric cars are classified as a 'more environmentally friendly option' than fossil fuel cars. This is only the case when the electricity for these cars is produced from renewable sources. In addition, the correct protocols must be executed when recycling these cars.

2.4 Impact corona crisis on environmental awareness and travel behaviour

According to a study conducted by the Dutch bank ABN Amro and opinion pollster Ipsos (2020) the willingness for environmentally conscious behaviour increased after the COVID-19 pandemic started. 71 per cent of the Dutch want to preserve the cleaner air created by the lockdown of large parts of the economy. Almost half of these people are also prepared to adapt their own travel behaviour to preserve this cleaner air. In 2019, a majority of Dutch people also said they thought climate change was important, but only a quarter of them thought about changing their daily travel behaviour.

Previously, cost and convenience prevailed among customers' choices. Now, the climate has the priority when it comes to choosing whether to leave the car parked and use an alternative mode of transport (ABN Amro, Ipsos, 2020). 76 per cent of those questioned were very or slightly willing to use their cars less. The climate comes first in this assessment. Costs, convenience and habits come afterwards. This development shows that inhabitants of the Netherlands take the climate into account when travelling. This awareness-raising seems to have been heightened by the corona outbreak (ABN Amro, Ipsos, 2020). Almost half of the Dutch citizens are now prepared to adapt their travel behaviour in order to save the climate. Therefore, it is interesting to investigate whether this growing environmental awareness will contribute to less car usage in the near future.

2.4 Conceptual model

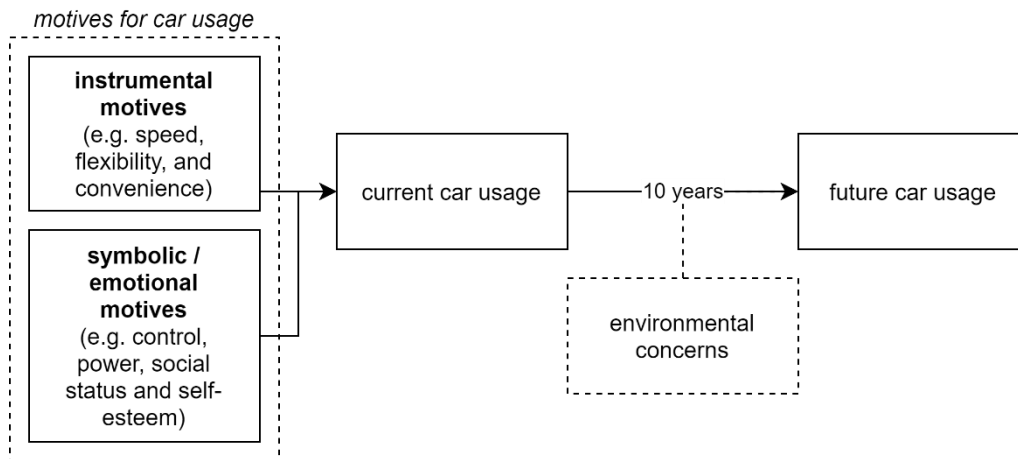


Figure 1. *Conceptual model.*

Figure 1 shows how instrumental motives, and symbolic and emotional motives affect the current car usage. This study tries to gain an understanding of whether environmental awareness will have a positive or negative impact on car use in the near future.

2.5 Hypothesis

The environmental awareness appears to be greater among young people than among older people (Elfrinkhof et al., 2014). This may indicate that the environment is seen as increasingly important by younger generations. People can have the desire to cause less damage to the environment if they value it. Considering people's travel behaviour is influenced by their desires (Steg et al., 2001), car use is – amongst other factors – influenced by people's environmental awareness. Therefore, the hypothesis of this research states: when people's environmental awareness is high, they are more willing to use their car less than people with a lower environmental awareness. In addition, a second hypothesis is that younger people are more willing to use their car less than older people, due to a higher environmental awareness.

3. Methodology

In this thesis, qualitative and quantitative research has been conducted to investigate how environmental awareness affects anticipated car ownership in the North of the Netherlands. Questionnaires, in Dutch, have been carried out among car owners living in the North of the Netherlands (Appendix 1) and literature research has been conducted.

The goal of quantitative research is to acquire information about the characteristics, behaviours and attitudes of the population by administering a standardized questionnaire (Clifford et al., 2010). Questionnaire research is particularly useful for eliciting people's attitudes and opinions about environmental issues (Clifford et al., 2010). This style of research is valuable to identify complex behaviours and social interactions, which helps to answer the research questions.

3.1 Data collection, validity and reliability

A questionnaire was conducted among car owners in the provinces Groningen, Friesland and Drenthe in the North of the Netherlands. They were, amongst other questions, asked about their environmental concerns and their mobility. The respondents were asked to give a score on some of the questions using a 5-point Likert scale. The questions were always asked in the same order. It was an internet-questionnaire, distributed via Instant Messaging apps like WhatsApp, via word of mouth and via social media like LinkedIn, to reach a large and diverse group of respondents. Internet-questionnaires are inexpensive to administer and they can be used to reach physically immobile groups. Now, during the COVID-19 pandemic, internet-questionnaires are also helpful to prevent travelling and maintain (social) distancing. The questionnaire was distributed in the months November and December of 2020. The data was collected and stored using the program 'Qualtrics'. In order to analyse the results, the data was analysed using the statistical application SPSS (see 4.1).

Desk research has been conducted to study literature and databases related to motives for car use, environmental awareness, the impact of the corona crisis on environmental awareness and travel behaviour, and current and future car usage.

An overview of all research questions and data collection can be found in Table 3.

3.2 Exclusion criteria

Respondents who did not own a car or lived outside Groningen, Friesland or Drenthe were excluded from participation in the questionnaire. This was assured by asking the first two questions: "Does your household own one or more cars?" and "Which municipality do you live in?". The remaining participants were all included in the dataset.

3.3 Research progress

The intention was to survey at least 120 respondents, distributed across the three provinces. Two weeks after distributing the questionnaire, there were too few respondents from the province of Friesland to achieve an equal distribution of respondents. To compensate for this, 350 mailbox flyers were distributed across seven towns in Friesland (from villages with 600 inhabitants to cities with 124.000 inhabitants). This led to an increase in the number of respondents from Friesland. The questionnaire was filled in by 141 respondents. After the exclusion criteria, the questionnaire yielded 125 usable responses. 24.0 per cent was originating from the province of Groningen, 40.0 per cent from Friesland and 36.0 per cent from Drenthe. The size of the sample was large enough to be able to generalise the results.

3.4 Ethical considerations

Research participants were asked if they were willing to cooperate in this research. Before the first question, an introductory text explained the research topic. The contact details of the researcher were provided. It was emphasised that their data would remain anonymous and would not be shared with third parties outside this thesis. The name or gender of respondents was not asked. Respondents were formally and respectfully addressed in the questionnaire. Except for the first two questions, which were used as exclusion criteria (see 3.2), no question was compulsory and could therefore be skipped without answering. 12.1 per cent of the respondents did not answer all questions. The remaining 87.9 per cent answered all questions. At the end of the questionnaire, there was an option to leave questions and comments.

Table 3. *Methodology.*

<i>Question</i>	<i>Which information</i>	<i>Moment of retrieval</i>	<i>Source</i>	<i>How to obtain the data</i>	<i>Documentation method</i>	<i>How to analyse the data</i>
What is the current car usage and what are the estimates of future car usage?	Insights from existing literature about future car use and the relationship between environmental concerns and mobility preferences	October – December 2020	Electronic academic database	(Academic) search engines	Document archive	Literature review
How do environmental concerns affect mobility behaviour?						
Are car owners in the North of the Netherlands willing to stop using their car?	Responses of questionnaire	November – December 2020	Car owners living in the North of the Netherlands	Questionnaire	Qualtrics	Statistical analyses in SPSS
To what extent do car owners in the studied group attach importance to the environment?						
What, according to the studied group, is the reason to stop using their car?						
In how many years is the studied group willing to stop using their car?						
Is there a generational effect in planning to stop using a car within the studied group?						

4. Results

4.1 Descriptive statistics

Appendix 2.1 shows the descriptive statistics of the dataset. All SPSS output can be found in Appendix 2.

Figure 2 shows the age distribution of the respondents. Most respondents, namely 26.8 per cent, fall in the age category 45-54 years old, followed by 18-24 with 20.3 per cent. There are no respondents in the categories under 18 years old or older than 85 years old.

