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Disclosing the Naysayers: Socio-Demographic Characteristics As Predictors of Climate Change Scepticism in the Netherlands

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ABSTRACT

There has been increasing scientific consensus regarding the existence of a dangerous anthropogenically induced climatic change. In contrast, the amount of people that deny climate change and consequently question this consensus, so-called climate change sceptics, is also increasing. Climate change sceptics are proven to impede the implementation of green policies. Therefore, to increase the chance of successfully implementing measures to combat climate change, these sceptics need to be targeted specifically during pro-environmental campaigns. To do so, it needs to be disclosed who these sceptics are. Consequently, this study aimed to identify socio-demographics that are predictors of climate change scepticism in the Netherlands.

Climate change scepticism consists of three breadths and three depths. The breadth refers to the concept that is being denied, which can be the (1) existence of climate change, (2) the anthropogenic influence on it and/or (3) its associated risks. The depth regards the intensity of denial, which can be (1) scepticism, (2) ambiguousness or (3) uncertainty. By interconnecting the breadths and depths, nine classifications are identified.

To identify scepticism predicting socio-demographics, an online survey was distributed. Due to an insufficient sample size, three classifications were excluded from the data analysis. A socio-demographical profile was identified for each of the remaining six classifications, the three breadths and for climate change scepticism in general. Although the profiles differ, the socio-demographics are consistent in their relation to climate change scepticism. In the case of significant relations, scepticism is consistently correlated with the male gender, high age, low educational level, residence rurality, residence vulnerability, conservatism and liberalism.

Depending on the strategy that the Dutch government wants to employ during its pro-environmental campaigns, the results offer multiple implications. The government could target the most generic sceptic profile, thus that of climate change scepticism in general. It could alternatively opt for the most specific, and therefore most time consuming, option of targeting the profiles of each classification individually. Lastly, the government could opt to pursue the “happy medium” between these two and target the sceptic profiles of the breadths.

Keywords: *climate change scepticism, socio-demographic characteristics, trend scepticism, attribution scepticism, risk scepticism*

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List of Acronyms

SDGs	Sustainable Development Goals	
FvD	Forum voor Democratie	(political party)
SGP	Staatkundig Gereformeerde Partij	(political party)
PVV	Partij voor de Vrijheid	(political party)
CDA	Christen-Democratisch Appèl	(political party)
50+	50PLUS	(political party)
PvdD	Partij voor de Dieren	(political party)
VVD	Volkspartij voor de Vrijheid en Democratie	(political party)
SP	Socialistische Partij	(political party)
PvdA	Partij van de Arbeid	(political party)
D66	Democraten 66	(political party)
CU	ChristenUnie	(political party)

CHAPTER 1: INTRODUCTION

1.1 Background

Throughout the previous decades there has been increasing scientific consensus regarding the existence of a climatic change resulting from anthropogenic activity (Whitmarsh, 2011). Arguably, climate change is one of the greatest global challenges of the 21st century (Poortinga et al., 2011; Islam et al., 2013). Global warming, caused by the increasing atmospheric concentration of greenhouse gases, results in many significant risks for humans, animals and nature. It affects water, soil, precipitation patterns, air quality and vegetation dynamics, which in turn are all interlinked (McMichael et al., 2006).

As opposed to the increasing evidence for the anthropogenically induced climatic change, the amount of climate change sceptics is also on the increase (Tranter & Booth, 2015; Poortinga et al., 2011). Climate change sceptics are people that deny climate change and consequently question the scientific consensus on climate change (Islam et al., 2013).

Policies and actions are urgently needed to mitigate climate change (Akter et al., 2012). However, the implementation of these are complicated by climate change sceptics, as this civic opposition discourages, impedes and delays such efforts (Akter et al., 2012). Consequently, convincing these sceptics can arguably be considered an even bigger priority. Therefore, identifying the socio-demographic characteristics that climate change sceptics tend to hold would enable policy makers to target sceptics specifically during pro-environmental campaigns.

Socio-demographic characteristics are parameters of humans and their activities, such as age, income and political orientation (Fedushko et al., 2013). The amount of research on socio-demographic characteristics that climate change sceptics tend to hold remains extremely limited (Tranter & Booth, 2015). The existing literature generally focusses on Nordic countries, Western Europe and the USA. The reason for this is that these countries share the characteristic of having a high level of gross domestic product per capita. This is in turn linked to high levels of non-materialistic values such as environmental support (Tranter & Booth, 2015).

1.2 Problem statement

Nevertheless, a study on the correlation between socio-demographic characteristics and climate change scepticism in the Netherlands is still lacking. This is striking, because this country is arguably in desperate need of policies and actions to mitigate climate change. The Netherlands

appears to show concern with regards to climate change, as the country signed the Paris agreement and adopted the Sustainable Development Goals (SDGs) for the years 2020, 2030 and 2050. Regardless, it is already evident that the country will fail to meet its goals for the year 2020 (Hammingh, 2019). Furthermore, the court has ruled that the Netherlands is legally obliged to reduce its greenhouse gas emissions by 25% in 2020 compared to the year 1990 (Rijksoverheid, 2020). However, research has shown that the realized reduction was only 14,5% by the end of the year 2018 (CBS, 2019a).

In an effort to reduce greenhouse gases, the country has identified sectors that need to participate in this pro-environmental movement. These sectors include electricity, industry, built environment, traffic and transport and agriculture (Rijksoverheid, 2020). The government has already implemented regulations to reduce emissions in these sectors, such as reducing the speed limit on highways and reducing the allowed amount of protein in cattle feed (Rijksoverheid, 2019). However, given the amount of resulting protests from the public (AD, 2019; Candel, 2019), resistance can arguably be considered to be high. This resistance against these green policies can originate from scepticism (Akter et al., 2012). Additionally, Forum voor Democratie (FvD), a political party that presents itself as being highly sceptical towards climate change, was considered the great winner in the country's elections in 2019 (NOS, 2019). This great win is arguably a strong indicator that climate change scepticism is on the rise in the Netherlands.

Since it is already the year 2020, the Dutch government only has a few months left to comply to the court's decision. Consequently, reducing the resistance, and thus convincing sceptics of the necessity of these policies, is of utmost importance. Namely, doing so will help to overcome this obstacle in implementing green policies. Therefore, the government first needs to understand which groups in society are discouraging, impeding and delaying its climate change mitigation policies and measures. As argued before, this would allow the government to target these *naysayers* specifically in pro-environmental campaigns.

1.3 Research Objective

Therefore, the aim of this research is to identify socio-demographic characteristics that are predictors of climate change scepticism in the Netherlands. It is important to stress that the aim is to *identify* characteristics that predict scepticism, and thus not to research *explanations* for certain characteristics to be predictors of climate change scepticism. Consequently, the main

research question of this study is: *“Which socio-demographic characteristics are predictors of climate change scepticism in the Netherlands?”*.

1.4 Report Structure

This report is structured as follows. In chapter 2, an elaborate literature study is presented. This chapter features a discussion on the concept of climate change scepticism, as well as a conceptual literature review on similar studies that are conducted abroad. Chapter 2 results in the formulation of this study’s hypotheses, as well as the formulation of the sub-questions to answer the main research question.

In chapter 3, the methodology that is used to test these hypotheses is elaborated upon. The results from these tests are presented in chapter 4. In chapter 5, the results are interpreted to answer the sub-questions. Furthermore, chapter 5 features a discussion of the results, an elaboration on the implications of the results and this study’s limitations. At the end of this report, in chapter 6, the main research question is answered, conclusions are drawn and suggestions for future research are provided.

CHAPTER 2: LITERATURE STUDY

In this chapter, an elaborate literature review is presented. First, the concept of climate change scepticism is discussed. This discussion leads to the concept's operationalisation into three "breadth" and three "depth" classifications, resulting in nine climate change scepticism categories. Second, the findings of similar studies conducted in other countries than the Netherlands are explored through conceptual literature reviewing. Third, the findings from this conceptual literature review are applied to the case of the Netherlands, resulting in the formulation of hypotheses and the conceptual framework. Fourth, in line with the findings of the literature review, the sub-questions to answer the main research question are formulated.

2.1 Climate Change Scepticism

As mentioned before, climate change sceptics are people that deny climate change and therefore question the scientific consensus on climate change (Islam et al., 2013). However, climate change scepticism is an ambiguous concept as there are three types of scepticism, namely *trend scepticism*, *attribution scepticism* and *risk scepticism* (Islam et al., 2013; Poortinga et al., 2011). *Trend sceptics* are the most extreme sceptics, as they deny the very existence of climate change. *Attribution sceptics* acknowledge the occurrence of climate change, however decline to accept the anthropogenic influence on it and instead consider it a natural occurrence. Lastly, *risk sceptics* acknowledge climate change and that anthropogenic activity has induced this phenomenon, but refuse to acknowledge that this poses significant risks to humans, animals and nature (Rahmstorf, 2004).

Besides this "breadth" categorisation of climate change scepticism, one can also distinguish three "depth" categories. Namely, in order from deep to shallow, the lack of acknowledgement can be classified as *scepticism*, *ambiguousness* and *uncertainty* (Poortinga et al., 2011). *Sceptics* strongly disbelieve or reject scientific proof for climate change. One portrays attitudinal *ambiguousness* when that person has conflicting feelings, attitudes or beliefs with regards to climate change. Consequently, ambiguous people would demonstrate scepticism, uncertainty and perhaps even acknowledgement alternately in evaluating climate change characteristics. *Uncertain* people have a low subjective sense of judgement of validity regarding whether climate change is a fact (Poortinga et al., 2011). People that acknowledge the existence, anthropogenic influence and risks of climate change are considered to be non-sceptical towards climate change.

By interconnecting the three depth and three breadth classifications, nine scepticism categories can be identified. These nine categories are presented as a diagram in Figure 1, and elaborated upon in Table 1. The categories are numbered according to their considered priority regarding future pro-environmental efforts, with 1 being the highest priority and 9 the lowest. *Trend Sceptics* are thus for instance considered top priority, as they deny climate change to the maximum extent in terms of both depth and breadth. Consequently, in line with the article by Akter et al. (2012), trend sceptics are expected to be the group of people that discourage, impede or delay pro-environmental efforts the most. Therefore, pro-environmental change agents should allocate their resources according to this prioritization.

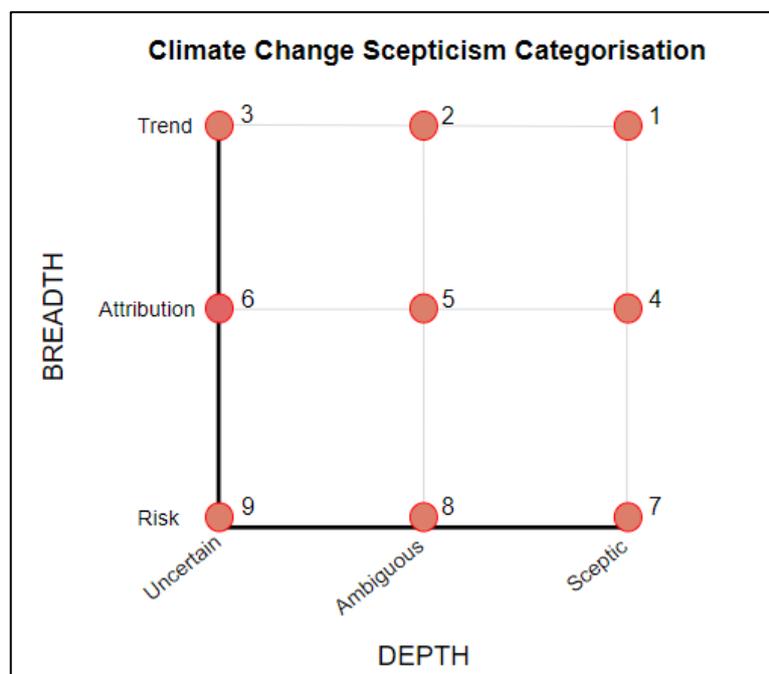


Figure 1: Climate Change Scepticism Categorisation

Table 1: Identified Scepticism Categories from Literature Review

Category	Attitude towards the existence of climate change	Attitude towards the anthropogenic influence on climate change	Attitude towards the risks associated with climate change
1. Trend scepticism	Sceptical	<i>Any Attitude</i>	<i>Any Attitude</i>
2. Trend ambiguousness	Ambiguous	<i>Any Attitude</i>	<i>Any Attitude</i>
3. Trend uncertainty	Uncertain	<i>Any Attitude</i>	<i>Any Attitude</i>
4. Attribution scepticism	Acknowledging	Sceptical	<i>Any Attitude</i>
5. Attribution ambiguousness	Acknowledging	Ambiguous	<i>Any Attitude</i>
6. Attribution uncertainty	Acknowledging	Uncertain	<i>Any Attitude</i>
7. Risk scepticism	Acknowledging	Acknowledging	Sceptical
8. Risk ambiguousness	Acknowledging	Acknowledging	Ambiguous
9. Risk uncertainty	Acknowledging	Acknowledging	Uncertain

2.2 Exploring Findings Similar Studies Abroad

In this paragraph, the findings of similar studies abroad are explored through conceptual literature reviewing. This literature review approach allows for a synthetisation of existing knowledge in this specific research field. Therefore, the resulting overview generates a clear understanding of what socio-demographic characteristics are proven to be predictors of climate change scepticism in other countries (Petticrew & Robberts, 2008). Consequently, this enables the shaping of expectations regarding which socio-demographics may be predictors of climate change scepticism in the case of the Netherlands.

For this conceptual literature review, scientific articles are retrieved from scientific databases including Google Scholar, Web of Science and Scopus. Articles that are considered relevant for this study are sought through the various combination of terms as shown in Figure 2. To ensure validity and high quality of the articles, they are filtered on being peer reviewed (Curry, 2019). Furthermore, the time frame filter is set from the year 2000 onwards, as climate change is considered to be a 21st century challenge (Poortinga et al., 2011).

