

Master Thesis

Overcoming Climate Change Scepticism and Increasing Sustainable Behaviour Intentions

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2 July 2021

## Abstract

Climate change is a risk that affects environment, humans and future generations. There are climate change sceptics that do not believe that there is any risk, nor they believe other facts related to climate change, such as human contribution to global warming. As climate change scepticism has a detrimental effect on sustainable behaviour choices, we need to know how to overcome scepticism. Thus, this study aims to understand climate change scepticism (CCS) from a worldview defense perspective and aims to investigate the role of hopeful and empowering messages on sustainable behaviour intentions (SBI) regarding willingness, planning and readiness. More specifically, this study investigated the moderating role of scepticism on these messages and SBI. Data was collected from 540 participants through a survey with an experimental approach. There are three conclusions. First, there was no difference in overall, trend, impact, attribution or efficacy scepticism between participants who watched a high threat video and participants who watched a low threat video. Participants scored higher on efficacy scepticism and lower on impact scepticism after watching a threat video. Second, some subgroups (e.g. 20-29 year olds, flexitarians) reported lower SBI after reading an article with a hopeful or empowering message. Third, efficacy moderated the effect of a message of hope and empowerment on SBI for some subgroups, such that higher efficacy sceptics reported lower SBI than lower efficacy sceptics. The negative response to the articles may possibly come from reactance that occurred after reading the articles. However, trend and attribution moderated the effect of the same message on planning intentions for omnivores and males, but in a positive direction.

## **Introduction**

### **A Way to Cope with Climate Change: Through the Lens of Sceptics**

Climate change is one of the greatest threats that humans face today. Changes in regional climate patterns like extreme droughts, accelerating ice melt and tropical storms are a result of the increasing greenhouse gases in the atmosphere produced by human activities, such as the increased use of fossil fuels and the emission of methane from livestock. The global average temperature keeps increasing if the emissions of greenhouse gases in the atmosphere continues. As a result of that a third of all plant and animal species may become extinct within this century and 280 million people worldwide will have to deal with a rising sea level in their living environment. A change in human behaviour is needed if we want to prevent further catastrophic effects due to climate change (Swim, Clayton & Howard, 2011).

However, no consensus about human's contribution to climate change has yet been reached. Even though scientific community largely agrees about diverse aspects of climate change (Anderegg et al., 2010), the public opinion seems to be more divided. Within public opinion, there are different views towards climate change. Broadly speaking, people can be categorized into two groups: those who do believe in human's contribution to climate change and those who are sceptic about climate change. Within this sceptic group, a distinction can be made between trend sceptics, who deny there is such a thing as an upward trend in global temperatures, attribution sceptics, who accept that the world's climate is changing but do not think that it is caused by human behaviour, impact sceptics, who agree that the world's climate is changing as a result of human activity but do not think it will have substantial detrimental impacts and efficacy sceptics, who dispute the efficacy of human action to tackle the problem (Rahmstorf, 2004). Although some sceptics may truly hold these beliefs regardless of scientific evidence to the contrary, these beliefs may also be a coping strategy. They may know that climate change is a problem, but they feel they are not able to do

anything about it and this leads to an inner conflict. The realization that climate change is a problem is uncomfortable and is preferably avoided, which results in denial. Their denial does not stem from stupidity, but is a self-defense mechanism against the inner conflict that would otherwise arise.

So far, most research on climate change scepticism (CCS) has focused on the sociodemographic characteristics of those who tend to be sceptic towards climate change, but less is known about the underlying motives. A well thought-out approach is of great importance, because sceptic attitudes will not result in intended sustainable behaviour choices, which are needed in order to prevent global warming and counteract further consequences in the next decades due to climate change. Because CCS is relatively new in research, it is necessary to study this if we want scientists, policymakers and citizens to be on the same line. To explore how individuals' intentions to fight climate change can be increased, it is important to understand the motives of individuals with the biggest resistance; those with a sceptic attitude. In the current study, these motives will be studied in an experimental setting, examining first whether a threat message increases CS. A distinction will be made between trend, impact, attitude and efficacy scepticism. Thereafter, it is important to understand how these groups should be approached, in order to increase their sustainable behaviour intentions (SBI). Feelings of threat posed by climate change and feelings of hope are opposite to each other, so a message of hope could decrease someone's threat feelings. Therefore, hope could be a good manipulation to decrease scepticism. A sense of empowerment could increase SBI, because empowerment could give someone the feeling that their sustainable behaviour is helpful and effective. When people feel they are actually able to fight climate change, they will be extra encouraged to change behaviour. This study examines whether a message of hope and empowerment increases the intentions to make sustainable food choices.