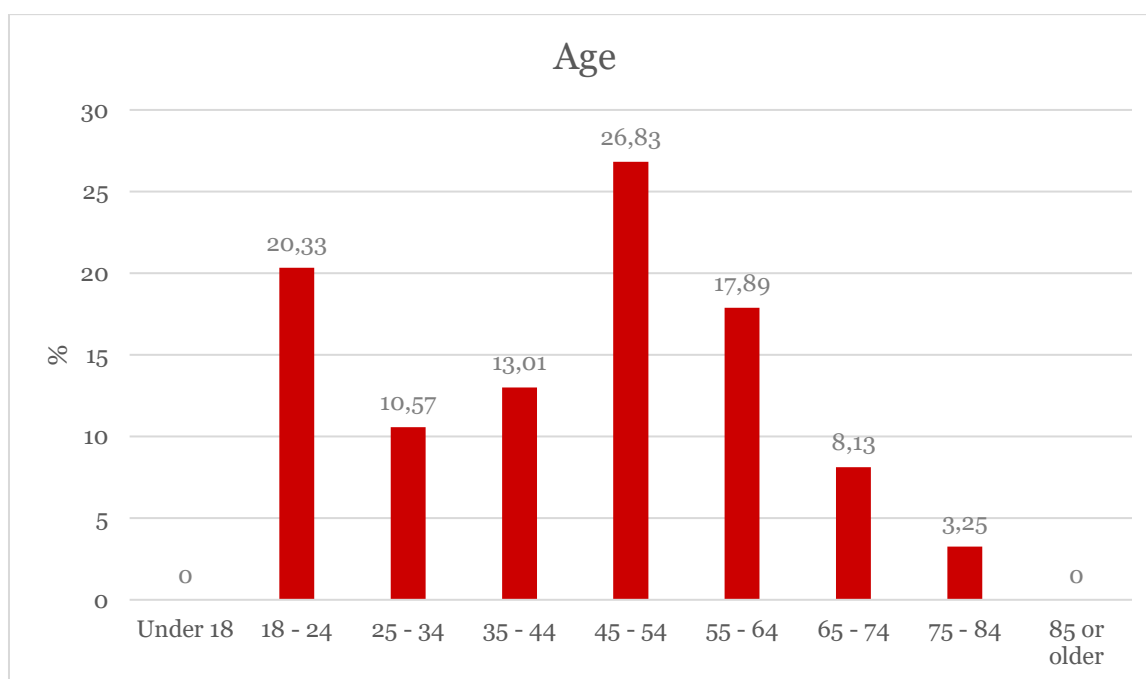


Figure 2. *Age distribution.*

Figure 3 shows the highest completed education. None of the respondents highest education was at primary level, most respondents studied mbo (secondary vocational education) or hbo (higher professional education). In figure 5 the annual income per household is shown. 22,8 per cent of the respondents chose not to answer this question. Most households are in the €30.000-€39.999 category, with 17,07 per cent (Figure 4).

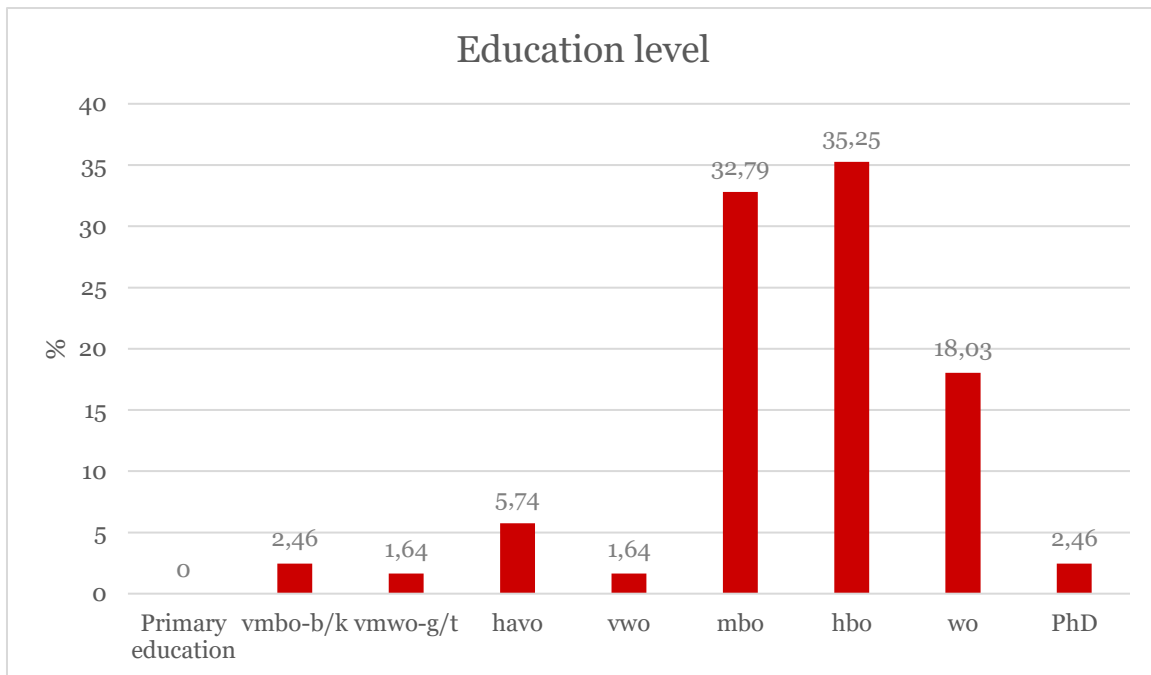


Figure 3. Highest level of education.

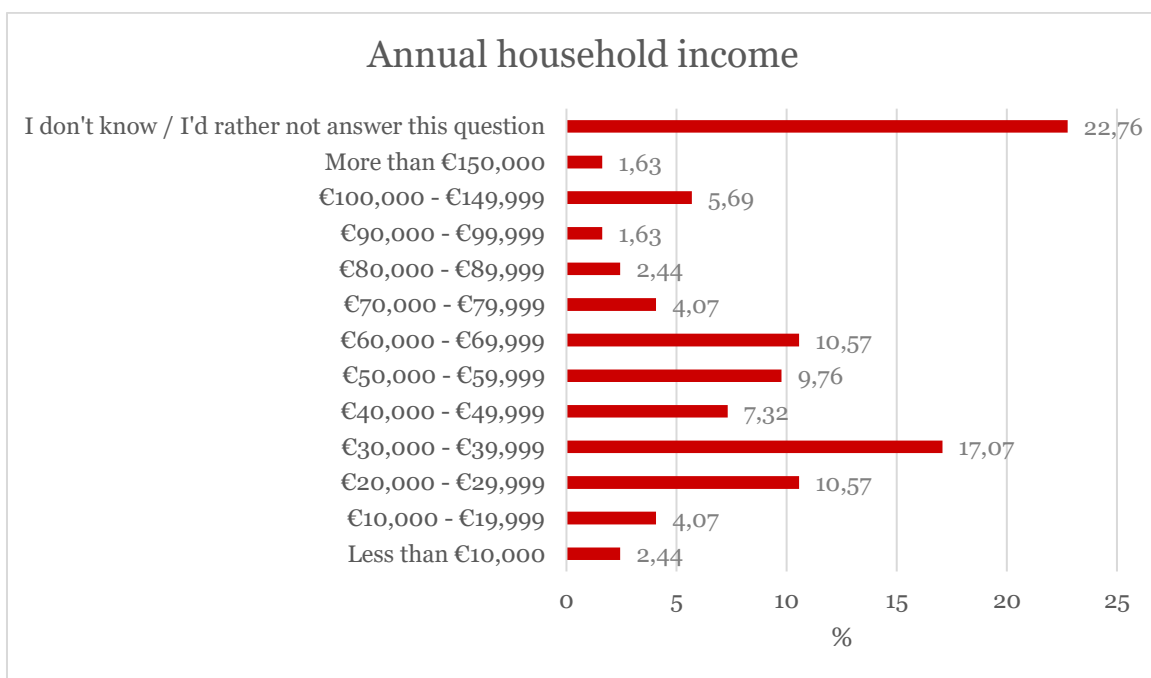


Figure 4. Annual household income.

Most respondents, 93,6 per cent, own a fossil fuel – petrol, diesel or gas – car. Only 6,4 per cent own an electric or hybrid car and no respondents own a hydrogen car (Figure 5). In Figure 6 the origin of the respondents per municipality is shown.