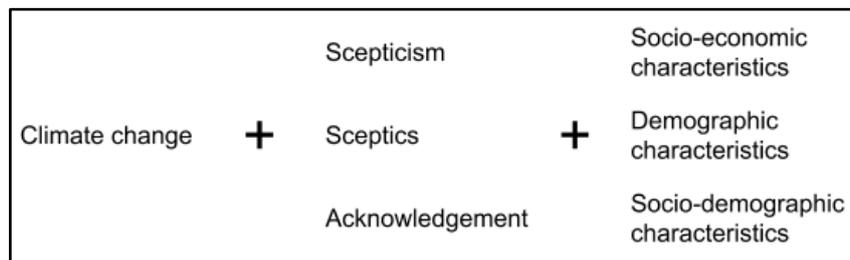


Figure 2: Search Terms

The resulting articles are only considered relevant when their aim was to identify more than one socio-demographic characteristic that predict climate change scepticism. Namely, the contribution to this discussion by articles that only consider one characteristic would be highly limited. Furthermore, the studies are only perceived relevant if they focus on a western country, so that it can be considered at least somewhat similar to the Netherlands. This delineation leads to a selection of eight articles, which verifies that this research field is highly limited. The chosen articles for this literature review are summarized in Table 2.

Table 2: Articles for Conceptual Literature Review

Nr.	Article by	Research object(s) considered relevant to this study
1	Jylhä et al. (2016)	Sweden
2	Akter et al. (2012)	Australia
3	Islam et al. (2013)	Scotland
4	Pickering (2015)	Canada
5	Poortinga et al. (2011)	United Kingdom
6	Van der Linden (2015)	United Kingdom
7	Whitmarsh (2011)	United Kingdom
8	Tranter & Booth (2015)	Australia, Austria, Canada, Denmark, Finland, France, Germany, Great Britain, New Zealand, Norway, Spain, Sweden, Switzerland and the United States of America

Rather than discussing the articles individually, their findings are systematically discussed per socio-demographic characteristic. By doing so, the reader is presented a clear overview on what characteristics the studies agree upon, and where their results contradict. As these articles generally do not differentiate between different scepticism depths and breadths, this discussion regards climate change scepticism as a general concept instead. At the end of this paragraph, in section 2.2.10, the findings are summarized in Table 3.

2.2.1 Gender

Out of the eight selected articles, seven included gender in their search for socio-demographic characteristics that correlate with climate change scepticism. However, none of these studies elaborated upon reasons for gender being of possible influence. The results of these studies somewhat differ. Most studies agree that gender is a significant predictor of climate change scepticism, as sceptics tend to be male (Jylhä et al., 2016; Akter et al., 2012; Whitmarsh, 2011; Van der Linden, 2015; Tranter & Booth, 2015).

The studies by Poortinga et al. (2011) and Pickering (2015) were however unable to conclude a relation between gender and climate change scepticism. Furthermore, even though Tranter and Booth (2015) concluded a relation between the male gender and climate change scepticism at a cross-national level, not all countries these authors researched support this

conclusion individually. Five out of the fourteen countries¹ did not show a significant relation between gender and climate change scepticism.

2.2.2 Age

Two arguments are provided for age being predictors of climate change scepticism. Islam et al. (2013) assert that people of young age tend to have a pro-environmental attitude, which the authors relate to the birth cohort effect. This effect suggests that a generation's attitude can be affected collectively by experiencing historical occurrences, such as the major global challenge of the 21st century climate change. A second argument for age being a predictor of scepticism, is that environmental studies are increasingly included in school curricula. Consequently, young people are more exposed to environmental related topics than elderly as the scientific consensus and debates regarding actions to combat climate change are of relatively recent origin (Islam et al., 2013; Whitmarsh, 2011).

Out of the eight selected articles, again seven included this socio-demographic characteristic. Five out of those seven articles indeed concluded a significant linear positive relationship between age and climate change scepticism (Akter et al., 2012; Islam et al., 2013; Poortinga et al., 2011; Whitmarsh, 2011; Tranter & Booth, 2015). This implies that young people tend to be less sceptical towards climate change than older people. Furthermore, Pickering (2015) also found a relationship between age and scepticism. However, rather than a linear relationship, this author concluded that the participants aged between 40 and 44 years old were significantly more sceptical than any other age.

In contrast, Van der Linden (2015) was not able to determine a significant relation between age and climate change scepticism. Additionally, Islam et al. (2013) did not find significant evidence to support any relations between age and trend- and risk scepticism. This is remarkable, as Islam et al. (2013) did conclude a positive linear relation between age and scepticism in general. This implies that the relation between age and attribution scepticism was sufficiently significant to compensate for the lack of relation between age and the other breadth scepticism classifications.

Lastly, some additional remarks need to be addressed. Tranter and Booth (2015), as with gender, were only able to conclude a significant relation between age and climate change scepticism at the cross-national level. At the country level, only Denmark, Finland and New

¹ Significant relations at the country level between climate change scepticism and gender were not found for Austria, Germany, Switzerland, Great Britain and the United States of America.

Zealand showed a significant relation between age and climate change scepticism. Consequently, Tranter and Booth (2015) consider it an inconsistent predictor. This inconsistency possibly explains why Van der Linden's (2015) findings did not align with the findings of Whitmarsh (2011) and Poortinga et al. (2011), despite having their research object in common, namely the United Kingdom.

2.2.3 Income

Seven out of the eight reviewed articles include income as a socio-demographic characteristic, and show contradictory results. Whitmarsh (2011), Akter et al. (2012), and Tranter and Booth (2015) found that income is positively related to the level of climate change scepticism. Whitmarsh (2011) argues that wealthy people are more likely to hold a sceptical attitude towards climate change as this societal group has more to lose. Namely, wealthy people have the financial means to purchase more goods and services than people with a low income. Consequently, people with high incomes tend to portray luxurious and high energy consuming lifestyles. Therefore, if people were to be urged to change to a low-carbon lifestyle, this would imply a more significant, downsizing shift for the rich than for the poor. Based upon this reasoning, Whitmarsh (2011) concludes that people with higher incomes are more likely to prefer denial over acknowledgement.

Furthermore, although not including income in their research, Jylhä et al. (2016) argue that sceptics are amongst those that are more willing to accept an uneven distribution of income. Arguably, these authors are hinting towards people with a high income. Namely, if income were to be more levelled in society, the wealthy would have to suffer a relative financial setback as opposed to the people with a low income.

In contrast, Poortinga et al. (2011) and Islam et al. (2013) concluded that income is negatively related to the level of scepticism. This implies that people with a high income are less likely to hold a sceptical attitude. Both studies explain this negative relationship in light of the so-called economic contingency hypothesis. This theory implies that immediate financial concerns overshadow any concerns towards climate change. Therefore, these studies argue that economic insecurity from having a low income, especially during an economic recession, reduces the acknowledgement towards climate change.

As opposed to the other studies, both Van der Linden (2015) and Pickering (2015) were unable to identify a relationship between income and the level of climate change scepticism. Arguably, this may be the result of having logical explanations for this relationship being either

positive or negative. Therefore, these arguments may balance each other out and consequently result in a non-significant outcome.

One striking observation is the different findings by the studies of Whitmarsh (2011), Poortinga et al. (2011) and Van der Linden (2015), as their studies all focussed on the United Kingdom. Respectively, these researchers found the relation between income and the level of climate change scepticism to be positive, negative and non-significant. Therefore, income appears to be a rather inconsistent predictor of climate change scepticism.

2.2.4 Educational Level

The findings of almost all seven studies that included the socio-demographic characteristic educational level in their research regarding climate change scepticism are in accordance with each other. Namely, six out of the seven have found that the level of education is negatively related to climate change scepticism (Islam et al., 2013; Pickering, 2015; Poortinga et al., 2011; Van der Linden, 2015; Whitmarsh, 2011; Tranter & Booth, 2015). The provided explanation for this relationship is that awareness and understanding of climate change and its risks increases through education. Therefore, the higher the level of education that people have obtained, the less sceptical these people are expected to be (Islam et al., 2013).

In contrast, Akter et al. (2012) did not find scientific support for educational level being a predictor of climate change scepticism. Moreover, Tranter and Booth (2015) argue that educational level is an inconsistent predictor at the country level, as this sociodemographic only correlated significantly with climate change scepticism in three countries².

2.2.5 Household Composition

In high contrast to the four previous characteristics, household composition is seldomly included in studies that aim to identify socio-demographic characteristics that are predictors of climate change scepticism. None of the studies that were selected for this conceptual literature review considered marital status, household size or household composition.

However, three studies included the amount of children of its participants (Whitmarsh, 2008; Akter et al., 2012; Pickering, 2015). Regardless, none of these studies elaborated upon arguments for the existence of any relationship between amount of children and the level of scepticism. Both Whitmarsh (2008) and Akter et al. (2012) concluded this characteristic to be

² Significant relations at the country level between climate change scepticism and educational level were only found for Australia, Norway and Great Britain.

slightly negatively, but not significantly related to scepticism. Only Pickering (2015) was able to determine a significant relationship, but this author found the relationship to be positive. However, this result only regards households with three or more children, as also Pickering (2015) was unable to identify any significant relation for households with two or less children.

2.2.6 Residence Vulnerability

Only two of the selected articles included residence vulnerability as a socio-demographic characteristic in their research, but the findings of these studies are congruous. Residence vulnerability is stipulatively defined here as the considered probability that one's residence is subjected to the climate change related risk of flooding (Islam et al., 2013; Van der Linden, 2015). Both Islam et al. (2013) and Van der Linden (2015) conclude a significant negative relationship between residence vulnerability and climate change scepticism. This implies that people that live in highly vulnerable areas do not tend to hold a sceptical attitude towards climate change. Islam et al. (2013) find the explanation for the negative relationship within the theory of affect heuristic. This theory implies that people that have personally experienced events such as floods are more likely to consider it's probability and risk in the future.

2.2.7 Residence Rurality

Besides vulnerability, residences can also be characterised in terms of its degree of rurality. A high level of rurality implies a low level of population density (Fox & Heaton, 2012). Three out of the eight reviewed studies included this socio-demographic characteristic. Both Tranter and Booth (2015) and Whitmarsh (2011) conclude that residence rurality is significantly positively related to climate change scepticism. This implies that people who live in high density areas hold a less sceptical attitude towards climate change than those living in low density areas. Whitmarsh (2011) argues that this positive relation is the result of nature's instrumental rather than symbolic function for those living in low density areas. Therefore, the argument of preferring denial over acknowledgement is applicable again, as low-carbon lifestyle opportunities for those living in rural areas tend to be limited (Whitmarsh, 2011).

However, this may come across as the opposite to what may have been expected. Namely, the argument that nature serves as an instrument arguably suggests that the people who benefit from nature would aim to protect this asset. Therefore, holding a sceptical attitude towards climate change and its consequences, rather than acknowledging it and acting accordingly, may come across as contradictory. This seeming contradiction possibly explains

why Pickering (2015) was not able to provide evidence for a significant relation between rurality and scepticism. Moreover, Tranter & Booth (2015) argue that rurality should not be considered a consistent predictor of scepticism, as rurality was only a significant predictor at the country level for Australia and Sweden.

2.2.8 Political Orientation

Seven out of the eight reviewed articles included political orientation in their research, of which six found a significant positive relation between conservatism and scepticism (Jylhä et al., 2016; Pickering, 2015; Poortinga et al., 2011; Van der Linden, 2015; Whitmarsh, 2011; Tranter & Booth, 2015). This implies that people that are conservatively oriented tend to be more sceptical towards climate change than those that are progressively oriented. Jylhä et al. (2016) argue that conservatives want to keep the current societal structures intact. Therefore, to prevent any possible changes to these structures by acknowledging climate change, conservatives would rather remain in denial and thus hold a sceptical attitude.

The seventh article, as opposed to the other articles, considered the spectrum of liberalism versus socialism rather than conservatism versus progressivism (Islam et al., 2013). This study found that climate change scepticism holds a significant negative relation to liberalism. Therefore, people that can be characterised as rather liberal are not expected to hold a sceptical attitude towards climate change. The authors explain this relation by arguing that liberals are open to societal change and therefore for societal pro-environmental changes. Furthermore, although not included in their own study, Tranter and Booth (2015) also state that climate change is likely to be acknowledged by people that vote for liberal parties.

2.2.9 Religiosity

The ninth and final socio-demographic characteristic that is considered in the selected articles regards religiosity. Only two studies included this characteristic, namely the articles by Van der Linden (2015) and Tranter and Booth (2015). These authors included religiosity without explaining why religiosity would hypothetically correlate with the level of climate change scepticism. Neither of the studies were able to identify a significant relation between religiosity and climate change scepticism.

2.2.10 Summarizing Table

As announced in paragraph 2.2, the findings of the eight selected articles are summarized in Table 3. The corresponding legend is included above the table.

Legend:

- = Researched; Significant Relation Proven
- = Researched; No Significant Relation Proven
- = Not Researched by this author

Table 3: Summarizing Table Literature Review

Article	Gender	Age	Income	Education	Household composition	Residence vulnerability	Residence rurality	Political orientation	Religiosity
Jylhä et al. (2016)	Men	N/A	N/A	N/A	N/A	N/A	N/A	Positive (Conservatism)	N/A
Akter et al. (2012)	Men	Positive	Positive	Negative	N/A	N/A	N/A	N/A	N/A
Islam et al. (2013)	N/A	Positive	Negative	Negative	N/A	Negative	N/A	Negative (Liberalism)	N/A
Pickering (2015)	N/A	Between 40-44 years old	N/A	Negative	Positive, for X > 2 children	N/A	N/A	Positive (Conservatism)	N/A
Poortinga et al. (2011)	N/A	Positive	Negative	Negative	N/A	N/A	N/A	Positive (Conservatism)	N/A
Van der Linden (2015)	Men	N/A	N/A	Negative	N/A	Negative	N/A	Positive (Conservatism)	N/A
Whitmarsh (2011)	Men	Positive	Positive	Negative	N/A	N/A	Positive	Positive (Conservatism)	N/A
Tranter & Booth (2015)	Men	Positive	Positive	Negative	N/A	N/A	Positive	Positive (Conservatism)	N/A

2.3 Application to the Netherlands

In this paragraph, the findings of the reviewed articles in paragraph 2.2 are applied to the case of the Netherlands specifically. By doing so, the socio-demographic characteristics that are included in the remainder of this study are identified.