### **Climate Change Scepticism as a Worldview Defence**

What can explain people's sceptical attitude towards climate change? Climate change can be seen as a threat or uncertainty to the individual. The discomfort of an individual's uncertainty evokes certain reactions. Threats to an individual's meaning and certainty can activate and increase the effort to maintain their scope of justice and bolster their system of meaning and value. Worldview defence research explains how exactly uncertainty-related motives and other worldview threats are related to someone's expression of derogative reactions towards someone who falls outside their own scope of justice (Bal & Van den Bos, 2019). Within the literature, there are different types of theoretical frameworks that are labelled as such worldview defences.

Terror management theory, coalitional psychology, uncertainty management theory, just-world theory and system justification theory advance distinct proposals of the origins of worldview defense (Greenberg et al., 1997; McGregor, 2006; Navarrete, 2005; Lerner, 1980; Jost & Banaji, 1994). These theories postulate this worldview defence effect as the output of mechanisms evolved either to allay the fear of death (Greenberg et al., 1997), foster social support (Navarrete, Kurzban, Fessler, & Kirkpatrick, 2004), reduce anxiety (McGregor, 2006), convince that the world is a just and fair place (Bal & Van den Bos, 2010; Jost & Banaji, 1994; Lerner, 1980) by holding on more rigidly to what is already known. These worldviews have in common that they protect individuals against feelings of uncertainty.

Climate change itself is also a threat for humans. The extent of climate change effects on individual regions will vary over time and could be harmful for some regions (Mackay, 2008). This threat can evoke uncertainty for human individuals. In addition to this reasoning, research by Feinberg and Willer (2011) has noted that dire messages and visualizations are likely to engender feelings of hopelessness, anxiety and it distances the public. From the point of view from worldview defence research, the expectation would be that due to a visualized

threat posed by climate change, scepticism as a mechanism would protect against this feeling of threat. This expectation results in the following hypothesis:

Hypothesis 1: Individuals who see a film clip with a message of high threat posed by climate change will be more sceptical towards climate change compared to individuals that see a film clip with a message of lower threat posed by climate change.

### **Feelings of Hope to Reduce Feelings of Threat**

Creating a consensus among the public opinion about human impact on climate change remains a challenge and requires a well-considered approach (Lorenzoni et al., 2007). Approaching individuals with messages that emphasize catastrophic, dire consequences or threats, can result in less concern and more hopelessness among individuals (Hart and Nisbet 2011). Thus, messaging climate change as a threat would also evoke this reaction. Feelings of hopelessness and inefficacy related to climate change are linked with a tendency to ignore the problem or to rationalize inaction (Norgaard 2011). Markowitz and Sharrif (2012) identify positive emotional appeals as a more promising strategy for climate change communication. Feelings of hope related to climate change increase the probability that individuals will choose to engage with the issue and adopt beliefs and behaviours consistent with efforts to stem the problem (Markowitz and Shariff 2012; Swim et al. 2010). Hope can be described as an affective, cognitive, or motivational stage which reflects the way in which individuals relate to desired uncertain future outcomes (Peterson & Seligman, 2004). Hope can only arise when a current situation is threatening (Lazarus, 1999, 2001), after which hope can decrease the threat perception (Bilandzic, Kalch & Soentgen, 2017). Hope and threat are thus opposites of each other, because threat refers to a negative outcome and hope refers to a positive outcome. This could suggest that hope reduces a feeling of threat posed by climate change. Since the expectation is that a feeling of threat evokes scepticism, hope can reduce threat and

thus indirectly decrease scepticism. Thus, emphasizing hope would be the first element in the well-considered approach of creating engagement among the public opinion.