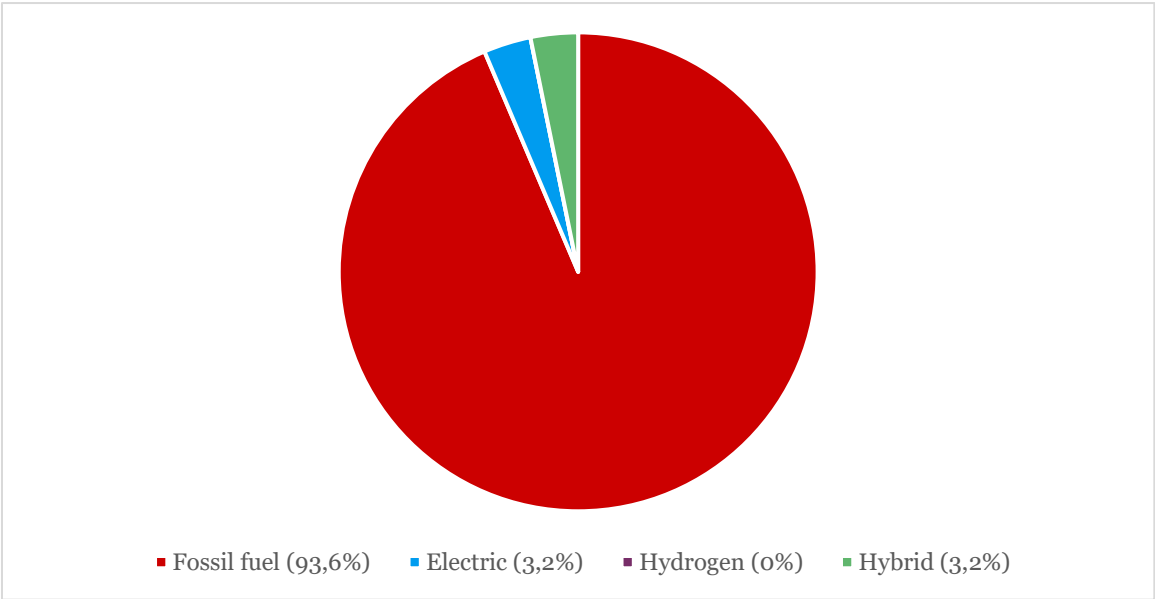


Figure 5. Type of car.

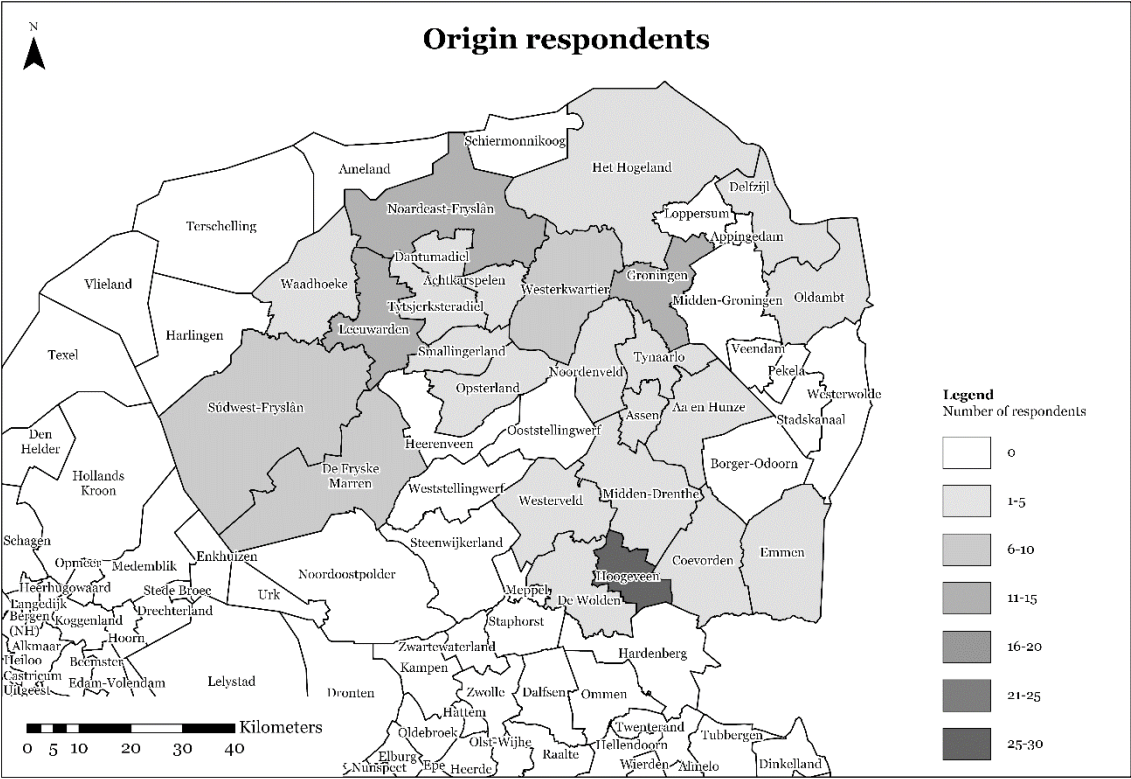


Figure 6. Origin respondents per municipality (Appendix 3).

4.2 To what extent do car owners in the studied group attach importance to the environment?

When respondents were asked about their opinion on the condition of the environment, a majority answered that the environment is in poor condition (Figure 7). Most people, namely 73.33 per cent, think the environment can be saved with great difficulty.

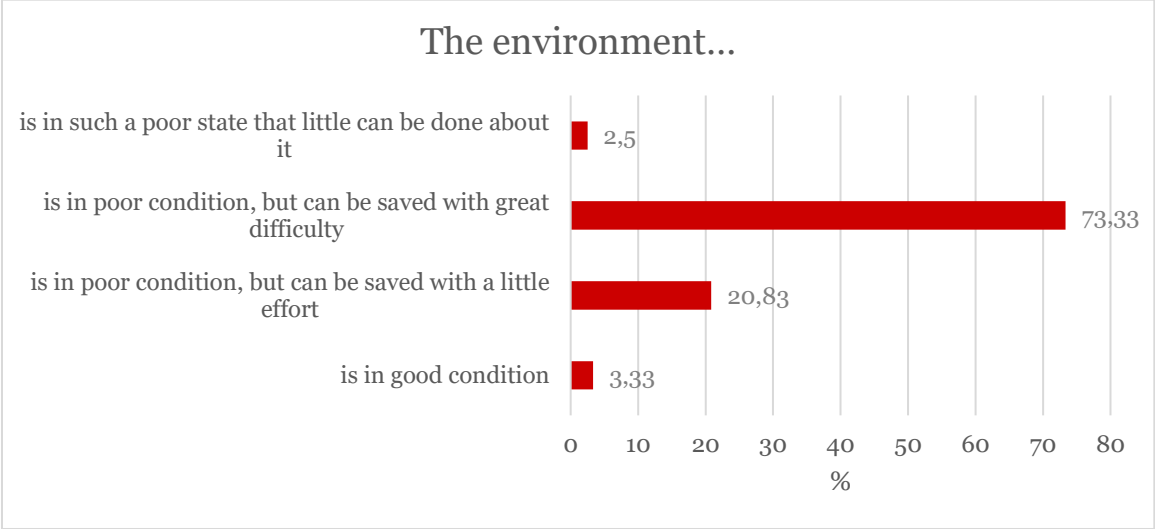


Figure 7. Statement on the condition of the environment.

Respondents were also asked about their willingness to change their lifestyle, in order to reduce damage to the environment (Figure 8). A majority of 85.72 per cent is willing to change their lifestyle.

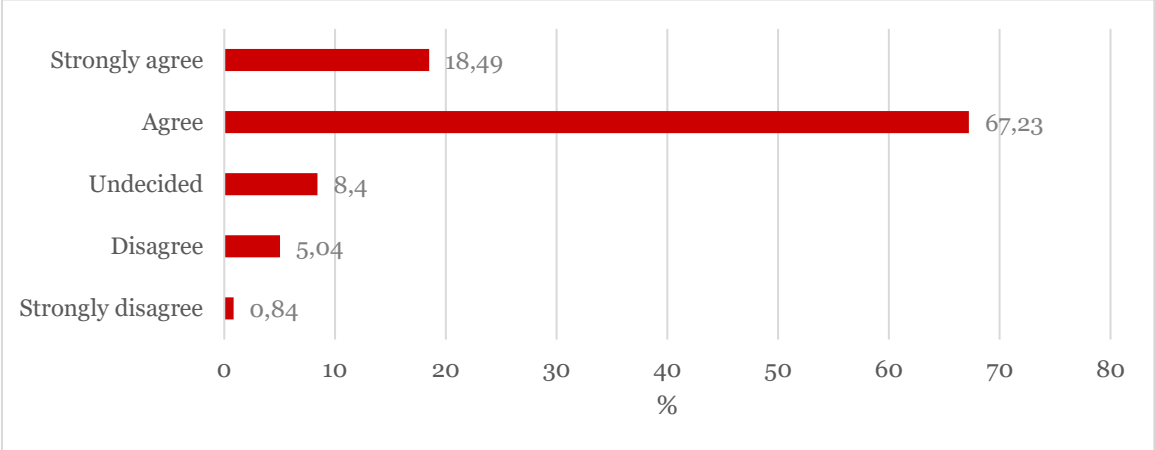


Figure 8. Willingness to change lifestyle.