Although none of the studies provided an explanation, the majority found men to be more sceptical than women. Therefore, it can be expected that this relation is also concluded when researching the Netherlands. As with gender, the expectation for this study with regards to age and educational level is also in agreement with the majority of the researched articles. Therefore, the expectation is that age is positively correlated and educational level negatively correlated with climate change scepticism in the Netherlands.

The socio-demographic income shows the most deviating results out of all the discussed socio-demographics. Therefore, to shape a hypothesis with regards to the Netherlands, it is helpful to consider the reasoning that these authors provided for their found relations. The democratically chosen leading political party in the Netherlands is the party VVD. This party is highly liberal and often regarded to as the political party that serves the rich (Cornelissen, 2019). This majority of votes arguably indicates that there is a significant group of rich citizens that seek to protect their assets. Therefore, in correspondence to the article by Whitmarsh (2011), the expectation for this group would be to prefer denial over acknowledgement regarding climate change. Consequently, under normal circumstances, the expectation would have been that income is positively related to climate change scepticism in the Netherlands.

However, the COVID-19 pandemic that the world is currently facing changes this hypothesis. As explained in paragraph 2.2.3, the economic contingency hypothesis argues that immediate financial concerns overshadow any concerns regarding climate change. The pandemic has been leading to the biggest economic crisis since the second world war (NOS, 2020). This economic crisis affects people with a low income more than people with a high income, as low income earners tend to have a lower financial buffer and are more likely to lose their job than high income earners (Tilburg University, 2020). Therefore, concerns regarding climate change are more likely to be overshadowed by financial concerns for low income earners than for high income earners. Consequently, the final hypothesis is that income is negatively related to climate change scepticism in the Netherlands.

As opposed to the previous characteristics, the characteristic of household composition has poor evidence of being a predictor of climate change scepticism. In fact, there was only a significant relation found for households with more than two children by only one study.

However, the amount of Dutch households that have more than two children has been decreasing for decades (CBS, 2020a). Therefore, this socio-demographic characteristic is considered to be irrelevant and is consequently not included in this study. The same applies to the characteristic religiosity. Neither of the two studies that included religiosity were able to find a significant relation between this characteristic and climate change scepticism. When considering the Netherlands specifically, religiosity is significantly losing popularity. The amount of people that consider themselves to be a follower of any religion has recently reached the all-time low of less than fifty percent of the population (CBS, 2019b). Consequently, religiosity is also excluded in the remainder of this study.

The socio-demographic residence vulnerability was only included by two studies, but both found a significant correlation. About sixty percent of the Netherlands is vulnerable to flooding, resulting in significant floods in the country's history (Van Alphen, 2014). Therefore, residence vulnerability is a relevant characteristic to include. In line with the studies' findings, this socio-demographic is expected to be negatively related to climate change scepticism.

Furthermore, the characteristic residence rurality is expected to be a predictor of climate change scepticism in the Netherlands. Recently, Dutch farmers have been expressing significant agitation. The country's intensified regulation regarding measures to mitigate climate change have resulted in Dutch farmers protesting on various occasions (Candel, 2019). These demonstrations can stem from simple dissatisfaction with the regulation itself. However, another explanation may be that the farmers' dissatisfaction originates from climate change scepticism. Therefore, residence rurality is expected to be positively correlated with climate change scepticism in the Netherlands.

Lastly, political orientation is also included in this study. In line with the findings of the studied articles, the expectations for this study is that conservatism is positively correlated and liberalism negatively correlated with climate change scepticism.

To conclude, the characteristics that are included in this study are: *gender, age, income, educational level, residence vulnerability, residence rurality, conservatism and liberalism*. In case of the Netherlands, climate change sceptics are expected to be conservative, old and male socialists with a low level of education, low income and who reside in rural areas that are at low risk of being flooded. Based on this hypothesis, this study's conceptual model is presented in Figure 3. Note that the conceptual model does not include potential moderating or mediating variables, as the reviewed articles do not include these either. Although this may explain some

of the inconsistency in these articles' results, researching such complex relations falls outside the scope of this research too.

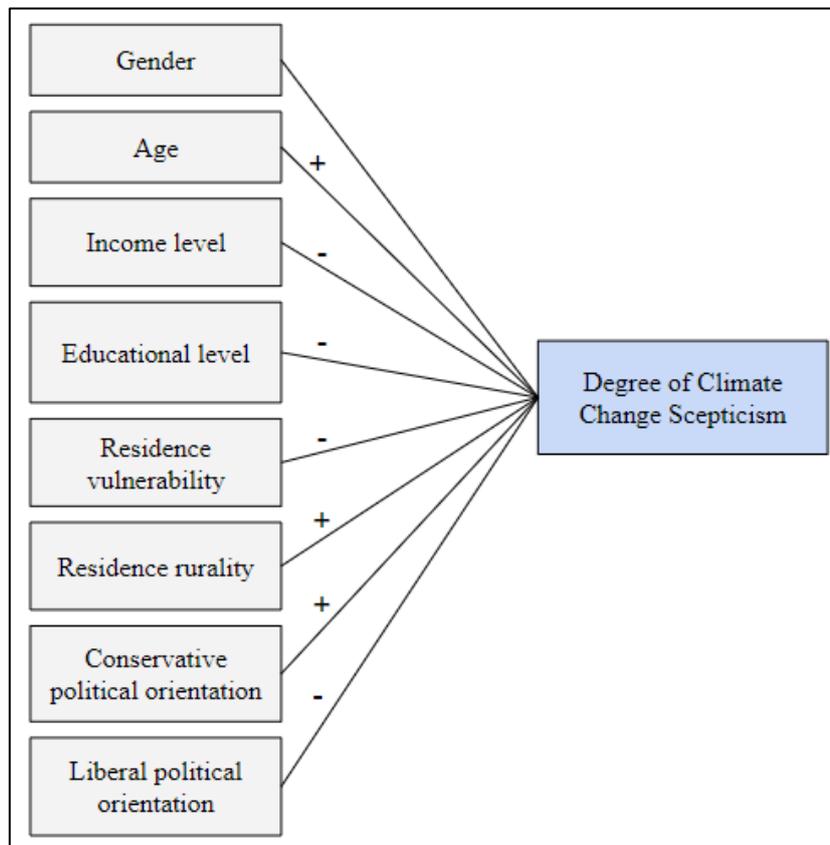


Figure 3: Conceptual model

2.4 Sub-Questions

Based on the findings of this chapter, thirteen sub-questions can be formulated to answer the main research question. The main research question, which was already formulated in paragraph 1.3, is: “Which socio-demographic characteristics are predictors of climate change scepticism in the Netherlands?” The sub-questions are presented in Figure 4. Note that, in this figure, “breadth 1” refers to the breadth *Trend*, “breadth 2” regards the breadth *Attribution* and “breadth 3” refers to the breadth *Risk*.

Here, it is important to remark that the conceptual model in Figure 3 only regards climate change scepticism as a general. The conceptual model is thus not specified to the classifications as identified in paragraph 2.1. This is due to the fact that not all reviewed articles differentiate between different breadth or depth scepticism levels. Therefore, no conclusions can be drawn regarding specific expectations per climate change scepticism classification. Instead, the conceptual model is tested for all thirteen sub-questions as shown in Figure 4.

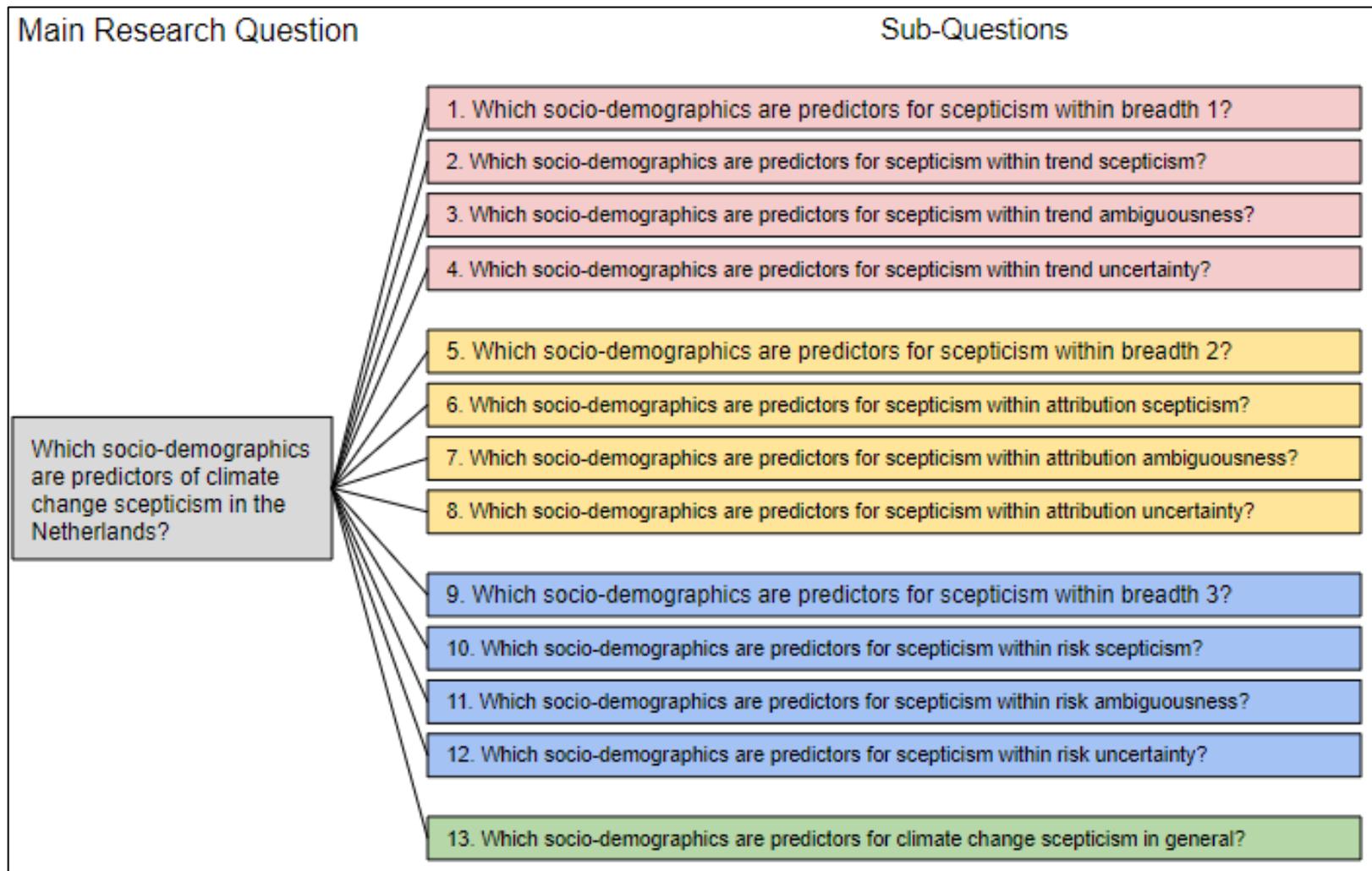


Figure 4: Sub-Questions

CHAPTER 3: METHODOLOGY

In this chapter, this study's methodology is elaborated upon. First, the chosen research method is explained, including the sample size and distribution method. Second, it is explained how the data is analysed. Third, the research ethics of this study are reflected upon.

3.1 Research Method

In this paragraph, the chosen research method for this study is elaborated upon.

3.1.1 Survey

The chosen research strategy is a survey, making this study an empirical, quantitative research. Surveys are considered to be an appropriate research strategy, as they enable the identification of correlations between variables (Verschuren & Doorewaard, 2010). This survey includes closed questions so that the retrieved data can be analysed in an objective manner.

The survey is created on Qualtrics, which is an online survey tool for the faculty of Behavioural, Management and Social Sciences of the University of Twente (University of Twente, 2020a). The survey is distributed in both English and Dutch in an effort to reach as many respondents as possible. The survey questions are divided into two sections. The first section includes six questions to determine the respondents' socio-demographics. The second section features three sets of six statements each to determine the respondent's attitude towards climate change. Both sections are further elaborated upon in paragraph 3.2. The survey questions are included in this report in Appendices 2 and 3.

3.1.2 Sampling Method

The research unit is all adults that live in the Netherlands, thus have the age of 18 or higher. To increase validity of the conclusions that are drawn from this data, the number of people that participate in the survey needs to be large (Verschuren & Doorewaard, 2010). To determine a suitable sample size, the Slovin formula is used (Arianti, 2018). The formula is the following.

$$n = \frac{N}{(1 + N * e^2)}$$

In this formula, n represents the number of samples that is considered to derive valid results. The N represents the total population, and e represents the chosen margin of error. The margin of error shows to what degree the results differ from the real population value (Israel, 1992). When applying to this study, the N is 14.065.573 (CBS, 2020b), and the e is chosen to be 10. Therefore, the required, minimum sample size for this study is the following.

$$n = \frac{14.065.573}{(1 + 14.065.573 * 0.1^2)} \approx 100$$

This sample size of 100 people, besides a margin of error of 10%, also guarantees a 95% confidence level given the population size (Israel, 1992). This confidence level implies that there is at least a 95 percent chance that the range of retrieved values contains the true mean of the population. Therefore, the results from this study imply that they are within 10 percentage of the real population value 95% of the time (Israel, 1992). Note that a minimum sample size of 100 is required for each of the thirteen sub-questions as presented in Figure 4.

Sub-questions that reach fewer than 100 people are disregarded from the result analysis. In an effort to prevent this situation from happening and thus provide people with an incentive to participate in the survey, a €20 gift card is randomly assigned to three survey participants.

Furthermore, Verschuren and Doorewaard (2010) stress the importance of drawing the samples randomly. This implies that all adults that live in the Netherlands have an equal chance of being included in the survey. Therefore, the survey is distributed online via the social media channels Facebook and LinkedIn, enabling people from all over the country to participate.