### **A Combination of Hope and Empowerment for Sustainable Intentions**

Even though hope can positively influence sceptics, it is not determined whether hope contributes to sustainable behaviour. According to Chadwick (2015), hope does not positively affect behavioural intentions. In contrast, a correlation was found between feelings of hope and efficacy on the one hand, and willingness to engage in sustainable behaviours on the other hand (Lorenzoni et al., 2007). It seems like the addition of this second component contributed to a change in sustainable intentions. This efficacy, the belief that an individual has the capacity to implement a proposed response to a threat and that the recommended action can effectively mitigate the threat (Bandura 1977), is not the only strategy found to evoke sustainable behaviour to fight climate change. A focus on feelings of empowerment is also important for effective communication on climate change (Haltinner & Sarathchandra, 2017), because empowerment gives motivational powers and a feeling is shaped that one's actions may establish a substantial ancestor of sustainable behaviour (Carless, 2004). Psychological consumer empowerment has been proposed as a motivational factor in sustainable consumer behaviour (Thøgersen, 2005). Thus, empowerment could give someone the feeling that their sustainable behaviour is helpful to fight climate change and so their intentions to behave sustainably increase when they feel empowered. For these sceptics, the combination of both hope and empowerment is important. Sceptics that deny the problem of climate change, have a barrier that impedes behavioural sustainable choices (Gifford, 2011). Only a message of empowerment would not be effective enough, that is why hope should decrease the feeling of threat to make them less sceptic before a message of empowerment can increase sustainable intentions. This expectation results in the following hypotheses:

Hypotheses 2: People who have been exposed to a message of both hope and empowerment report higher sustainable behaviour intentions, compared to people who have not been exposed to a message of both hope and empowerment

Those who are less sceptic will react less strongly to a message of hope than those who are more sceptic. They do not experience a sense of threat, for which a message of hope can have a strong effect. The feeling of hope has a stronger effect on higher-sceptic groups and the following hypothesis has therefore been formulated:

Hypotheses 3: Climate change scepticism moderates the effect of a message of hope and empowerment on sustainable behaviour intentions, such that effects will be stronger for higher-sceptics groups than for lower-sceptic groups.

### **Benefits of Empowering Lower-sceptic groups**

A message of empowerment can have impact on both higher-sceptic groups and lower-sceptic groups. It is not certain that all lower-sceptic groups automatically have higher SBI, because not only someone's belief or concern regarding climate change can influence their individual sustainable behaviour. Someone's sociodemographic variables, environmental knowledge and experience can influence that as well (Barr, 2006). For example, someone may not know what behaviours will help slow or stop climate change. Lower-sceptic groups may not have higher SBI, because they are not aware or engaged with climate change. This group could be empowered as well. For them, hope is not a prerequisite for empowerment to increase sustainable intentions. So the expectation is that empowerment by itself should be enough by itself to see an increase in sustainable intentions. That has resulted in the last hypothesis:



Hypotheses 4: Lower-sceptic groups who have been exposed to a message of empowerment report higher sustainable behaviour intentions compared to lower-sceptic groups who have not been exposed to a message of empowerment.

### **Increasing Intentions towards Sustainable Food Choices**

Emphasizing feelings of hope and empowerment should be effective for increasing SBI. But, what precedes making such a choice and why are these sustainable choices helpful to fight climate change?