As a follow-up question, people were asked what they had done already to reduce their impact on the environment (Figure 9). What is noticeable, is the actions being close to each other in terms of times mentioned. In addition to using their car less, respondents also seem to be focusing on paying attention on their waste, energy usage, meat consumption and purchasing solar panels.

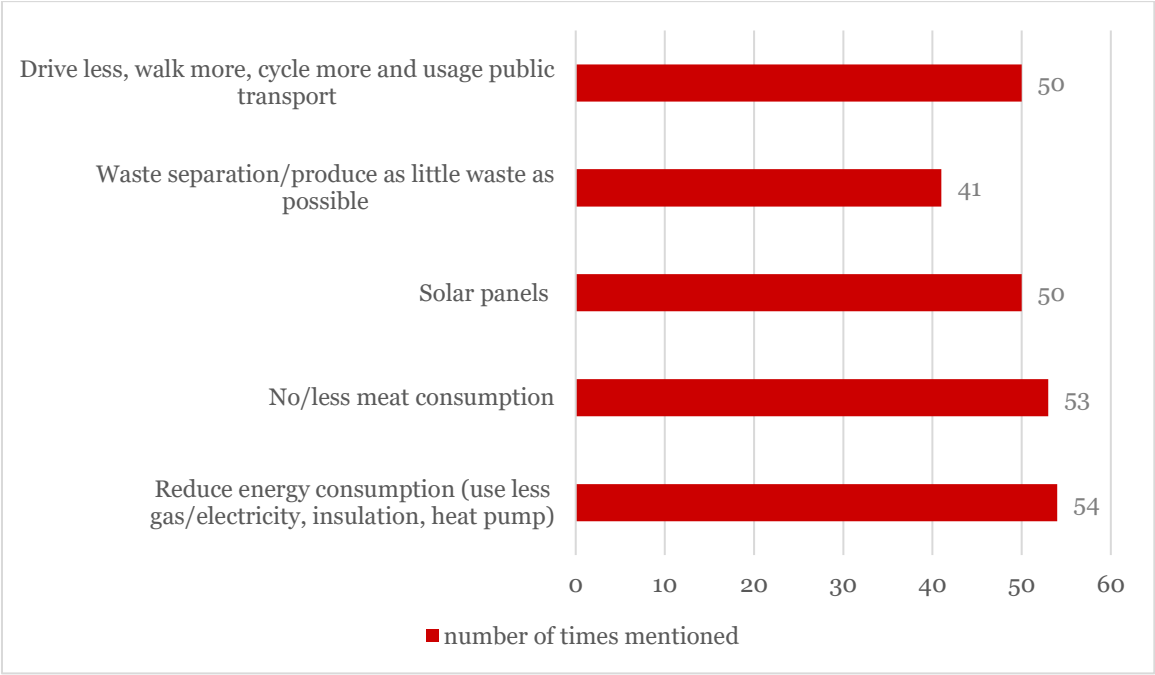


Figure 9. *Actions to reduce impact on environment.*

4.3 What, according to the studied group, is the reason to stop using their car?

4.3.1 Using car less

Respondents were asked if they are willing to use their car less depending on cost, comfort and environmental impact (Figure 10). People value the environment most – 54.7 per cent is willing to use their car less if the alternative mode of transports is significantly better for the environment. This is followed by comfort, where 46.8 per cent is willing to use their car less if the alternative is considerably more comfortable. The cost of a mode of transport is the least important reason, with 29.7 per cent of the respondents willing to use their car less if the alternative is significantly cheaper.

When asked what ‘comfort’ means to them, respondents mainly indicated a shorter journey time with less chance of delay. What also is seen as comfortable, is not having to wait for a transfer. In addition, people find it comfortable if their mode of transport is “practical and easy, and does not cause any hassle or stress”.

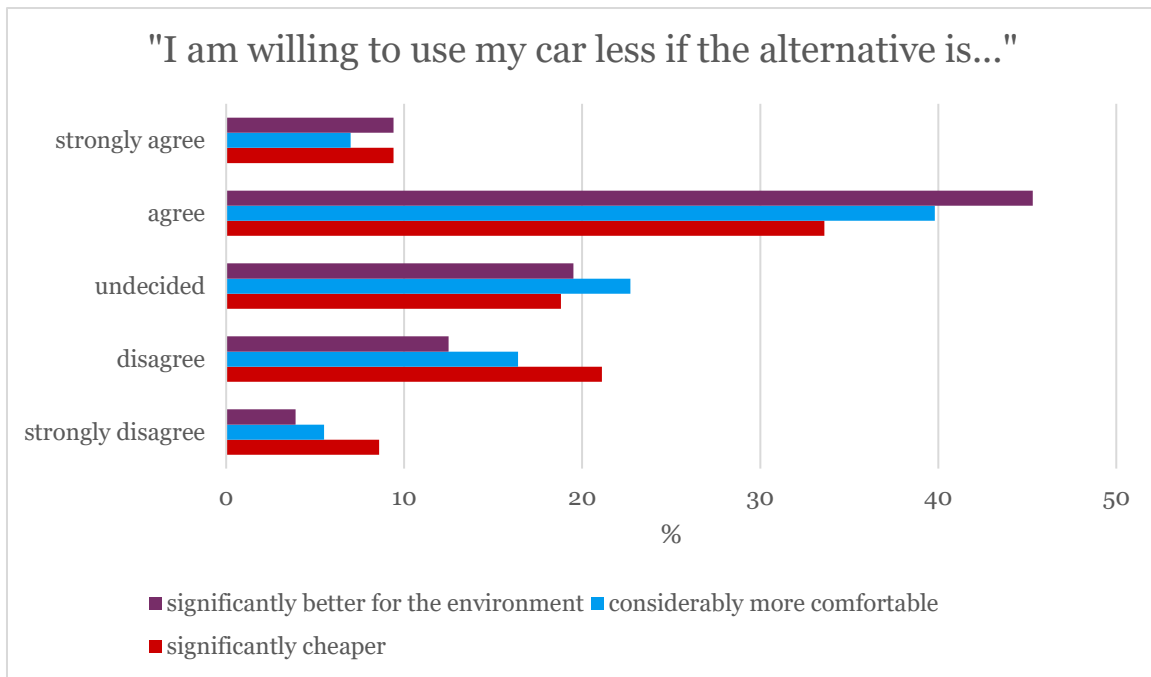


Figure 10. *Motivations for using car less.*

4.3.2 Getting rid of car

The same reasons were asked for the question if people are willing to get rid of their car (Figure 11). There is a similarity: people again state the environment is the most important reason for them to get rid of their car. 23.4 per cent of the respondents is willing to stop using their car if the alternative is significantly better for the environment. This is again followed by comfort with 21.1 per cent. Lastly, 16.4 per cent of the respondents is willing to get rid of their car if the alternative mode of transport is significantly cheaper.