3.2 Analysis

In this paragraph, it is explained how the collected data is analysed. Therefore, it is first explained how the respondent's socio-demographics are measured. Second, the approach to measure the degree of scepticism for each respondent is elaborated upon. Third, the method to handle non-response is shortly discussed. Fourth, the method to identify correlations between the socio-demographics and the classifications of scepticism is explained.

3.2.1 Measuring Socio-Demographics

As already mentioned in paragraph 3.1.1, the first section of the survey includes six questions to determine the respondents' socio-demographics. The survey questions are presented in Appendices 2 and 3. Respectively, these questions regard the respondents' gender, age, educational level, income, zip code and political orientation.

The answers to the first four questions are used directly in the data analysis. The answers to the final two questions are not used directly, however serve two purposes each. First, the respondents' zip code is used to determine its residence rurality. To do so, the tool by CBS (2017) is used to look up the amount of people per square kilometre of that particular zip code. Second, the zip code is used to determine the respondent's residence vulnerability. Each zip code is entered into the website www.overstroomik.nl (2020), which is a tool created by the

government. This tool shows how high the water could reach in case of a flood, but also the probability of a flood occurring. Consequently, residence vulnerability is calculated by multiplying the likelihood and impact. This tool however does not provide the exact flood risk, but generates one of five options for each zip code instead. These options, as well as the interpretation method for each, are presented in Table 4.

Table 4: Residence Flood Risk Interpretations

Generated Options	Interpretation
Chance higher than 10% of being flooded	Flood likelihood of 10%
Chance between 1% and 10% of being flooded	Flood likelihood of 5,5%
Chance lower than 1% of being flooded	Flood likelihood of 1%
Impossible to be flooded due to high elevation	Flood likelihood of 0%
No data available	Leave cell blank in dataset

The political preference of the respondents shows their orientation on the spectrum of liberalism versus socialism, as well as the spectrum of conservatism versus progressivism. Operationalizing each national political party into concrete points on both spectrums requires creativity, as it is not an exact science. In an effort to operationalize political orientation, the plot diagram by the newspaper Trouw (2017) is used. This source however does not include the party “FvD”, which is therefore placed on both spectrums by reasoning. The resulting operationalization is shown in Table 5. In this table, each political party is given a value for its position on both spectrums, which both range from minus 10 to 10.

Table 5: Operationalization Political Orientation

Political Party	Socialism (-10) versus Liberalism (10)	Conservatism (-10) versus Progressivism (10)
VVD	7,5	-6
PvdA	-4	1,5
CDA	1,5	-6
CU	-1	-1
FvD	8	-9
GroenLinks	-4,5	7
D66	0,5	7
PvdD	-9	5
PVV	1,5	-8,5
SGP	3	-5
SP	-9,5	3,5
50Plus	-6	0,5
DENK	-7	5

3.2.2 Measuring Scepticism

The second section of the survey features three sets of six statements each to determine the respondent's attitude towards climate change. These statements are presented in Appendices 2 and 3. The survey participants are asked to respond to each of these eighteen statements through the means of a seven point Likert Scale, ranging from (1) Strongly Disagree to (7) Strongly Agree. For each statement, a response of "7" indicates the most sceptical response, except for the final two statements of each set. For these statements, "7" indicates the least sceptical response. Consequently, for the data analysis, these answers are reversed so that they align with the format of the other statements.

The first set of statements is designed to measure the respondent's attitude regarding the existence of climate change. The responses to the second set of statements are used to determine the respondent's attitude regarding the anthropogenic influence on climate change. Lastly, the responses to the third set of statements disclose the respondent's attitude regarding the risks that are associated with climate change. The statements that are used are either drawn from or inspired by all studies that are used in paragraph 2.2 of this report.

As mentioned before, this study aims to identify socio-demographics as predictors of scepticism for (1) the nine attitude classifications of Table 1, (2) the three breadths and for (3) scepticism in general. Before statistical tests can be performed, a classification scheme to determine the degree of scepticism needs to be designed for the (1) and (3). These schemes differ between these two, and are therefore discussed separately. For the three breadths, no scepticism classification scheme is necessary, which is further explained in paragraph 3.2.4.

Attitude Classifications

For this analysis, the responses from each survey participant are used three times, namely once for each of the three climate change scepticism breadths. Therefore, inspired by Table 1, Table 6 shows the classification scheme to identify the three attitudes that each participant holds.

Table 6: Attitude Classification Scheme

Breadth	Depth	Average	Variation Width
Breadth 1: Trend (Statements Set 1)	Sceptical	$X \geq 5$	$X \leq 2$
	Ambiguous	<i>Any</i>	$X > 2$
	Uncertain	$3 \leq X < 5$	$X \leq 2$
	Acknowledgement	$X < 3$	$X \leq 2$
Breadth 2: Attribution (Statements Set 2)	Sceptical	$X \geq 5$	$X \leq 2$
	Ambiguous	<i>Any</i>	$X > 2$
	Uncertain	$3 \leq X < 5$	$X \leq 2$
	Acknowledgement	$X < 3$	$X \leq 2$
Breadth 3: Risk (Statements Set 3)	Sceptical	$X \geq 5$	$X \leq 2$
	Ambiguous	<i>Any</i>	$X > 2$
	Uncertain	$3 \leq X < 5$	$X \leq 2$
	Acknowledgement	$X < 3$	$X \leq 2$

As shown in Table 6, four depth categories are considered, namely “acknowledgement”, “uncertain”, “ambiguous” and “sceptical”. An answer of “7” on the Likert scale indicates the most sceptical attitude and an answer of “1” the most acknowledging attitude. This implies that the respondents give their answers to each of the statements in a range of 6 points, namely from 1 to 7. Reasoning from this, three of the four depths are allocated a range of 2 points of the Likert scale. Consequently, “acknowledgers” are considered to score an average of 1-3, “uncertain people” a 3-5 and “sceptics” any average score between 5-7. These averages are computed by calculating the mean score for the six statements per set for each respondent.

There is however one depth remaining, namely “ambiguousness”. The approach to identifying ambiguousness is different, as it regards the alternate demonstration of different scepticism depths. Consequently, determining “ambiguousness” based on an average is impossible, as that does not reflect the variety in the respondents’ answers. Therefore, alternatively, variation width is considered instead. Variation width is the difference between the highest and lowest answer given by the respondent. For example, when a participant scores one statement a 7 and another a 2, the variation width is 5. Given that the other three depths are allocated a range of 2 points each, variation width needs to exceed that in order to classify an individual as being ambiguous. Namely, by exceeding a variation width of 2 points, the respondent per definition demonstrates different depths of scepticism.

The other three depths are given the condition of variation width being equal of lower than 2. Namely, for instance, the average score for one individual may be a 4 for the first set of statements, whose attitude would therefore be classified as *trend uncertain*. However, this average may be the result of all statements being answered with 1's and 7's, which therefore classifies the attitude as *trend ambiguous* instead.

Scepticism in General

For this analysis, the approach is different, as the respondents' answers are only used once. Rather than considering the attitude for each breadth, only the respondent's "worst" attitude is considered, in line with Table 1. For instance, if a respondent is considered trend acknowledging, attribution ambiguous and risk sceptical, only the second is used. Table 1 shows that this respondent would therefore be considered to fall in classification 5.

To identify the "worst" attitude of each respondent, the classification scheme in Table 6 is used as well. To classify all respondents in terms of scepticism in general, Table 7 is applied. Note that the difference between Table 7 and Table 1 is the addition of the tenth category.

Table 7: Classification Scheme Climate Change Scepticism in General

Category	Attitude towards the existence of climate change	Attitude towards the anthropogenic influence on climate change	Attitude towards the risks associated with climate change
1. Trend scepticism	Sceptical	<i>Any Attitude</i>	<i>Any Attitude</i>
2. Trend ambiguousness	Ambiguous	<i>Any Attitude</i>	<i>Any Attitude</i>
3. Trend uncertainty	Uncertain	<i>Any Attitude</i>	<i>Any Attitude</i>
4. Attribution scepticism	Acknowledging	Sceptical	<i>Any Attitude</i>
5. Attribution ambiguousness	Acknowledging	Ambiguous	<i>Any Attitude</i>
6. Attribution uncertainty	Acknowledging	Uncertain	<i>Any Attitude</i>
7. Risk scepticism	Acknowledging	Acknowledging	Sceptical
8. Risk ambiguousness	Acknowledging	Acknowledging	Ambiguous
9. Risk uncertainty	Acknowledging	Acknowledging	Uncertain
10. Acknowledging	Acknowledging	Acknowledging	Acknowledging

3.2.3 Non-response

It is important to consider the approach in handling incomplete survey responses, so-called non-response. There are four scenarios, which each need a different approach. The first scenario is where a respondent only answers the questions regarding the socio-demographics. In this case, no correlations can be sought between socio-demographics and scepticism. Consequently, these responses are removed from the dataset. A second scenario is that a respondent only responds to a few statements before leaving the survey. These responses can only be used if at least one set of statements is completed, as only completed sets can be used to identify attitudes. If not, these responses are also removed from the dataset.

The third scenario is where the respondent only completes one or two sets of the statements to measure scepticism. Despite the incompleteness, these recorded answers are used, as it is possible to classify that respondent's attitude for those one or two breadths.

The fourth scenario, as with the third, is where the respondent completes one or two sets of the second section of the survey. Despite that these responses can be used to identify the attitudes for these breadths, this is not necessarily the case for the data analysis for climate change scepticism in general. For instance, when the incomplete response shows an acknowledging attitude for the first two breadths, the response cannot be used here. Namely, it is then unclear what that respondent's worst attitude would be, as that person could fall in any category from 7 to 10. However, for instance, if the incomplete response discloses that the respondent is "trend uncertain", the incompleteness is not an issue as the worst attitude is clear.

3.2.4 Statistical Analyses

The statistical computer program SPSS is used to identify correlations between the socio-demographics and climate change scepticism. The statistical tests that are used to identify correlations for the attitude classifications and breadths are different than those used to identify correlations for scepticism in general. Therefore, these are discussed separately.

Attitude Classifications and Breadths

To answer sub-questions 1 to 12, the socio-demographics are tested against average scores. To identify scepticism predicting socio-demographics for the breadths, all responses within that breadth are used. For example, for the breadth "Trend", the respondents' socio-demographics are tested against all average scores for the first set of statements. Given that all responses are used, these averages range from 1 to 7.

To identify scepticism predicting socio-demographics for the classifications, a slightly different approach is used. Rather than using all responses, only those whose attitudes fall within a certain classification are considered. For example, when aiming to identify scepticism predictors of the classification “*trend uncertainty*”, the respondents that are classified as “*trend sceptic*”, “*trend ambiguous*” or “*trend acknowledger*” are filtered out of the data set. In this example, the averages for the first set of statements range between 3 and 5, against which the socio-demographics are tested.

The statistical tests used to identify correlations are presented in Table 8. These tests are appropriate for the *continuous* data against which the socio-demographics are tested.

Table 8: Statistical Tests for Attitude Classifications and Breadths

Socio-demographic	Statistical Test
Gender (<i>nominal variable</i>)	Point-Biserial Correlation
Age, Income, Residence Vulnerability, Residence Rurality, Conservatism, Liberalism (<i>continuous variables</i>)	Pearson’s Product-Moment Correlation
Educational level (<i>ordinal variable</i>)	Spearman’s Rank-Order Correlation

Scepticism in General

To answer sub-question 13, a different approach to the data analysis is used. Namely, the socio-demographics are tested against the *ordinal* values of the ten classifications in Table 7. As opposed to testing against averages, the socio-demographics are tested against the worst attitude of all respondents. The statistical tests used to identify correlations are presented in Table 9.

Table 9: Statistical Tests for Climate Change Scepticism in General

Socio-demographic characteristic	Statistical Test
Gender (<i>nominal variable</i>)	Mann-Whitney U test
Age, Income, Residence Vulnerability, Residence Rurality, Conservatism, Liberalism (<i>continuous variables</i>)	Spearman’s Rank-Order Correlation
Educational level (<i>ordinal variable</i>)	Somers’d

3.3 Research Ethics

Research ethics regard the moral principles that need to be considered in the research to maintain research integrity and prevent research misconduct (Ali & Kelly, 2004). In this paragraph, three key principles in the case of surveys are elaborated upon (Aldridge, 2001).

3.3.1 Informed consent

Aldridge (2001) argues that survey researchers need to be as open as reasonably possible about the research aim and the uses of the findings of the research. Therefore, at the beginning of the survey, the respondents are presented an introductory statement, which is shown in Appendix 1. This statement discloses that the survey is used to collect data for a thesis for the Master Environmental and Energy Management at the University of Twente. Additionally, a mention of the research aim is presented, although it is important to consider the sensitivity of the topic of the thesis. This issue is elaborated upon in section 3.3.3.

Furthermore, the introductory statement includes an estimation on the survey completion time, and the mention that the respondent has the right to leave the survey at any moment. Lastly, the respondents are provided with contact information, so that they can address any questions or comments. After this introductory statement, the survey participants need to click on a button to continue with the actual survey questions. It is stressed that, by clicking on this button, the participant is considered to provide the research with its informed consent.

3.3.2 Confidentiality

According to Aldridge (2001), protecting the confidentiality and anonymity of the survey's respondents is important to consider. Namely, by doing so, respondents are more willing to share information, especially when that information can be considered private or sensitive. Therefore, data needs to be treated confidentially in its storage, analysis and publication.

Protecting confidentiality has several implications for this study. First, the participants are informed in the introductory statement that they remain anonymous throughout the survey. Second, the retrieved data is stored electronically on my personal computer and on the secure server BMS Lab of the University of Twente for a period of ten years, as recommended by the university (University of Twente, 2020b). By doing so, the risks of unauthorized people accessing the data and data inaccessibility are minimized.

There is however a possibility that anonymity cannot be guaranteed for all respondents. At the end of the survey, the participants can enter their email address if they want to receive the summary of the research' findings and/or to be eligible for the gift cards. This measure is considered inevitable, because the research ethics regarding informed consent dictate that the respondents need to have the opportunity to receive a summary of the findings (Aldridge, 2001). Furthermore, to distribute the gift cards, an email address is necessary as a means to contact the winners.