It is important to mention that intended oriented behaviour focusses on the individual's intentions. When someone's willingness to change their behaviour increases due to a message of hope and/or empowerment, only intent-oriented behaviour can be changed in that short amount of time (Geiger, Fischer & Schader, 2018). Broadly, sustainable behaviour include different types of action, such as sustainable consumption. Sustainable consumption refers to an individual's behaviour as acts of satisfying needs in different areas of life by using, acquiring and disposing goods and services that do not compromise the socioeconomic and/or ecological conditions of other people, currently living or in the future, to satisfy their personal needs. (Geiger, Fischer & Schader, 2018). Three consumption areas are identified as ecologically most relevant in terms of greenhouse gases, acidification emissions, tropospheric ozone and resource requirements, namely food, housing and mobility (Lorek and Spangenberg 2001). For the current study, only the food consumption area will be taken into account, since food production is responsible for a major part of the environmental impacts and emissions. Reduced demand for livestock products will significantly decrease emissions. Improvements in the entire food-chain and dietary changes are needed for this. Decreased food wastage and dietary change with reduced meat and dairy are often cited as helpful. About 30–40% of food in both developed and developing countries is currently wasted (Smith

& Gregory, 2013). Besides that, the production of local and biological foods generally has lower environmental impacts than non-local and high processed foods. Together, these aspects have a major impact in terms of sustainable food consumption. Therefore, this study refers to sustainable food behaviour as dietary changes, food waste reduction and changes towards more local and biological foods as SBI.

### **The Aim of the Current Study**

The expectation is that hope and empowerment can influence the intentions to behave sustainably. For this study this would mean that with two manipulations, eight different condition groups are created. The expectation is that both threat and article condition influences SBI. It is interesting to see whether there is a difference in outcome of CCS for when a group is exposed to a message of threat posed by climate change, compared to a group that has been exposed to a low threatening message about climate change. This will be the first manipulation. Then the expectation is that a combination of hope and empowerment can increase sustainable intentions among higher-sceptic groups and only empowerment can increase sustainable intentions among lower-sceptic groups. This study investigates whether it is possible to get a grip on these sceptic attitudes with a manipulation of hope and empowerment and whether this can increase SBI. The results of the study can answer the following two-fold question:

*“To what extent does a sense of threat posed by climate change increase scepticism towards climate change among individuals? And how does a manipulation of hope and empowerment relate to an increase of the intentions to make sustainable food choices for both higher- and lower-sceptic groups?”*

## **Method**

This cross-sectional study was part of a larger research project from dr. Michèlle Bal at Utrecht University. The data of the current quantitative study was collected through a survey. An experimental approach was chosen for this study. Manipulations make it possible to see whether a threat message can increase CCS and if hope and empowerment can increase SBI. Experimental settings make it difficult to determine the external validity of a study, but for the research question this could be seen as the most suitable method.

## **Participants**

The recruitment of the participants was done via the internet. Participants were recruited via an online platform, where participants get a small financial compensation. People who identified themselves as male, female, non-binary or other were able to participate. The minimum sample size was determined with a power analysis with the program G Power 3, whereafter the decision was made to increase this number to increase the findings' external validity. It leads to higher accuracy and conclusions could be drawn better about subgroups of the sample. Besides that, a large sample size made the odds greater of capturing outliers. 123 participants were removed from the dataset because they answered two or three manipulation checks wrong or spent too short time on completing the survey. A total of 540 participants remained.

## **Procedure**

The data were received from an online experiment. The experiment started with some information about the research and how the data will be stored afterwards. Then there was an informed consent. It was important for the participants to know they were able to quit at any time and they will stay anonymous. For the participants that wanted to ask questions or

submit any complaints, contact details were mentioned at the beginning and at the end of the experiment. After this information is, the experiment started.

There was a permission for this research from the Faculty Ethics Review Board (FERB). The FERB has given their permission to dr. Michèle Bal by confirming the ethical proposal that has been filled for her study. This proposal number is: 20-406. The approval is shown in Appendix 1. Only an amendment was requested for this specific study.

## Instruments

To answer the two-pronged research question “*To what extent does a sense of threat posed by climate change increase scepticism towards climate change among individuals? And how does a manipulation of hope and empowerment relate to an increase of the intentions to make sustainable food choices for both higher- and lower-sceptic groups?*”, participants were be divided into eight groups through the use of two manipulations; climate change threat (high vs. low) and action messages for hope and/or empowerment (hope vs. empowerment vs. hope and empowerment vs. control). The division of the manipulation group is shown in Figure 1.