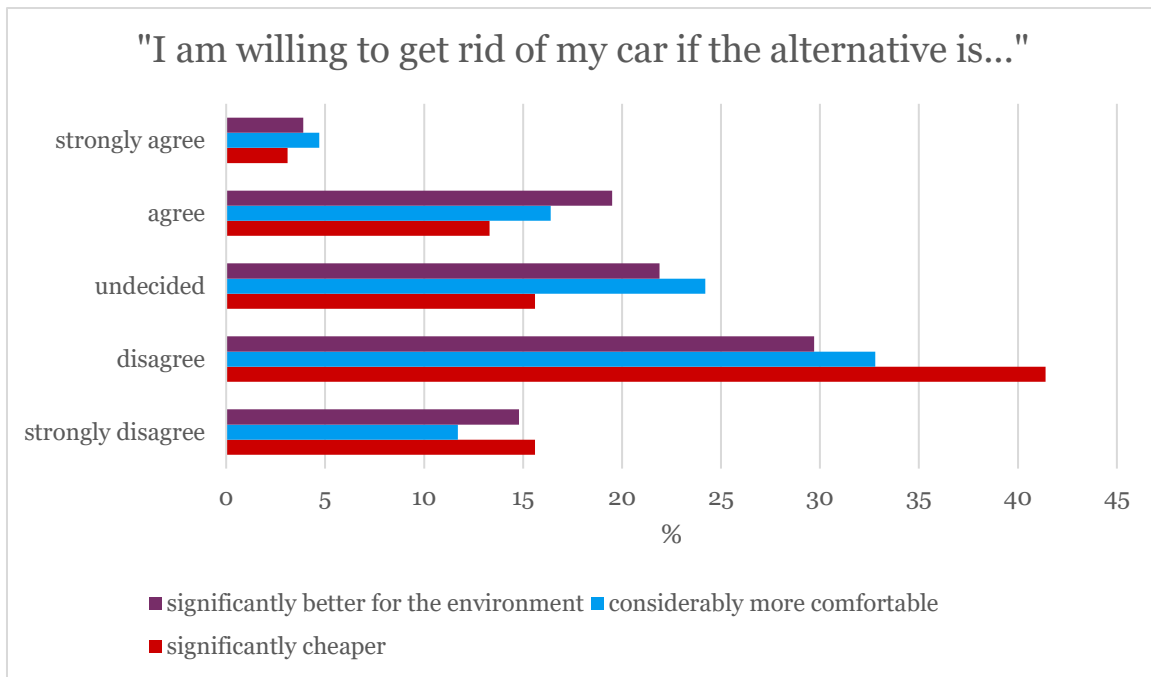


Figure 11. *Motivating for getting rid of car.*

4.4 How do environmental concerns affect mobility behaviour?

A group variable was created to ensure that the Mann-Whitney U-test could be used. The data from the Likert scale used in the questionnaire is ordinal. Therefore, regression analyses could not be used. The Mann-Whitney U-test is a rank-based nonparametric test that can be used to determine if there are differences between two groups on a continuous or ordinal dependent variable (Laerd Statistics, 2015). As this test only indicates whether there is a difference, it does not indicate whether there is a positive or negative correlation. When someone indicated that (s)he was willing to use their car less in order to reduce damage to the environment, it was assumed that this has a positive relationship with their environmental concern.

The ordinal dependent variables are questions about environmental concerns (questions 7, 8, 9, 10 and 12, Appendix 1). The two groups were created by using the questions “I am willing to use my car less if the alternative is significantly better for the environment” and “I am willing to get rid of my car if the alternative is significantly better for the environment”. Group 1 are people who answered “strongly agree” or “agree”. Group 2 are people who answered “disagree” or “strongly disagree”. The answer “undecided” has not been included in these analyses. The distributions of the groups were not similar, as assessed by visual inspection.

4.2.1 Willingness to use car less

To analyse if environmental concerns have an impact on respondents' willingness to use their car less, several Mann-Whitney U-tests were carried out with environmental awareness questions and the willingness to use their car less (Table 4).

Table 4. *Significance willingness to use car less.*

	I am willing to use my car less if the alternative is significantly better for the environment (for example: less emissions of harmful substances).*	Appendix
<i>A: The environment...</i>	0.014	2.1
<i>B: Do you believe that the current concerns about the future of the environment are justified?</i>	0.008	2.2
<i>C: I am willing to change my lifestyle (e.g. eat less meat, install solar panels at home, separate waste, drive less) to reduce the damage I do to the environment.</i>	0.117	2.3
<i>D: I have already changed my lifestyle to reduce the damage I do to the environment.</i>	0.117	2.4
<i>E: I am willing to change my type of car to a more environmentally friendly option (e.g. electric or hydrogen) to reduce the damage I do to the environment.</i>	0.022	2.5

*significant at 5% interval

- A. This Mann-Whitney U-test was significant, $U = 537.4$, $z = -2.459$, $p = 0.014$. Respondents who believe the environment is in poor condition, are on average more willing to use their car less.
- B. This Mann-Whitney U-test was significant, $U = 597.5$, $z = -2.638$, $p = 0.008$. Respondents who believe that the current concerns about the future of the environment are justified, are on average more willing to use their car less.
- C. This Mann-Whitney U-test was significant, $U = 377$, $z = -3.796$, $p < 0.000$. Respondents who are willing to change their lifestyle, are on average more willing to use their car less.

- D. This Mann-Whitney U-test was not significant, $U = 627.5$, $z = -1.568$, $p = 0.117$.
 Respondents who say they already have changed their lifestyle, are not on average more willing to use their car less.
- E. This Mann-Whitney U-test was significant, $U = 440$, $z = -2.290$, $p = 0.022$.
 Respondents who are willing to change their type of car, are on average more willing to use their car less.

From this, it can be concluded that respondents with environmental concerns are willing to use their car less if the alternative mode of transport is significantly better for the environment. Only people who state they already changed their lifestyle are not willing to use their car less. This might be caused by the fact that they already use their car less.

4.2.2 Willingness to get rid of car

To analyse if environmental concerns have an impact on respondents' willingness to get rid of their car, several Mann-Whitney U-tests have been carried out with environmental awareness questions and the willingness to get rid of their car (Table 5).

Table 5. *Significance willingness to get rid of car.*

	Q34: I am willing to get rid of my car if the alternative is significantly better for the environment.*	Appendix
<i>A: The environment...</i>	0.038	2.6
<i>B: Do you believe that the current concerns about the future of the environment are justified?</i>	0.341	2.7
<i>C: I am willing to change my lifestyle to reduce the damage I do to the environment.</i>	0.047	2.8
<i>D: I have already changed my lifestyle to reduce the damage I do to the environment.</i>	0.338	2.9
<i>E: I am willing to change my type of car to a more environmentally friendly option to reduce the damage I do to the environment.</i>	0.125	2.10

*significant at 5% interval

- A. This Mann-Whitney U-test was significant, $U = 673.5$, $z = -2.073$, $p = 0.038$. Respondents who believe the environment is in poor condition, are on average more willing to get rid of their car.
- B. This Mann-Whitney U-test was not significant, $U = 796$, $z = -0.952$, $p = 0.341$. Respondents who believe that the current concerns about the future of the environment are justified, are on average not more willing to get rid of their car.
- C. This Mann-Whitney U-test was significant, $U = 654$, $z = -1.991$, $p = 0.047$. Respondents who are willing to change their lifestyle, are on average more willing to get rid of their car.
- D. This Mann-Whitney U-test was not significant, $U = 776$, $z = -0.958$, $p = 0.338$. Respondents who say they already have changed their lifestyle, are on average not more willing to get rid of their car.
- E. This Mann-Whitney U-test was not significant, $U = 608.5$, $z = -1.533$, $p = 0.125$. Respondents who are willing to change their type of car, are on average not more willing to get rid of their car.

From this it can be concluded that respondents who believe the environment is in poor condition, are also willing to get rid of their car if the alternative mode of transport is significantly better for the environment. This also applies to respondents who indicate that they are willing to change their lifestyle.

Besides, respondents who believe that the current concerns about the environment are justified, respondents who say they already changed their lifestyle to reduce the damage they do to the environment, and respondents who are willing to change their type of car to a more environmentally friendly option to reduce the damage they to the environment, are not willing to get rid of their car. A possible explanation for this can be that they already have changed their lifestyle.

4.2.3 Average amount of kilometres travelled by car per day

To analyse if environmental concerns have an impact on the average amount of kilometres respondents travel by car per day, several Mann-Whitney U-tests have been carried out with environmental awareness questions and the number of kilometres travelled by car per day (Table 6).

For the statistical analyses used to answer this research question, a group variable was created for respondents who travel less than the average amount of kilometres travelled in the North of the Netherlands (see 2.1.1) – 41.2 kilometres – or more.

Table 6. *Significance average amount of kilometres travelled by car per day.*

	Q23: How many kilometres do you travel by car on an average weekday (to work, for groceries, sports, etc.)?*	
	Compared to average Netherlands	Appendix
<i>Q16: The environment...</i>	0.229	2.11
<i>Q17: Do you believe that the current concerns about the future of the environment are justified?</i>	0.146	2.12
<i>Q18: I am willing to change my lifestyle (e.g. eat less meat, install solar panels at home, separate waste, drive less) to reduce the damage I do to the environment.</i>	0.044	2.13
<i>Q19: I have already changed my lifestyle to reduce the damage I do to the environment.</i>	0.022	2.14
<i>Q21: I am willing to change my type of car to a more environmentally friendly option (e.g. electric or hydrogen) to reduce the damage I do to the environment.</i>	0.962	2.15

*significant at 5% interval

- A. This Mann-Whitney U-test was not significant, $U = 1348.5$, $z = -1.202$, $p = 0.229$. Respondents who believe the environment is in poor condition, do not drive on average less than the average inhabitant of the North of the Netherlands.
- B. This Mann-Whitney U-test was not significant, $U = 1384$, $z = -1.453$, $p = 0.146$. Respondents who believe that the current concerns about the future of the environment are justified, do not drive on average less than the average inhabitant of the North of the Netherlands.
- C. This Mann-Whitney U-test was significant, $U = 1204$, $z = -2.010$, $p = 0.044$. Respondents who are willing to change their lifestyle, drive on average less than the average inhabitant of the North of the Netherlands.
- D. This Mann-Whitney U-test was significant, $U = 1228$, $z = -2.292$, $p = 0.022$. Respondents who say they already have changed their lifestyle, drive on average less than the average inhabitant of the North of the Netherlands.