However, entering an email address is not required for any participant. It is explained to the respondents that, by disclosing their email address, they risk that this possibly reveals their identity. Therefore, all respondents can make the decision not to disclose their email address to ensure their anonymity. For those that choose to fill in their email address, it is stressed that this data is used in a confidential manner. This is achieved by only using the email addresses for the purposes of allocating the gift cards and distributing the research summary. None of the potentially revealed identities or email addresses are disclosed in the publication or defence of this research, nor is this data stored anywhere.

3.3.3 Sensitivity

Sensitivity regards the minimization of risk that the survey participants experience any harm or discomfort (Aldridge, 2001). As mentioned in section 3.3.1, the participants are explained the aim of the research. However, when the participants are informed that the research is aimed to “disclose the naysayers”, this may lead to them being hesitant to portray a sceptical attitude to prevent any physical or psychological harm done to them as a result of their answers. Therefore, in the survey’s introduction statement, it is stressed that there are no good answers to the questions, the answers are anonymously recorded and that answers do not affect their chances of winning one of the gift cards. Furthermore, the explanation of the research topic is presented in a neutral manner, to prevent indicating an opinion regarding climate change scepticism.

Additionally, some questions regarding the socio-demographic characteristics, such as income, may be perceived to be rather personal. Therefore, people may feel uncomfortable disclosing that information. To prevent any psychological distress, the survey participants can opt for the “I prefer not to answer” answer possibility for all questions regarding socio-demographic characteristics.

CHAPTER 4: RESULTS

In this chapter, this studies' results are presented. First, the chapter is introduced by shortly describing the statistics of the sample. Second, the Cronbach Alpha is calculated to determine whether the data can be used as planned. Third, socio-demographic characteristics that predict climate change scepticism are identified for each scepticism classification and each scepticism breadth. Fourth, scepticism predicting socio-demographics are sought for climate change scepticism as a general concept. Lastly, the results are summarized in paragraph 4.7.

4.1 Introduction

The output of SPSS regarding the descriptive statistics of the survey's responses is presented in Appendix 4. A total amount of 1012 people participated in the survey, of whom 943 completed the entire survey. The sample consists of 165 (16,3%) men and 842 (83,2%) women. The gender of five respondents is not disclosed. The age of the survey participants ranges between 18 and 84. The average age within the sample is 37 years ($M_{Age} = 37.11$, $SD = 14,01$). The average gross annual income is €27.654 ($M_{Income} = €27.653,69$, $SD = 28.332,016$). The educational level is not normally distributed, with a minimum of primary school and maximum of a PhD. The median of educational level was 4.0, which is HBO. The question regarding the preferred political party was left unanswered most, with a total of 195 (19,3%) missing values.

In Appendix 5, the amount of survey participants for the attitude classifications is presented. Three classifications have not reached the pre-set requirement of 100, namely *Trend Scepticism*, *Attribution Scepticism* and *Risk Scepticism*. Respectively, these classifications were attributed to 12, 39 and 61 people. These attitudes are therefore not included in the analysis in paragraphs 4.3 to 4.5. **Note that, in the remainder of this chapter, trend scepticism, attribution scepticism and risk scepticism refer to the *breadths*, thus not the classifications.** Furthermore, for all tables in this chapter goes that one asterisk implies a significance level of 10%, two asterisks imply 5% and three asterisks imply 1%.

4.2 Cronbach's Alpha

To test the reliability of the survey, Cronbach's Alpha is used. This statistical index measures the internal consistency across several test items by quantifying the degree to which these correlate with each other. Cronbach's Alpha ranges from 0,000 to 1,000, in which a higher value indicates a more reliable survey (Adamson & Prion, 2013). Cronbach's Alpha is calculated for the survey's three sets of statements, to assess whether the responses correlate

sufficiently. Namely, if the correlation is sufficient, these responses can be combined to calculate the average score for each individual as necessary to perform the data analysis as planned. A minimum value of 0,700 is required (Adamson & Prion, 2013) for the answers to the statements to be combined per set.

The survey aimed to measure the respondents' attitude with regards to climate change through three constructs. The construct "Trend" consisted of six statements. The scale had a high level of internal consistency, as determined by a Cronbach's Alpha of 0,883. The construct "Attribution" also consisted of six statements. The scale had a high level of internal consistency, as determined by a Cronbach's Alpha of 0,802. The construct "Risk" furthermore consisted of six statements. The scale had a high level of internal consistency, as determined by a Cronbach's Alpha of 0,877. Therefore, to conclude, all statements show sufficient correlation for the individual statements to be combined within these three sets in a reliable manner.

4.3 Predictors of Trend Scepticism

Gender

To analyse if the degree of trend scepticism differs between men and women, a point-biserial correlation was run between gender and the average scores for the first set of statements. The results are presented in Table 10.1. Gender was only significant for the classification "Trend Ambiguousness", in which men are more sceptical than women.

Table 10.1: Trend, Gender

		Full Breadth	Ambiguousness	Uncertainty
N		1,007	371	130
Men	Mean	2,69	3,65	3,70
	SD	1,29	1,08	0,51
Women	Mean	2,66	3,39	3,73
	SD	1,15	0,89	0,48
Correlation		-0,010	-0,106	0,021
p		0,750	0,041** (Men)	0,810

Age

To analyse if the degree of trend scepticism correlates with age, a Pearson's product-moment correlation was run between age and the average scores for the first set of statements. The results are presented in Table 10.2. Age was a significant scepticism predictor of the breadth "Trend" as well as its underlying classification "Trend Ambiguousness", in which older people are more sceptical than younger people.

Table 10.2: Trend, Age

	Full Breadth	Ambiguousness	Uncertainty
N	997	367	126
Coefficient	0,170	0,160	0,081
p	0,000*** (+)	0,002*** (+)	0,370

Educational Level

To analyse if the degree of trend scepticism correlates with educational level, a Spearman’s rank-order correlation was run between educational level and the average scores for the first set of statements. The results are presented in Table 10.3. Educational level was a significant scepticism predictor of the breadth “*Trend*” as well as its underlying classification “*Trend Ambiguousness*”, in which highly educated people are less sceptical.

Table 10.3: Trend, Educational Level

	Full Breadth	Ambiguousness	Uncertainty
N	1.007	371	130
Coefficient	-0,355	-0,187	-0,097
p	0,000*** (-)	0,000*** (-)	0,273

Income

To analyse if the degree of trend scepticism correlates with income, a Pearson product-moment correlation was run between income and the average scores for the first set of statements. The results are presented in Table 10.4. No significant support was found for income to be a predictor of the breadth “*Trend*”, nor for its underlying classifications.

Table 10.4: Trend, Income

	Full Breadth	Ambiguousness	Uncertainty
N	878	313	108
Coefficient	0,027	0,067	-0,068
p	0,420	0,239	0,486

Residence Rurality

To analyse if the degree of trend scepticism correlates with residence rurality, a Pearson product-moment correlation was run between population density and the average scores for the first set of statements. The results are presented in Table 10.5. Residence rurality was only a significant scepticism predictor of the breadth “*Trend*”. The negative coefficient implies that scepticism is high when the population density is low. Therefore, to rephrase it into rurality, scepticism is positively correlated with residence rurality.

Table 10.5: Trend, Residence Rurality

	Full Breadth	Ambiguousness	Uncertainty
N	997	366	129
Coefficient	-0,113	-0,046	-0,060
p	0,000*** (+)	0,377	0,501

Residence Vulnerability

To analyse if the degree of trend scepticism correlates with residence vulnerability, a Pearson product-moment correlation was run between flood risk and the average scores for the first set of statements. The results are presented in Table 10.6. No significant support was found for residence vulnerability to be a predictor of the breadth “*Trend*”, nor for its underlying classifications.

Table 10.6: Trend, Residence Vulnerability

	Full Breadth	Ambiguousness	Uncertainty
N	868	320	113
Coefficient	0,045	0,032	-0,041
p	0,183	0,573	0,667

Conservatism

To analyse if the degree of trend scepticism correlates with conservative political orientation, a Pearson product-moment correlation was run between the degree of conservatism and the average scores for the first set of statements. The results are presented in Table 10.7. Conservative political orientation was a significant scepticism predictor of the breadth “*Trend*” and its underlying classification “*Trend Ambiguousness*”. As shown in Table 5, the spectrum of conservatism versus progressivism ranges from -10 to 10 respectively. Therefore, the *negative* coefficients imply that conservatism is *positively* correlated with trend scepticism.

Table 10.7: Trend, Conservatism

	Full Breadth	Ambiguousness	Uncertainty
N	817	296	92
Coefficient	-0,379	-0,324	<i>Insufficient Sample Size</i>
p	0,000*** (+)	0,000*** (+)	<i>Insufficient Sample Size</i>

Liberalism

To analyse if the degree of trend scepticism correlates with liberal political orientation, a Pearson product-moment correlation was run between the degree of liberalism and the average

scores for the first set of statements. The results are presented in Table 10.8. Liberal political orientation was a significant scepticism predictor of the breadth “*Trend*” and its underlying classification “*Trend Ambiguosness*”. The positive coefficients imply that people with a liberal political orientation are more sceptical than people on the socialism side of the spectrum.

Table 10.8: Trend, Liberalism

	Full Breadth	Ambiguousness	Uncertainty
N	817	296	92
Coefficient	0,188	0,154	<i>Insufficient Sample Size</i>
p	0,000*** (+)	0,008*** (+)	<i>Insufficient Sample Size</i>

4.4 Predictors of Attribution Scepticism

Gender

To analyse if the degree of trend scepticism differs between men and women, a point-biserial correlation was run between gender and the average scores for the second set of statements. The results are presented in Table 11.1. Gender was significant for the breadth “*Attribution*” and its underlying classification “*Attribution Uncertainty*”, in which men are more sceptical.

Table 11.1: Attribution, Gender

		Full Breadth	Ambiguousness	Uncertainty
Men	N	956	654	114
	Mean	3,59	3,62	4,05
	SD	1,29	0,95	0,39
Women	Mean	3,40	3,51	3,78
	SD	1,03	0,89	0,50
Correlation		-0,067	-0,048	-0,173
p		0,039** (Men)	0,225	0,065* (Men)

Age

To analyse if the degree of attribution scepticism correlates with age, a Pearson's product-moment correlation was run between age and the average scores for the second set of statements. The results are presented in Table 11.2. Age was a significant scepticism predictor of the breadth “*Attribution*” and both its underlying classifications, in which older people are more sceptical than younger people.

Table 11.2: Attribution, Age

	Full Breadth	Ambiguousness	Uncertainty
N	948	650	113
Coefficient	0,079	0,089	0,266
p	0,015** (+)	0,023** (+)	0,004*** (+)

Educational Level

To analyse if the degree of attribution scepticism correlates with educational level, a Spearman’s rank-order correlation was run between educational level and the average scores for the second set of statements. The results are presented in Table 11.3. Educational level was a significant scepticism predictor of the breadth “*Attribution*” and both its underlying classifications, in which highly educated people are less sceptical.

Table 11.3: Attribution, Educational Level

	Full Breadth	Ambiguousness	Uncertainty
N	956	654	113
Coefficient	-0,219	-0,223	-0,171
p	0,000*** (-)	0,000*** (-)	0,070* (-)

Income

To analyse if the degree of attribution scepticism correlates with income, a Pearson product-moment correlation was run between income and the average scores for the second set of statements. The results are presented in Table 11.4. No significant support was found for income to be a predictor of the breadth “*Attribution*”, nor for its underlying classifications.

Table 11.4: Attribution, Income

	Full Breadth	Ambiguousness	Uncertainty
N	836	573	96
Coefficient	0,040	0,044	<i>Insufficient Sample Size</i>
p	0,253	0,298	<i>Insufficient Sample Size</i>

Residence Rurality

To analyse if the degree of attribution scepticism correlates with residence rurality, a Pearson product-moment correlation was run between population density and the average scores for the second set of statements. The results are presented in Table 11.5. Residence rurality was only a significant scepticism predictor of the breadth “*Attribution*”. The negative coefficient implies that scepticism is high when the population density is low. Therefore, to rephrase it into rurality, scepticism is positively correlated with residence rurality.

Table 11.5: Attribution, Residence Rurality

	Full Breadth	Ambiguosness	Uncertainty
N	948	649	113
Coefficient	-0,068	-0,029	-0,047
p	0,035** (+)	0,454	0,622

Residence Vulnerability

To analyse if the degree of attribution scepticism correlates with residence vulnerability, a Pearson product-moment correlation was run between flood risk and the average scores for the second set of statements. The results are presented in Table 11.6. Residence vulnerability was only a significant scepticism predictor of the breadth “*Attribution*” and its underlying classification “*Attribution Ambiguosness*”. The positive coefficients imply that scepticism is high when the residence vulnerability is high.

Table 11.6: Attribution, Residence Vulnerability

	Full Breadth	Ambiguosness	Uncertainty
N	824	564	97
Coefficient	0,066	0,084	<i>Insufficient Sample Size</i>
p	0,058* (+)	0,046** (+)	<i>Insufficient Sample Size</i>

Conservatism

To analyse if the degree of attribution scepticism correlates with conservative political orientation, a Pearson product-moment correlation was run between the degree of conservatism and the average scores for the second set of statements. The results are presented in Table 11.7. Conservative political orientation was a significant scepticism predictor of the breadth “*Attribution*” and its underlying classification “*Attribution Ambiguosness*”. The *negative* coefficients imply that conservatism is *positively* correlated with attribution scepticism.

Table 11.7: Attribution, Conservatism

	Full Breadth	Ambiguosness	Uncertainty
N	778	541	84
Coefficient	-0,368	-0,328	<i>Insufficient Sample Size</i>
p	0,000*** (+)	0,000*** (+)	<i>Insufficient Sample Size</i>

Liberalism

To analyse if the degree of attribution scepticism correlates with liberal political orientation, a Pearson product-moment correlation was run between the degree of liberalism and the average

scores for the second set of statements. The results are presented in Table 11.8. Liberal political orientation was a significant scepticism predictor of the breadth “*Attribution*” and its underlying classification “*Attribution Ambiguousness*”. The positive coefficients imply that people with a liberal political orientation are more sceptical than people on the socialism side of the spectrum.