E. This Mann-Whitney U-test was not significant, $U = 1369$, $z = -0.048$, $p = 0.962$.

Respondents who are willing to change their type of car, do not drive on average less than the average inhabitant of the North of the Netherlands.

From this it can be concluded that respondents who are willing to change their lifestyle to reduce the damage they do to the environment, and respondents who say they already changed their lifestyle to reduce the damage they do to the environment, drive less than the average inhabitant of the North of the Netherlands.

Besides, respondents who believe the environment is in poor condition, respondents who believe that the current concerns about the environment are justified, and respondents who are willing to change their type of car to a more environmentally friendly option to reduce the damage they do to the environment, do not drive less than the average inhabitant of the North of the Netherlands.

4.5 Are car owners in the North of the Netherlands willing to stop using their car?

With 49.56 per cent in total, most respondents are not willing to get rid of their car if the alternative is significantly better for the environment (Figure 11). Only 26.09 per cent is willing to get rid of their car.

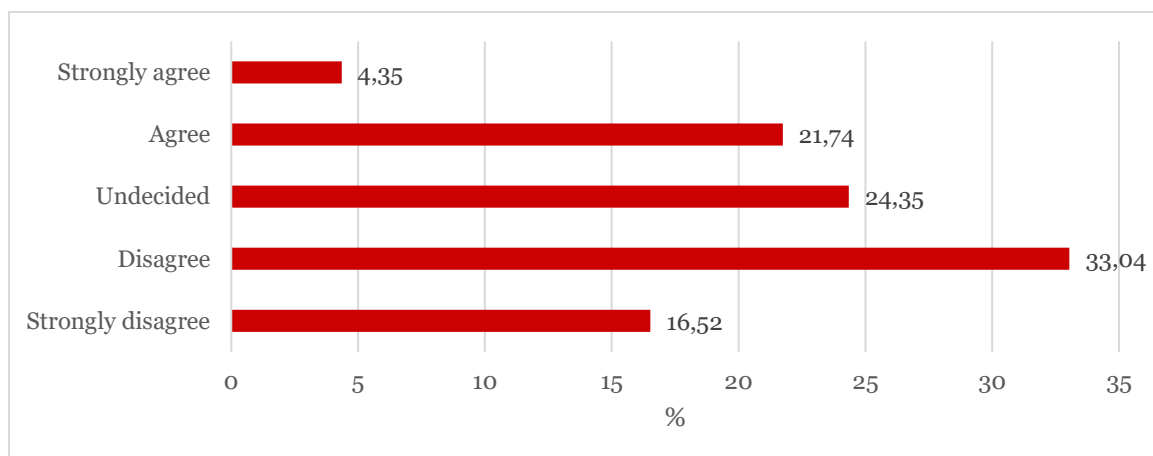


Figure 11. *Willingness to get rid of car if the alternative is significantly better for the environment.*

4.3.1 In how many years is the studied group willing to stop using their car?

Respondents who are willing to get rid of their car are ready to do so in 8.9 years on average. The standard deviation, however, was big (8.56) due to the number of years fluctuating between 0 and 40 years.

The distribution in Figure 12 shows that 81.49 per cent of the respondents who are willing to get rid of their car, are willing to do so somewhere between 1 and 10 years from now. The rest of the respondents indicated being willing to get rid of their car after a longer amount of time.

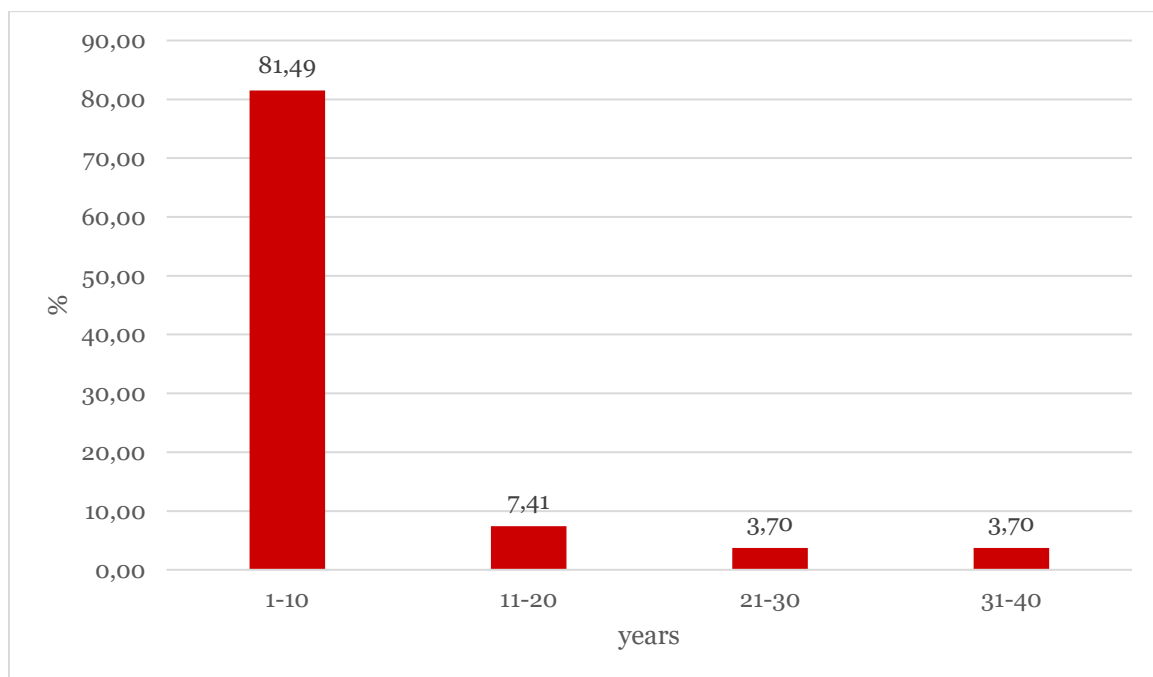


Figure 12. In how many years willing to get rid of car.

4.3.4 Is there a generational effect in planning to stop using a car?

Comparing the age group of respondents to the question if they are willing to get rid of their car if the alternative is significantly better for the environment, provides the following findings (Table 7). In the age group of 25-34, 58 per cent of the respondents are not willing to get rid of their car, and only 24 per cent is willing to get rid of their because of environmental concerns. Per centage-wise, respondents in the age group 45-54 are most willing to get rid of their car at 24 per cent. In the age group 75-84, there is the highest doubt with 67 per cent of responding they do not know if they are willing to get rid of their car. What should be mentioned is that only three respondents were in the age group of 75-84, which is not statistically significant. This number of respondents is too low to draw any conclusions from. There does not seem to be a generational effect in planning to stop using a car.

Table 7. *Willingness to get rid of car because of environmental concerns.*

Age	Disagree	Agree	I don't know	N
18 - 24	52%	24%	24%	21
25 - 34	58%	33%	8%	12
35 - 44	31%	19%	50%	16
45 - 54	56%	25%	19%	32
55 - 64	48%	38%	14%	21
65 - 74	50%	20%	30%	10
75 - 84	33%	0%	67%	3

5. Conclusion

Inhabitants of the North of the Netherlands believe that the environment is in poor condition, and they are willing to change their lifestyle to reduce their impact on the environment. They cite 'less driving' as a way to lower their impact, indicating that environmental awareness has an impact on their mobility. This is also evident from the other results, which indicate that people with environmental concerns are willing to use their car less if the alternative mode of transport is better for the environment. This is consistent with literature which states that car use is influenced by environmental concerns (Steg et al., 2001). However, the results seem to differ from a study showing that environmental awareness did not significantly lower people's car use (Kim & Ulfarsson, 2008). This could be caused by a difference in commuting distance, or the lack of good car alternatives, such as a reliable public transport network. Another possible cause is the fact that environmental awareness has influenced their intentions, but not their real behaviour (Ajzen, 1991). Nevertheless, the environment is the most important reason for people to use their car less, followed by comfort. People indicate that they find the cost of an alternative mode of transport the least important reason for using their car less or getting rid of it. This corresponds to the results of a study in the Netherlands (ABN Amro, Ipsos, 2020).

A majority of the inhabitants of the North of the Netherlands are not willing to get rid of their car altogether, but there are exceptions. For example, people who are willing to change their lifestyle are on average more willing to get rid of their car than people who do not want to change their lifestyle. For people who do not want to change their lifestyle, getting rid of their car is something they are not willing to do at the moment. This could be caused by a high dependence on their cars, because of commuting distances being too large to walk or cycle. Another explanation may be that people do not see public transport as a good alternative. This may also be related to the fact that people who say they want to change their lifestyle and have changed their lifestyle, drive fewer kilometres per day with their car than on average. This could indicate a lower dependency on their car.

People's environmental concerns seem to have an impact on people's willingness to use their car less, especially if they are willing to change their lifestyle. However, there does not seem to be any difference between age groups.

5.1 Recommendations for future research

It is recommended to conduct a qualitative research among car owners living in the North of the Netherlands. Qualitative research can be used to gain more insights into people's motives of why they might be willing to get rid of their car because of environmental concerns. Besides, quantitative research could be conducted into a larger group of respondents to be able to provide stronger statements. With a larger group of respondents, it is also possible to create a map from which patterns can be observed in the answer options of respondents.

5.2 Reflection

The data collection of this study showed the difficulty to gain an equal distribution of respondents across the three provinces. In addition, this research did not take into account whether people lived in a rural or urban area. This could affect people's dependence on cars.

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Appendices

Appendix 1: Questionnaire

Welcome

In this questionnaire you will be asked a number of questions about yourself, about how you think about the environment and about your travel movements. This questionnaire is for a survey among car owners on the influence of environmental awareness on future car use in the North of the Netherlands, conducted by Thijs Oost (student Spatial Design and Planning, University of Groningen).

Your data is anonymous and will not be shared with third parties. If you have any questions and/or remarks, please contact me via t.oost.1@student.rug.nl.

Thank you in advance for your cooperation.

--

Thijs Oost

Personal data

1. Does your household own one or more cars?
 - Yes
 - No (= skip to end of survey)
2. Which municipality do you live in?
 - (skip to end of survey if municipality was from outside Groningen, Friesland or Drenthe)
3. What type of car(s) do you own?
 - Fossil fuel (petrol/diesel/gas)
 - Electric
 - Hydrogen
 - Other: ...
4. What is your age (in years)?
 - Under 18
 - 18-24
 - 25-34
 - 35-44
 - 45-54

- 55-64
- 65-74
- 75-84
- 85 or older

5. What is your highest level of education?

- primary education
- vmbo-b/k
- vmbo-g/t
- havo
- vwo
- mbo
- hbo
- wo
- PhD

6. What is your household's annual net income?

- Less than €10.000
- €10.000 - €19.999
- €20.000 - €29.999
- €30.000 - €39.999
- €40.000 - €49.999
- €50.000 - €59.999
- €60.000 - €69.999
- €70.000 - €79.999
- €80.000 - €89.999
- €90.000 - €99.999
- €100.000 - €149.999
- Over €150.000
- I don't know / I'd rather not answer this question

Environmental awareness

Environmental awareness is the extent to which respondents are aware of the environment and says something about the amount of attention someone pays to the environment. The environment, also known as the 'biological living environment', is the whole of the natural, social and cultural environment that affects a living being.

7. The environment...
 - Is in good condition
 - Is in poor condition, but can be saved with a little effort
 - Is in poor condition, but can be saved with great difficulty
 - Is in such a poor state that little can be done about it
8. Do you believe that the current concerns about the future of the environment are justified?
 - Yes
 - No
 - I don't know
9. I am willing to change my lifestyle (e.g. eat less meat, install solar panels at home, separate waste, drive less) to reduce the damage I do to the environment.
 - Strongly disagree 1 – 5 Strongly agree
10. I have already changed my lifestyle to reduce the damage I do to the environment.
 - Strongly disagree 1 – 5 Strongly agree
(if 1, 2 or 3 = skip question 11)
(if 4 or 5 = display question 11)
11. Could you give examples of things you have already done to reduce the damage you do to the environment?
12. *(question was only displayed if answer on question 3 was "fossil fuel")*.
 - Strongly disagree 1 – 5 Strongly agree

Mobility

The questions below are about your travel behaviour before the COVID-19 pandemic.

13. How many kilometres do you travel by car on an average weekday (to work, for groceries, sports, etc.)?
14. What means of transport do you use, apart from your car, on a weekly basis?
 - Electric bicycle
 - Normal (non-electric) bicycle
 - Public transport
 - Walking
 - Car pooling/car sharing
 - Other: ...
15. What do you use your car most for?
 - Going to work
 - Doing groceries
 - To friends/family/etc.
 - Other: ...

*The next three questions are about **using your car less**. This means that your household still own a car, but uses it less often.*

16. I am willing to use my car less if the alternative (e.g. bicycle, public transport, car sharing) is significantly cheaper.
 - Strongly disagree 1 – 5 Strongly agree
17. I am willing to use my car less if the alternative is considerably more comfortable.
 - Strongly disagree 1 – 5 Strongly agree
(if 1, 2 or 3 = skip question 18)
(if 4 or 5 = display question 18)
18. What does 'more comfortable' mean to you?
19. I am willing to use my car less if the alternative is significantly better for the environment (for example: less emissions of harmful substances).
 - Strongly disagree 1 – 5 Strongly agree

The next three questions are about getting **rid of your car**. This means that your household stops owning a car, and sells it.

20. I am willing to get rid of my car if the alternative is significantly cheaper.

- Strongly disagree 1 – 5 Strongly agree

21. I am willing to get rid of my car if the alternative is considerably more comfortable.

- Strongly disagree 1 – 5 Strongly agree

22. I am willing to get rid of my car if the alternative is significantly better for the environment.

- Strongly disagree 1 – 5 Strongly agree

(if 1, 2 or 3 = skip question 23)

(if 4 or 5 = display question 23)

23. In how many years do you think you will be prepared to get rid of your car for environmental reasons?

24. Do you have any questions or remarks?

End of questionnaire

Your answers have been saved. Thank you very much for filling in this questionnaire. Should you have any further questions and/or comments, please contact me via t.oost.1@student.rug.nl. You can now close this window.

Appendix 2: SPSS output

Appendix 2.1

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
The environment...	120	2,75	,554	1	4	3,00	3,00	3,00
Drive less	91	1,2308	,42366	1,00	2,00	1,0000	1,0000	1,0000

Ranks

	Drive less	N	Mean Rank	Sum of Ranks
	no	21	36,60	768,50
	Total	91		

Test Statistics^a

	The environment...
Mann-Whitney U	537,500
Wilcoxon W	768,500
Z	-2,459
Asymp. Sig. (2-tailed)	,014

a. Grouping Variable: Drive less

Appendix 2.2

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
Do you believe that the current concerns about the future of the environment are justified?	120	1,17	,524	1	3	1,00	1,00	1,00
Drive less	91	1,2308	,42366	1,00	2,00	1,0000	1,0000	1,0000

Ranks

	Drive less	N	Mean Rank	Sum of Ranks
	no	21	52,55	1103,50
	Total	91		

Test Statistics^a

Do you believe that the current concerns about the future of the environment are justified?

Mann-Whitney U	597,500
Wilcoxon W	3082,500
Z	-2,638
Asymp. Sig. (2-tailed)	,008

a. Grouping Variable: Drive less

Appendix 2.3

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
I am willing to change my lifestyle (e.g. eat less meat, install solar panels at home, separate waste, drive less) to reduce the damage I do to the environment.	119	3,97	,742	1	5	4,00	4,00	4,00
Drive less	91	1,2308	,42366	1,00	2,00	1,0000	1,0000	1,0000

Ranks

	Drive less	N	Mean Rank	Sum of Ranks
	I am willing to change my lifestyle (e.g. eat less meat, install solar panels at home, separate waste, drive less) to reduce the damage I do to the environment.	yes	70	50,11
no		20	29,35	587,00
Total		90		

Test Statistics^a

I am willing to change my lifestyle (e.g. eat less meat, install solar panels at home, separate waste, drive less) to reduce the damage I do to the environment.

Mann-Whitney U	377,000
Wilcoxon W	587,000
Z	-3,796
Asymp. Sig. (2-tailed)	,000

a. Grouping Variable: Drive less

Appendix 2.4

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
I have already changed my lifestyle to reduce the damage I do to the environment.	120	3,78	,814	1	5
Drive less	91	1,2308	,42366	1,00	2,00

Ranks

	Drive less	N	Mean Rank	Sum of Ranks
I have already changed my lifestyle to reduce the damage I do to the environment.	yes	70	47,54	3327,50
	no	21	40,88	858,50
	Total	91		

Test Statistics^a

I have already changed my lifestyle to reduce the damage I do to the environment.

Mann-Whitney U	627,500
Wilcoxon W	858,500
Z	-1,568
Asymp. Sig. (2-tailed)	,117

a. Grouping Variable: Drive less

Appendix 2.5

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
I am willing to change my type of car to a more environmentally friendly option (e.g. electric or hydrogen) to reduce the damage I do to the environment.	112	3,41	,926	1	5	3,00	4,00	4,00
Drive less	91	1,2308	,42366	1,00	2,00	1,0000	1,0000	1,0000

Ranks

	Drive less	N	Mean Rank	Sum of Ranks
	no	19	33,16	630,00
	Total	87		

Test Statistics^a

I am willing to change my type of car to a more environmentally friendly option (e.g. electric or hydrogen) to reduce the damage I do to the environment.