Table 11.8: Attribution, Liberalism

	Full Breadth	Ambiguousness	Uncertainty
N	778	541	84
Coefficient	0,233	0,192	<i>Insufficient Sample Size</i>
p	0,000*** (+)	0,000*** (+)	<i>Insufficient Sample Size</i>

4.5 Predictors of Risk Scepticism

Gender

To analyse if the degree of trend scepticism differs between men and women, a point-biserial correlation was run between gender and the average scores for the third set of statements. The results are presented in Table 12.1. Gender was a significant predictor of the breadth “*Risk*” as well as its underlying classification “*Risk Uncertainty*”, in which men were significantly more sceptical than women.

Table 12.1: Risk, Gender

		Full Breadth	Ambiguousness	Uncertainty
	N	939	452	159
Men	Mean	3,59	3,74	3,85
	SD	1,37	1,22	0,63
Women	Mean	3,33	3,59	3,65
	SD	1,27	0,96	0,63
	Correlation	-0,075	-0,054	-0,198
	p	0,021** (Men)	0,256	0,012** (Men)

Age

To analyse if the degree of risk scepticism correlates with age, a Pearson's product-moment correlation was run between age and the average scores for the third set of statements. The results are presented in Table 12.2. Age was only a significant scepticism predictor of the breadth “*Risk*”, in which older people are more sceptical than younger people.

Table 12.2: Risk, Age

	Full Breadth	Ambiguousness	Uncertainty
N	932	450	158
Coefficient	0,085	0,053	0,013
p	0,010** (+)	0,258	0,875

Educational Level

To analyse if the degree of risk scepticism correlates with educational level, a Spearman’s rank-order correlation was run between educational level and the average scores for the third set of statements. The results are presented in Table 12.3. Educational level was a significant scepticism predictor of the breadth “*Risk*” and both its underlying classifications, in which highly educated people are less sceptical.

Table 12.3: Risk, Educational Level

	Full Breadth	Ambiguousness	Uncertainty
N	939	450	160
Coefficient	-0,318	-0,175	-0,210
p	0,000*** (-)	0,000*** (-)	0,008*** (-)

Income

To analyse if the degree of risk scepticism correlates with income, a Pearson product-moment correlation was run between income and the average scores for the third set of statements. The results are presented in Table 12.4. No significant support was found for income to be a predictor of the breadth “*Risk*”, nor for its underlying classifications.

Table 12.4: Risk, Income

	Full Breadth	Ambiguousness	Uncertainty
N	824	393	134
Coefficient	0,055	0,037	-0,062
p	0,117	0,462	0,474

Residence Rurality

To analyse if the degree of risk scepticism correlates with residence rurality, a Pearson product-moment correlation was run between population density and the average scores for the third set of statements. The results are presented in Table 12.5. Residence rurality was only a significant scepticism predictor of the breadth “*Risk*” and its underlying classification “*Risk ambiguousness*”. The negative coefficients imply that scepticism is high when the population

density is low. Therefore, to rephrase it into rurality, scepticism is positively correlated with residence rurality.

Table 12.5: Risk, Residence Rurality

	Full Breadth	Ambiguousness	Uncertainty
N	931	447	159
Coefficient	-0,111	-0,128	0,015
p	0,001*** (+)	0,007*** (+)	0,848

Residence Vulnerability

To analyse if the degree of risk scepticism correlates with residence vulnerability, a Pearson product-moment correlation was run between flood risk and the average scores for the third set of statements. The results are presented in Table 12.6. Residence vulnerability was a significant scepticism predictor of the breadth “*Risk*” and its underlying classification “*Risk Ambiguousness*”. The positive coefficients imply that scepticism is high when residence vulnerability is high.

Table 12.6: Risk, Residence Vulnerability

	Full Breadth	Ambiguousness	Uncertainty
N	811	390	138
Coefficient	0,066	0,095	0,077
p	0,059* (+)	0,061* (+)	0,370

Conservatism

To analyse if the degree of risk scepticism correlates with conservative political orientation, a Pearson product-moment correlation was run between the degree of conservatism and the average scores for the third set of statements. The results are presented in Table 12.7. Conservative political orientation was a significant scepticism predictor of the breadth “*Risk*” as well as both its underlying classifications. The negative coefficients imply that conservatism is positively correlated with risk scepticism.

Table 12.7: Risk, Conservatism

	Full Breadth	Ambiguousness	Uncertainty
N	764	366	115
Coefficient	-0,456	-0,382	-0,253
p	0,000*** (+)	0,000*** (+)	0,006*** (+)

Liberalism

To analyse if the degree of risk scepticism correlates with liberal political orientation, a Pearson product-moment correlation was run between the degree of liberalism and the average scores for the third set of statements. The results are presented in Table 12.8. Liberal political orientation was a significant scepticism predictor of the breadth “*Risk*” and its underlying classification “*Risk Ambiguousness*”. The positive coefficients imply that people with a liberal political orientation are more sceptical than people on the socialism side of the spectrum.

Table 12.8: Risk, Liberalism

	Full Breadth	Ambiguousness	Uncertainty
N	764	366	115
Coefficient	0,298	0,264	0,053
p	0,000*** (+)	0,000*** (+)	0,571

4.6 Predictors of Climate Change Scepticism in General

Appendix 6 shows the distribution of responses when considering the respondents’ worst attitude. As explained in paragraph 3.2.3, 16 responses need to be disregarded from this analysis as the corresponding worst attitude is unclear due to incompleteness of the survey.

Gender

A Mann-Whitney U test was run to determine if there were differences in distributions across the ten scepticism classifications between men and women. Distributions of the classifications were similar for men and women, as assessed by visual inspection. Classification scores for men (M= 4,04) and women (M= 4,08) were not statistically significantly different, U= 67.943,500, z= 0,145, p= 0,884. Therefore, gender is not identified as being a significant predictor of climate change scepticism in general.

Age

To analyse if the degree of scepticism correlates with age, a Spearman’s rank-order correlation was run between age and the ordinal value of the classification of the respondents’ worst attitudes. A total of 981 participants were recruited. There was a statistically significant correlation between age and the degree of climate change scepticism (coefficient= -0,117, p= 0,000***). As the ordinal value “1” indicates the most sceptical classification, the *negative* coefficient shows that age and the climate change scepticism are *positively* correlated. Therefore, older people are more sceptical towards climate change than younger people.

Educational level

Somers'd was run to analyse if the degree of climate change scepticism correlates with educational level amongst 991 participants. There is a statistically significant correlation between educational level and the ordinal value of the classification of the respondents' worst attitudes ($d= 0,215$, $p= 0,000***$). As the ordinal value "1" indicates the most sceptical classification, the *positive* coefficient shows that educational level and the climate change scepticism are *negatively* correlated. Therefore, highly educated people are less sceptical towards climate change than low educated people.

Income

A Spearman's rank-order correlation was run to assess the relationship between income and the ordinal value of the classification of the respondents' worst attitudes. A total of 864 participants were recruited. There was no statistically significant correlation between income and the degree of climate change scepticism (coefficient= $0,007$, $p= 0,845$). Therefore, income is not identified as being a predictor of climate change scepticism in general.

Residence Rurality

To analyse if the degree of scepticism correlates with residence rurality, a Spearman's rank-order correlation was run. A total of 997 participants were recruited. There was a statistically significant, positive correlation between population density and the ordinal values of the classification of the respondents' worst attitudes (coefficient= $0,105$, $p= 0,001***$). As the ordinal value "1" indicates the most sceptical classification, this result implies that the most sceptical people reside in lowest density areas. To rephrase it into residence rurality, the people that have a sceptical attitude towards climate change in general reside in rural areas.

Residence Vulnerability

To analyse if the degree of scepticism correlates with residence vulnerability, a Spearman's rank-order correlation was run. A total of 856 participants were recruited. There was not a statistically significant correlation between residence vulnerability and the ordinal values of the classification of the respondents' worst attitudes (coefficient= $-0,039$, $p= 0,259$). Therefore, residence vulnerability is not identified as a predictor of climate change scepticism in general.

Conservatism

To analyse if the degree of scepticism correlates with conservative political orientation, a Spearman's rank-order correlation was run. A total of 803 participants were recruited. There was a statistically significant, positive correlation between the orientation on the conservatism

versus progressivism spectrum and the ordinal values of the classification of the respondents' worst attitudes (coefficient= 0,276, p= 0,000***). Given that the ordinal value "1" indicates the most sceptical classification, this result implies that the people with the most sceptical attitude regarding climate change in general are conservatively oriented.

Liberalism

To analyse if the degree of scepticism correlates with liberal political orientation, a Spearman's rank-order correlation was run. A total of 803 participants were recruited. There was a statistically significant, negative correlation between the orientation on the socialism versus liberalism spectrum and the ordinal values of the classification of the respondents' worst attitudes (coefficient= -0,189, p= 0,000***). Given that the ordinal value "1" indicates the most sceptical classification, this result implies that the people with the most sceptical attitude regarding climate change in general are liberally oriented.

4.7 Summarizing Table – Predictors of Scepticism

The results that are presented in paragraphs 4.3 to 4.6 are summarized in Table 13. The corresponding legend is included above the table.

Legend:

= Significant Relation Proven
 = No Significant Relation Proven
 I.S.S. = Insufficient Sample Size

+ = Positive Relation
 - = Negative Relation

* = p < 0.10
 ** = p < 0.05
 *** = p < 0.01

Table 13: Summarizing Table – Predictors of Climate Change Scepticism in the Netherlands

Scepticism type		Gender (Hypothesis: Men)	Age (Hypothesis: +)	Educational Level (Hypothesis: -)	Income (Hypothesis: -)	Rurality (Hypothesis: +)	Vulnerability (Hypothesis: -)	Conservatism (Hypothesis: +)	Liberalism (Hypothesis: -)
		TREND	Full Breadth		+ ***	- ***		+ ***	
Ambiguousness (classification 2)	Men **	+ ***	- ***					+ ***	+ ***
Uncertainty (classification 3)								I.S.S.	I.S.S.
ATTRIBUTION	Full Breadth	Men **	+ **	- ***		+ **	+ *	+ ***	+ ***
Ambiguousness (classification 5)			+ **	- ***			+ **	+ ***	+ ***
Uncertainty (classification 6)	Men *	+ ***	- *	I.S.S.			I.S.S.	I.S.S.	I.S.S.
RISK	Full Breadth	Men **	+ **	- ***		+ ***	+ *	+ ***	+ ***
Ambiguousness (classification 8)				- ***		+ ***	+ *	+ ***	+ ***
Uncertainty (classification 9)	Men **			- ***				+ ***	
Climate Change Scepticism in General			+ ***	- ***		+ ***		+ ***	+ ***

CHAPTER 5: DISCUSSION

In this chapter, this study's discussion is presented. First, the results are interpreted by using the findings to answer the sub-questions. Second, the results are discussed and compared to this study's hypotheses. Third, implications of the results are elaborated upon. Thereafter, and lastly, the research limitations are reflected upon.

5.1 Interpretation of Results

In this paragraph, the research sub-questions as formulated in Figure 4 are answered. Due to the lack of responses for the classifications *trend scepticism*, *attribution scepticism* and *risk scepticism*, sub-questions 2, 6 and 10 cannot be answered. The numbers between brackets throughout this paragraph refer to the sub-questions that are answered.

(1) Across *the full breadth of trend scepticism*, climate change sceptics tend to be old, low educated people that reside in rural areas and have a conservative and liberal political orientation. (3) Within the *trend ambiguousness* classification, sceptics tend to be old, low educated males with a conservative and liberal political orientation. (4) No predictors were found for *trend uncertain* people.

(5) Across *the full breadth of attribution scepticism*, climate change sceptics tend to be old, low educated men that live in rural and vulnerable areas and have a conservative and liberal political orientation. (7) Within the *attribution ambiguousness* classification, sceptics tend to be old, low educated males with a conservative and liberal political orientation that live in vulnerable areas. (8) Within the *attribution uncertainty* classification, sceptics tend to be old, low educated men.

(9) Across *the full breadth of risk scepticism*, climate change sceptics tend to be old, low educated men that live in rural and vulnerable areas and have a conservative and liberal political orientation. (11) Within the *risk ambiguousness* classification, sceptics tend to be low educated people that reside in rural and vulnerable areas and have a conservative and liberal political orientation. (12) Within the *risk uncertainty* classification, sceptics tend to be low educated men that vote for conservative political parties.

(13) In general, *climate change sceptics* tend to be old, low educated people that reside in rural areas and have a conservative and liberal political orientation.

5.2 Discussion Results

In line with the hypothesis regarding *gender*, men were significantly more sceptical than women for several of the researched relations. However, this is not the case of climate change scepticism in general, nor for the breadth “*Trend*” and three of the six studied classifications. Although gender was therefore an inconsistent predictor of scepticism, it was consistently the male gender that was more sceptical in the case of significant relations.

Also in congruence with the hypothesis, *age* positively correlated to climate change scepticism for most of the researched relations. Not only were old people most sceptical regarding climate change in general, this was furthermore the case for all three breadths. When zooming into the classifications, age is no longer a consistent predictor, as only three of the six relations were proven significant.

Furthermore, as expected, *educational level* is significantly negatively related to climate change scepticism for most researched relations. This significance is strong, with most proven correlations having a significance level below 1%. The only classification where no correlation was found was *Trend Uncertainty*. Therefore, educational level is a nearly consistent predictor of climate change scepticism.

On the contrary, no significant correlations were found for the socio-demographic *income*. Consequently, no proof was found that the degree of scepticism is directly related to one’s income. There are however alternative avenues to explore, which are discussed in paragraph 6.2.

In line with the hypothesis, *residence rurality* was significantly positively correlated with climate change scepticism for several of the researched relations. Similar to the socio-demographic age, strong significant correlations are identified for climate change scepticism in general and all three breadths, but less so when zooming into the classifications. Of the six classifications, residence rurality was only significantly positively correlated with the classification *Risk Ambiguosness*. Therefore, residence rurality should only be considered a consistent predictor of climate change scepticism in a rather broad context.

Some significant correlations were found between *residence vulnerability* and climate change scepticism, however these were opposite to what was expected. Whereas the hypothesis was that residence vulnerability and scepticism were negatively correlated, the significant relations in this study were consistently positive. This implies that people that live in areas that are at high risk of being flooded are sceptical towards climate change. This result is however

only significant for the breadths “*Attribution*” and “*Risk*” as well as the attitude of *ambiguosness* for both of these breadths.

Conservatism was consistently significantly positively correlated to climate change scepticism, which is in agreeance with the corresponding hypothesis. This significance was very strong, as the significance level for all proven relations was less than 1%. Due to non-response, two relations had insufficient sample sizes, which therefore could not be analysed. However, across the relations that were included in the data analysis, conservatism was a consistent predictor of scepticism.

Liberalism was a nearly consistent predictor of scepticism, however contradicted the corresponding hypothesis. Whereas liberalism and scepticism were expected to be negatively correlated, this correlation proved to be positive instead. As with conservatism, the significance level of all identified correlations was below 1%. The only classification for which no significant correlation could be found was *Risk Uncertainty*, despite a sufficient sample size. All in all, liberalism is generally a predictor of climate change scepticism, but not consistently.

Lastly, although not tested for significance, the most sceptical people that participated in this study are followers of the political parties SGP, FvD and PVV. The least sceptical people in this study are followers of the parties GroenLinks, CU and D66. Furthermore, the most sceptical people that participated in this study live in the provinces Zuid-Holland, Drenthe, Limburg and Overijssel. The least sceptical people live in the provinces Gelderland, Utrecht and Groningen. The corresponding statistics are presented in Appendix 7.

5.3 Implications Results

The results of this study have multiple potential implications, depending on the strategy that the Dutch government aims to employ. Given that the government only has roughly four months remaining to comply to the court’s decision of reducing its greenhouse gases as mentioned in paragraph 1.2, it is arguably likely that the government would opt for a rather quick strategy. In that case, whilst implementing and executing its pro-environmental policies, the government should focus its efforts on the societal groups that match the generic socio-demographical profile of a climate change sceptic. Therefore, in agreeance with the answer to sub-question 13, actions should then be designed to minimize the policy discouragement from people in low-density areas that are old, low educated, conservative and liberal.

If the Dutch government wants to opt for the most specific, and therefore most time consuming, approach in minimizing pro-environmental policy discouragement, convincing

efforts should be focussed on the socio-demographical profiles of the underlying classifications. The pursuit of these classifications should be done in accordance to the order as depicted in Table 1. Although these profiles somewhat differ, pursuing each classification one by one will not work counteractively. Namely, there are no contradictive results between the significant relations, as each socio-demographic is either *only positively* or *only negatively* correlated with climate change scepticism. For instance, it is safe to mainly focus on men, as women are not the most sceptical in any of the classifications.

Lastly, if the government wants to pursue the “happy medium” between these two approaches instead, it could opt to target the socio-demographical profiles of the full breadths. In that case, it should first target the profile of the breadth “*Trend*”, and thereafter the identical sceptic profile of the breadths “*Attribution*” and “*Risk*”.

5.4 Research Limitations

This study has several limitations that need to be addressed. First, the pre-set requirement of 100 participants was not met by the classifications “*Trend Scepticism*”, “*Attribution Scepticism*” and “*Risk Scepticism*”. Therefore, the sceptic profiles for these classifications remain undisclosed.

Furthermore, this research was performed during the global pandemic of COVID-19, making the distribution of the survey through any means other than the internet arguably impossible due to the danger of contamination. Moreover, this pandemic, and its resulting economic crisis, may have impacted the results of this study, as it potentially influenced the way that people perceive their surroundings and priorities. Particularly, the socio-demographic income is expected to have been impacted in the light of the economic contingency hypothesis.

Additionally, the collected dataset contains non-response for each of the socio-demographics. Consequently, a total of six relations in Table 13 could not be analysed. This especially affected the sceptic profile sketching for the classification “*Attribution Uncertainty*”, with four out of eight socio-demographics missing.

Lastly, three types of socio-demographics faced limitations. First, to establish residence rurality for each zip code and therefore look up the corresponding population density, data from 2017 was used. If the analysis is redone when more recent data becomes available, the results may differ. Second, the tool that was used to determine residence vulnerability for each zip code has limitations. As discussed priorly, this tool does not provide the exact flood risk, but generates one of five options for each zip code instead. If the interpretation method as shown in Table 4 were to be altered, the results may differ as well.

Third, political orientation faced limitations. In the design of the survey, participants were deliberately asked for their preferred political party as opposed to asking them to landmark their positions on both spectrums. The underlying assumption was that people might find it difficult to identify how conservative/progressive and social/liberal they perceive themselves to be, and would find it easier to pick one political party instead. The downfall is however that the operationalization of the political parties on both spectrums as presented in Table 5 is not an exact science and should therefore not be perceived as such. Additionally, the data that this operationalization was based upon stems from an article of 2017, which furthermore addresses the fact that political parties evolve and change over time. Therefore, when altering the operationalization, the results may change as well.

CHAPTER 6: CONCLUSION

6.1 Conclusion

The main research question of this research is “*Which socio-demographic characteristics are predictors of climate change scepticism in the Netherlands?*”. Based on the literature study, climate change sceptics were expected to be conservative, old and male socialists with a low level of education, low income and who reside in rural areas that are at low risk of being flooded. The statistical analysis on the data retrieved from the deployed survey however revealed that, in general, climate change sceptics tend to be old, low educated people that reside in rural areas and have a conservative and liberal political orientation. Therefore, in contrast to the hypothesis, the socio-demographics gender, income and residence vulnerability are not predictors of climate change scepticism in general. Furthermore, as opposed to the hypothesized socialistic political orientation, climate change sceptics were thus found to be liberally politically oriented instead.

The socio-demographical profile of a “*climate change sceptic*” is however somewhat ambiguous, as can be observed when zooming into the concept of climate change scepticism. When zooming in from *climate change scepticism in general* to its underlying *breadths*, slightly different profiles appear. Even though the profile for the breadth “*Trend*” is equal to that of climate change scepticism in general, for the breadths “*Attribution*” and “*Risk*” the male gender and residence vulnerability are also added to the profile. As opposed to the hypothesis, residence vulnerability is positively correlated to climate change scepticism. When zooming in even further into the underlying *attitude classifications*, the profile of a climate change sceptic becomes even more diverse.

These differences in profiles of climate change sceptics make it difficult to answer the main research question unambiguously. However, although the exact profiles differ, the socio-demographics are consistent in their relation to climate change scepticism. In the case of significant relations, scepticism is consistently associated with the male gender, high age, low education, residence rurality, residence vulnerability, conservatism and liberalism.

The results from this study can be used in multiple manners, depending on the strategy that the Dutch government wants to employ. *Naysayers* can be targeted in pro-environmental campaigns by targeting the socio-demographical profile of climate change scepticism in general, or those of its underlying breadths or classifications. After all, the more sceptics are convinced of the existence of the dangerous anthropogenically induced climate change, the greater the chance that the Netherlands will be able to achieve the SDGs of 2030 and 2050.

6.2 Future Research

There are multiple suggestions for future research. First, this study should be repeated after the COVID-19 pandemic and its resulting economic crisis. By doing so, the impact of this crisis on the results can be assessed. It is furthermore advised to aim to reach more survey participants. Not only would a larger sample size benefit the reliability of the results, it possibly enables the profiling of climate change sceptics within the three attitude classifications that could not be included in this study.

Second, the socio-demographics could be approached differently. Future researchers could include other demographics than those included in this study. Additionally, in this study, residence vulnerability is stipulatively defined as the multiplication of flood likelihood and flood impact. However, one could also interpret this socio-demographic as the multiplication of risk and impact of draught, heatwaves or a hybrid of all these.

Third, the relations between the socio-demographics and scepticism could be approached differently. In this study, only direct relations between socio-demographics and climate change scepticism were researched. When observing Table 13, it is arguably striking that none of the researched relations for the socio-demographic income were significant. Furthermore, as evident from this study's literature review, amongst all socio-demographics, income showed the most deviating results in the reviewed studies. All in all, this raises the question whether income should be considered a mediating or moderating variable instead, which should be researched.

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APPENDIX 1: INTRODUCTION STATEMENT SURVEY

English version

This is a survey for a thesis to the master Environmental and Energy Management at the University of Twente. **You can only participate in this survey if you are at least 18 years of age and live in the Netherlands.** This survey aims at identifying people's attitudes regarding whether or not climate change exists, if it is caused by human activity and if there are any risks involved. To do so, participants to this survey are asked to answer a set of questions, which will take approximately five minutes to complete. The responses are anonymously recorded and participation is voluntary. You hold the right to decline to participate and withdraw from the survey at any time, without any consequences.

The retrieved data will be stored for a period of ten years on my personal computer and the university's secure server BMS-LAB. This period of ten years, which is in line with the university's guidelines, enables me to answer any follow-up questions and to revise the research if necessary.

At the end of the survey you have the opportunity to write down your email address if you are interested in receiving a summary of the research's findings and/or want to be eligible for one of the three 20 euro gift cards to be spend on www.bol.com. These gift cards will be allocated to three randomly drawn participants. **Your answers to the questions will not affect your chances of receiving a gift card.** Writing down your email address is **not** obligatory, and only serves as a means for me to distribute the summaries and the lottery winners' gift cards. Please note that, when you are choosing to write down your email address, this may jeopardise your anonymity. However, email addresses will be handled confidentially and will thus not be analysed, stored or published anywhere.

To continue with the survey questions, please click on the button below. **Note that, by clicking this button, you are considered to provide the research with your informed consent.** If you have any questions, please contact me via email. Thank you in advance!

Dutch version

Dit is een vragenlijst voor een scriptie ten behoeve van de master Environmental and Energy Management aan Universiteit Twente. **U kunt alleen meedoen aan deze vragenlijst als u 18 jaar of ouder bent en in Nederland woont.** Dit onderzoek heeft als doel om de houding van mensen te identificeren met betrekking tot of klimaatverandering bestaat, in welke mate het veroorzaakt is door menselijke activiteit en of er risico's aan verbonden zijn. Het invullen van deze vragenlijst duurt maximaal vijf minuten. Deelname aan deze vragenlijst is vrijwillig en de antwoorden worden anoniem opgeslagen. U behoudt het recht om niet deel te nemen en de enquête vroegtijdig af te sluiten. Hier zit ten voor u geen consequenties aan.

De verzamelde data wordt bewaard gedurende 10 jaar op mijn persoonlijke computer en de veilige server BMS-LAB van Universiteit Twente. Deze periode is in lijn met de richtlijnen van de universiteit, en zorgt ervoor dat ik vervolgvragen kan beantwoorden en het onderzoek kan herzien indien nodig.

Aan het einde van de vragenlijst kunt u uw e-mailadres noteren indien u een samenvatting van mijn onderzoek wil ontvangen en/of kans wil maken op één van de drie cadeaukaarten ter waarde van 20 euro te besteden bij bol.com. De winnaars van deze cadeaukaarten worden willekeurig gekozen. **Uw antwoorden hebben dus geen invloed op uw winkansen.** Het noteren van een e-mailadres is **niet** verplicht en dient uitsluitend als middel om de samenvattingen en cadeaukaarten te verzenden. Het noteren van een e-mailadres kan uw anonimiteit in gevaar brengen. Echter, e-mailadressen worden betrouwbaar behandeld en daartoe niet geanalyseerd, bewaard of gepubliceerd.

Om door te gaan met de vragenlijst, gelieve op onderstaande knop drukken. **Door op deze knop te drukken, ga ik er van uit dat u het bovenstaande gelezen heeft en daarmee instemt.** Mochten er nog vragen zijn, dan kunt u contact met mij opnemen per mail. Bij voorbaat dank!

APPENDIX 2: SURVEY QUESTIONS ENGLISH

Section 1 Survey: Socio-Demographics

Please note that red-coloured text in the “Answer Options” column implies that respondents have the opportunity to answer freely. Unclear answers resulting from this are removed from the data set.

Nr.	Question	Answer Options
1	What is your gender?	Male; Female; Prefer not to say
2	What is your age?	Open text box; Prefer not to say
3	What is your highest level of educational?	Primary school; High School; MBO; HBO; University Bachelor; University Master; PhD; Other, namely..; Prefer not to say
4	What is your gross annual income?	Open text box; Prefer not to say
5	What is your zip code?	Open text box; Prefer not to say
6	Which national political party do you prefer?	VVD; PvdA; CDA; Forum voor Democratie; GroenLinks; D66; PvdD; PVV; SGP; SP; 50+ Partij; DENK; Other, namely...; Prefer not to say

Section 2 Survey: Measuring Scepticism

Please note that all statements are responded to with the means of a seven point Likert Scale, in which the answers range from (1) Strongly Disagree to (7) Strongly Agree. “7” indicates the most sceptical response to each statement, except for statements number 5 and 6 for all three sets of statements. For these statements, “7” indicates the least sceptical response.

Statements Set 1: Measuring attitude with regards to the existence of climate change	Statements Set 2: Measuring attitude with regards to the human attribution in climate change	Statements Set 3: Measuring attitude with regards to the risks associated with climate change
1. There is too much contradictory evidence with respect to climate change to claim with certainty that it exists	1. Climate change is a natural fluctuation of the earth’s temperature	1. The media is too alarmist about issues like climate change
2. The evidence for the existence of climate change is unreliable	2. Claims that human activities are changing the environment are exaggerated	2. It is too early to tell if climate change actually is a problem
3. “Climate change” does not exist; it is nothing but a money grubbing scheme	3. Climate change is too complex to claim that people are causing it	3. Floods are not increasing; there is just more reporting of it in the media these days
4. The existence of climate change is so uncertain that it is useless to make forecasts	4. Many leading experts still question if human activity is causing climate change	4. Heatwaves are not increasing, there is just more reporting of it in the media these days
5. We are already experiencing climate change	5. Climate change is caused by human activity	5. It terrifies me to think about the consequences of climate change
6. I am certain that climate change exists	6. The air pollution from modern society (industry, transportation etc.) causes the climate to change	6. I find it important that the government spends a lot of money to counteract the consequences of climate change

APPENDIX 3: SURVEY QUESTIONS DUTCH

Section 1 Survey: Socio-Demographics

Please note that red-coloured text in the “Answer Options” column implies that respondents have the opportunity to answer freely. Unclear answers resulting from this are removed from the data set.