Mann-Whitney U	440,000
Wilcoxon W	630,000
Z	-2,290
Asymp. Sig. (2-tailed)	,022

a. Grouping Variable: Drive less

Appendix 2.6

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
The environment...	120	2,75	,554	1	4	3,00	3,00	3,00
Get rid of car	87	1,6552	,47807	1,00	2,00	1,0000	2,0000	2,0000

Ranks

	Get rid of car		N	Mean Rank	Sum of Ranks
	1,00	2,00			
The environment...	1,00		30	50,05	1501,50
		2,00	57	40,82	2326,50
	Total		87		

Test Statistics^a

The environment...

Mann-Whitney U	673,500
Wilcoxon W	2326,500
Z	-2,073
Asymp. Sig. (2-tailed)	,038

a. Grouping Variable: Get rid of car

Appendix 2.7

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
Do you believe that the current concerns about the future of the environment are justified?	120	1,17	,524	1	3	1,00	1,00	1,00
Get rid of car	87	1,6552	,47807	1,00	2,00	1,0000	2,0000	2,0000

Ranks

	Get rid of car	N	Mean Rank	Sum of Ranks
Do you believe that the current concerns about the future of the environment are justified?	1,00	30	42,03	1261,00
	2,00	57	45,04	2567,00
	Total	87		

Test Statistics^a

Do you believe that the current concerns about the future of the environment are justified?

Mann-Whitney U	796,000
Wilcoxon W	1261,000
Z	-,952
Asymp. Sig. (2-tailed)	,341

a. Grouping Variable: Get rid of car

Appendix 2.8

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
I am willing to change my lifestyle (e.g. eat less meat, install solar panels at home, separate waste, drive less) to reduce the damage I do to the environment.	119	3,97	,742	1	5	4,00	4,00	4,00
Get rid of car	87	1,6552	,47807	1,00	2,00	1,0000	2,0000	2,0000

Ranks

	Get rid of car	N	Mean Rank	Sum of Ranks
I am willing to change my lifestyle (e.g. eat less meat, install solar panels at home, separate waste, drive less) to reduce the damage I do to the environment.	1,00	30	49,70	1491,00
	2,00	56	40,18	2250,00
	Total	86		

Test Statistics^a

I am willing to change my lifestyle (e.g. eat less meat, install solar panels at home, separate waste, drive less) to reduce the damage I do to the environment.

Mann-Whitney U	654,000
Wilcoxon W	2250,000
Z	-1,991
Asymp. Sig. (2-tailed)	,047

a. Grouping Variable: Get rid of car

Appendix 2.9

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
I have already changed my lifestyle to reduce the damage I do to the environment.	120	3,78	,814	1	5	4,00	4,00	4,00
Get rid of car	87	1,6552	,47807	1,00	2,00	1,0000	2,0000	2,0000

Ranks

	Get rid of car	N	Mean Rank	Sum of Ranks
I have already changed my lifestyle to reduce the damage I do to the environment.	1,00	30	46,63	1399,00
	2,00	57	42,61	2429,00
	Total	87		

Test Statistics^a

	I have already changed my lifestyle to reduce the damage I do to the environment.
Mann-Whitney U	776,000
Wilcoxon W	2429,000
Z	-,958
Asymp. Sig. (2-tailed)	,338

a. Grouping Variable: Get rid of car

Appendix 2.10

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
I am willing to change my type of car to a more environmentally friendly option (e.g. electric or hydrogen) to reduce the damage I do to the environment.	112	3,41	,926	1	5	3,00	4,00	4,00
Get rid of car	87	1,6552	,47807	1,00	2,00	1,0000	2,0000	2,0000

Ranks

	Get rid of car	N	Mean Rank	Sum of Ranks
I am willing to change my type of car to a more environmentally friendly option (e.g. electric or hydrogen) to reduce the damage I do to the environment.	1,00	28	46,77	1309,50
	2,00	54	38,77	2093,50
	Total	82		

Test Statistics^a

I am willing to change my type of car to a more environmentally friendly option (e.g. electric or hydrogen) to reduce the damage I do to the environment.

Mann-Whitney U	608,500
Wilcoxon W	2093,500
Z	-1,533
Asymp. Sig. (2-tailed)	,125

a. Grouping Variable: Get rid of car

Appendix 2.11

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
The environment...	120	2,75	,554	1	4	3,00	3,00	3,00
Under or above average km's per day	113	1,3805	,48768	1,00	2,00	1,0000	1,0000	2,0000

Ranks

	Under or above average km's per day	N	Mean Rank	Sum of Ranks
The environment...	1,00	70	59,24	4146,50
	2,00	43	53,36	2294,50
	Total	113		

Test Statistics^a

The environment...

Mann-Whitney U	1348,500
Wilcoxon W	2294,500
Z	-1,202
Asymp. Sig. (2-tailed)	,229

a. Grouping Variable: Under or above average km's per day

Appendix 2.12

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
Do you believe that the current concerns about the future of the environment are justified?	120	1,17	,524	1	3	1,00	1,00	1,00
Under or above average km's per day	113	1,3805	,48768	1,00	2,00	1,0000	1,0000	2,0000

Ranks

	Under or above average km's per day		N	Mean Rank	Sum of Ranks
	1,00	2,00			
Do you believe that the current concerns about the future of the environment are justified?	1,00		70	55,27	3869,00
	2,00		43	59,81	2572,00
	Total		113		

Test Statistics^a

Do you believe that the current concerns about the future of the environment are justified?

Mann-Whitney U	1384,000
Wilcoxon W	3869,000
Z	-1,453
Asymp. Sig. (2-tailed)	,146

a. Grouping Variable: Under or above average km's per day

Appendix 2.13

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
I am willing to change my lifestyle (e.g. eat less meat, install solar panels at home, separate waste, drive less) to reduce the damage I do to the environment.	119	3,97	,742	1	5	4,00	4,00	4,00
Under or above average km's per day	113	1,3805	,48768	1,00	2,00	1,0000	1,0000	2,0000

Ranks

	Under or above average km's per day	N	Mean Rank	Sum of Ranks
I am willing to change my lifestyle (e.g. eat less meat, install solar panels at home, separate waste, drive less) to reduce the damage I do to the environment.	1,00	69	60,55	4178,00
	2,00	43	50,00	2150,00
	Total	112		

Test Statistics^a

I am willing to change my lifestyle (e.g. eat less meat, install solar panels at home, separate waste, drive less) to reduce the damage I do to the environment.

Mann-Whitney U	1204,000
Wilcoxon W	2150,000
Z	-2,010
Asymp. Sig. (2-tailed)	,044

a. Grouping Variable: Under or above average km's per day

Appendix 2.14

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
I have already changed my lifestyle to reduce the damage I do to the environment.	120	3,78	,814	1	5	4,00	4,00	4,00
Under or above average km's per day	113	1,3805	,48768	1,00	2,00	1,0000	1,0000	2,0000

Ranks

	Under or above average km's per day	N	Mean Rank	Sum of Ranks
I have already changed my lifestyle to reduce the damage I do to the environment.	1,00	70	60,96	4267,00
	2,00	43	50,56	2174,00
	Total	113		

Test Statistics^a

	I have already changed my lifestyle to reduce the damage I do to the environment.
Mann-Whitney U	1228,000
Wilcoxon W	2174,000
Z	-2,292
Asymp. Sig. (2-tailed)	,022

a. Grouping Variable: Under or above average km's per day

Appendix 2.15

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
I am willing to change my type of car to a more environmentally friendly option (e.g. electric or hydrogen) to reduce the damage I do to the environment.	112	3,41	,926	1	5	3,00	4,00	4,00
Under or above average km's per day	113	1,3805	,48768	1,00	2,00	1,0000	1,0000	2,0000

Ranks

	Under or above average km's per day	N	Mean Rank	Sum of Ranks
I am willing to change my type of car to a more environmentally friendly option (e.g. electric or hydrogen) to reduce the damage I do to the environment.	1,00	64	54,11	3463,00
	2,00	43	53,84	2315,00
	Total	107		

Test Statistics^a

I am willing to change my type of car to a more environmentally friendly option (e.g. electric or hydrogen) to reduce the damage I do to the environment.

Mann-Whitney U	1369,000
Wilcoxon W	2315,000
Z	-,048
Asymp. Sig. (2-tailed)	,962

a. Grouping Variable: Under or above average km's per day

Appendix 3: map origin respondents per municipality