Nr.	Vraag	Antwoordmogelijkheden
1	Wat is uw geslacht?	Man; Vrouw; Zeg ik liever niet
2	Wat is uw leeftijd?	Open tekst box; Zeg ik liever niet
3	Wat is uw hoogst genoten opleiding?	Primary school; High School; MBO; HBO; University Bachelor; University Master; PhD; Anders, namelijk...; Zeg ik liever niet
4	Wat is uw bruto jaarinkomen?	Open tekst box; Zeg ik liever niet
5	Wat is uw postcode?	Open tekst box; Zeg ik liever niet
6	Welke nationale politieke partij heeft uw voorkeur?	VVD; PvdA; CDA; Forum voor Democratie; GroenLinks; D66; PvdD; PVV; SGP; SP; 50+ Partij; DENK; Anders, namelijk...; Zeg ik liever niet

Section 2 Survey: Measuring Scepticism

Please note that all statements are responded to with the means of a seven point Likert Scale, in which the answers range from (1) Strongly Disagree to (7) Strongly Agree. “7” indicates the most sceptical response to each statement, except for statements number 5 and 6 for all three sets of statements. For these statements, “7” indicates the least sceptical response.

Stellingen Set 1: Meten van houding ten aanzien van bestaan van klimaatverandering	Stellingen Set 2: Meten van houding ten aanzien van de menselijke attributie aan klimaatverandering	Stellingen Set 3: Meten van houding ten aanzien van de risico's verbonden aan klimaatverandering
<ol style="list-style-type: none"> 1. Er is te veel tegenstrijdig bewijs met betrekking tot klimaatverandering om met zekerheid te zeggen dat het bestaat 2. Het bewijs voor het bestaan van klimaatverandering is onbetrouwbaar 3. “Klimaatverandering” bestaat niet; het is niets meer dan geldklopperij 4. Het bestaan van klimaatverandering is zo onzeker dat het nutteloos is om er voorspellingen over te doen 5. We ervaren op dit moment al een klimaatverandering 6. Ik weet zeker dat klimaatverandering bestaat 	<ol style="list-style-type: none"> 1. Klimaatverandering is een natuurlijke schommeling in de temperatuur op aarde 2. Beweringen dat menselijke activiteiten het klimaat veranderen zijn overdreven 3. Klimaatverandering is te complex om te kunnen stellen dat mensen het veroorzaken 4. Veel vooraanstaande experts twijfelen er nog steeds aan of klimaatverandering veroorzaakt wordt door mensen 5. Klimaatverandering is veroorzaakt door menselijke activiteit 6. De luchtvervuiling door de moderne samenleving (industrie, transport etc.) veroorzaakt een klimaatverandering 	<ol style="list-style-type: none"> 1. De media zaait teveel paniek over klimaatverandering 2. Het is te vroeg om te zeggen of klimaatverandering een probleem is 3. Overstromingen nemen niet toe; er is alleen meer berichtgeving over in de media tegenwoordig 4. Hittegolven nemen niet toe; er is alleen meer berichtgeving over in de media tegenwoordig 5. Het beangstigt mij om te denken aan de gevolgen van klimaatverandering 6. Ik vind het belangrijk dat de overheid veel geld investeert om de gevolgen van klimaatverandering tegen te gaan

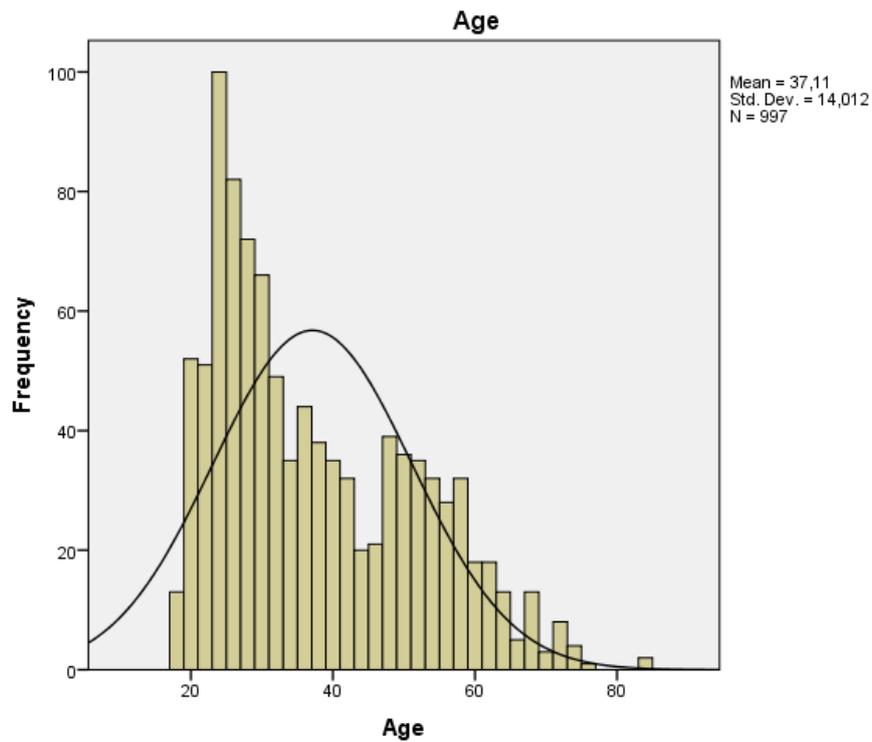
APPENDIX 4: SPSS OUTPUT; DESCRIPTIVE STATISTICS

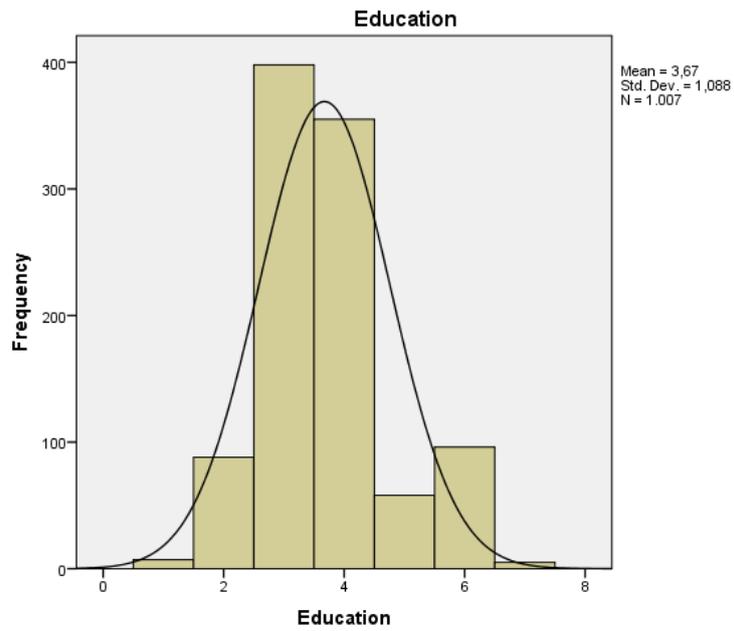
Statistics

		Gender	Age	Education	Income	Zip code	Political Orientation
N	Valid	1007	997	1007	878	998	817
	Missing	5	15	5	134	14	195
Mean		1,84	37,11	3,67	27653,69		
Median		2,00	33,00	4,00	24000,00		
Std. Deviation		,370	14,012	1,088	28332,016		
Minimum		1	18	1	0		
Maximum		2	84	7	375000		

Gender

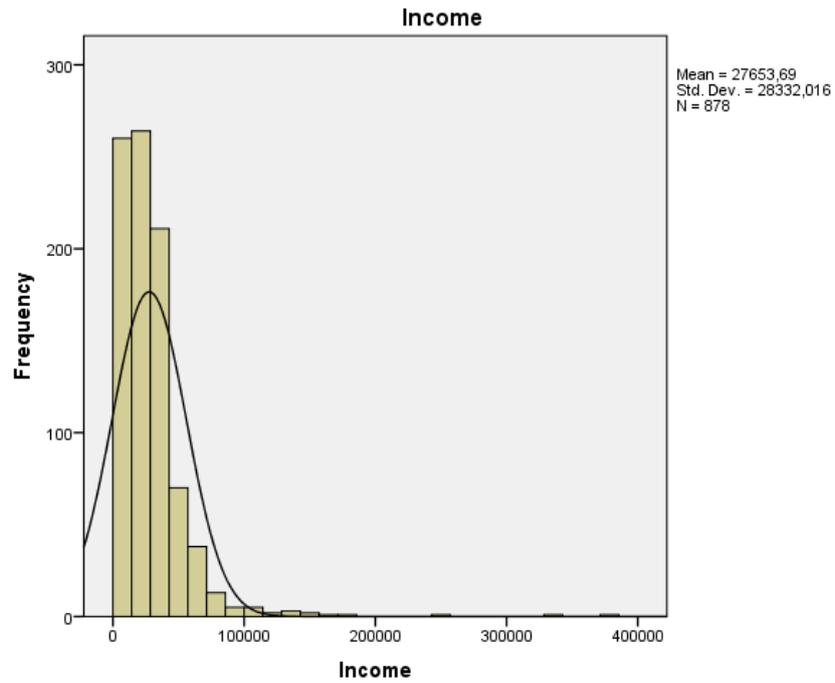
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	165	16,3	16,4	16,4
	2	842	83,2	83,6	100,0
	Total	1007	99,5	100,0	
Missing	System	5	,5		
Total		1012	100,0		





Education

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	7	,7	,7	,7
2	88	8,7	8,7	9,4
3	398	39,3	39,5	49,0
4	355	35,1	35,3	84,2
5	58	5,7	5,8	90,0
6	96	9,5	9,5	99,5
7	5	,5	,5	100,0
Total	1007	99,5	100,0	
Missing	5	,5		
Total	1012	100,0		



Political Orientation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	50+	8	,8	1,0	1,0
	CDA	46	4,5	5,6	6,6
	CU	28	2,8	3,4	10,0
	D66	108	10,7	13,2	23,3
	DENK	9	,9	1,1	24,4
	FvD	83	8,2	10,2	34,5
	GroenLinks	115	11,4	14,1	48,6
	PvdA	72	7,1	8,8	57,4
	PvdD	53	5,2	6,5	63,9
	PVV	83	8,2	10,2	74,1
	SGP	7	,7	,9	74,9
	SP	73	7,2	8,9	83,8
	VVD	132	13,0	16,2	100,0
	Total	817	80,7	100,0	
Missing	195	19,3			
Total	1012	100,0			

APPENDIX 5: AMOUNT OF RESPONSES PER ATTITUDE

BREADTH 1: TREND

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Acknowledger	496	49,0	49,0	49,0
	Ambiguous	373	36,9	36,9	85,9
	Sceptic	12	1,2	1,2	87,1
	Uncertain	131	12,9	12,9	100,0
	Total	1012	100,0	100,0	

BREADTH 2: ATTRIBUTION

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Acknowledger	150	14,8	15,6	15,6
	Ambiguous	657	64,9	68,4	84,1
	Sceptic	39	3,9	4,1	88,1
	Uncertain	114	11,3	11,9	100,0
	Total	960	94,9	100,0	
Missing		52	5,1		
Total		1012	100,0		

BREADTH 3: RISK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Acknowledger	268	26,5	28,4	28,4
	Ambiguous	454	44,9	48,1	76,6
	Sceptic	61	6,0	6,5	83,0
	Uncertain	160	15,8	17,0	100,0
	Total	943	93,2	100,0	
Missing		69	6,8		
Total		1012	100,0		

APPENDIX 6: AMOUNT OF RESPONSES PER WORST CATEGORY

Classification for the Analysis Regarding Climate Change Scepticism in General

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 (Trend Sceptic)	12	1,2	1,2	1,2
	2 (Trend Ambiguous)	373	36,9	37,4	45,7
	3 (Trend Uncertain)	131	12,9	13,2	58,8
	4 (Attribution Sceptic)	4	,4	,4	59,2
	5 (Attribution Ambiguous)	343	33,9	34,4	93,7
	6 (Attribution Uncertain)	19	1,9	1,9	95,6
	7 (Risk Sceptic)	0	0	0	95,6
	8 (Risk Ambiguous)	37	3,7	3,7	99,3
	9 (Risk Uncertain)	7	,7	,7	100,0
	10 (Acknowledger)	70	6,9	7,0	8,2
	Total	996	98,4	100,0	
Missing		16	1,6		
Total		1012	100,0		

APPENDIX 7: DEGREE OF SCEPTICISM IN GENERAL PER PROVINCE AND POLITICAL PARTY

Please note that a lower mean implies a higher level of scepticism, as “1” indicates the most sceptical classification and “10” the least (see table 5). Note that the total N equals 996 instead of 1012, as the worst classification was unclear for 16 participants.

Political parties:

Political Orientation	Mean	N	Std. Deviation
SGP	3,00	6	1,549
FvD	3,10	83	1,708
PVV	3,11	83	1,645
CDA	3,33	46	1,726
50+	3,38	8	2,722
DENK	3,67	9	2,179
PvdD	3,75	52	2,159
VVD	3,95	129	2,084
SP	4,38	73	2,384
PvdA	4,43	69	2,671
D66	4,64	107	2,392
CU	5,36	28	2,738
GroenLinks	5,53	110	2,712
MISSING	3,75	193	2,146
Total	4,07	996	2,337

Provinces:

Province	Mean	N	Std. Deviation
Zuid-Holland	3,67	160	2,194
Drenthe	3,73	55	2,103
Limburg	3,76	33	1,937
Overijssel	3,76	67	2,175
Zeeland	3,78	104	2,251
Noord-Holland	3,90	171	2,400
Brabant	4,00	104	1,995
Friesland	4,02	115	2,224
Flevoland	4,40	5	1,342
Groningen	4,68	37	2,439
Utrecht	5,32	57	2,823
Gelderland	5,41	73	2,603
MISSING	3,73	15	2,282
Total	4,07	996	2,337