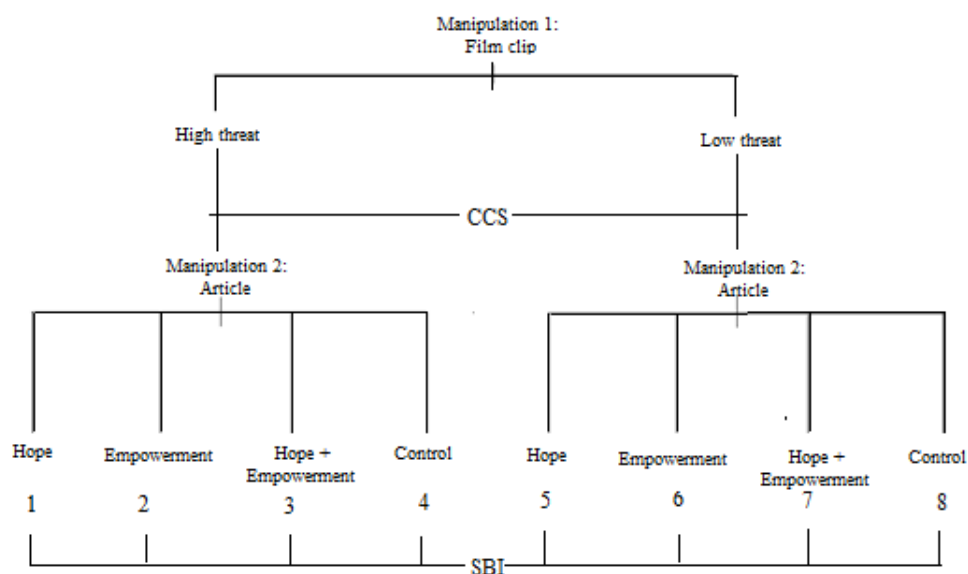


Figure 1. Step-by-step approach for the manipulation and control groups in the experiment

For the first manipulation and control group (high threat vs. low threat), both conditions watched a film clip in which climate change was framed as a high threat (manipulation group) or was framed as a low threat (control group). After that, both groups' CCS was measured through a Climate Change Ccepticism Scale. This scale contains four subscales for trend, impact, attribution and trend scepticism. It is a 7-points Likert Scale that contains 16 items. This is a scale developed by Michèlle Bal, Marijn Stok and Janna de Graaf and is shown in Appendix 2. For the second manipulation, all four conditions read a text in where they received a message of hope (manipulation group), a message of empowerment (manipulation group), a message of both hope and empowerment (manipulation group) or a neutral message (control group). These articles are shown in Appendix 3. Then their intentions to make sustainable food choices were measured, on a scale that questions different aspects: someone's willingness to make sustainable food choices, plans to make sustainable food choices and preparedness to pay for sustainable food products. In this part of the scale it was taken into account that some participants already have an omnivore, vegetarian, pescatarian or vegan diet. The questions were adjusted according to their diet. For example, statements related to meat are not shown to vegetarians or vegans. The SBI scale is shown in Appendix 4. Then questions were asked regarding their gender, age category and the country they currently live in.

### **Analysis plan**

When all data was collected, statistical analyses were conducted with R. For the first three hypotheses, GLMs were conducted. For the fourth hypothesis, a t-test was conducted. For the first hypotheses, threat was used as independent variable, CCS as dependent variable and age gender or diet were used as control variables. For the second hypothesis, hope and

empowerment are the independent variables and intentions to behave sustainably is the dependent variable. For the third hypothesis, hope and empowerment was used as the first independent variable, threat as the second independent variable and intentions to behave sustainably as dependent variable. Here, a GLM was conducted to analyse whether threat has a moderating role for the relationship between hope and empowerment on the one hand and intentions to make sustainable food choices on the other hand. It was decided to create an extra scale that measures willingness to make plant-based food choices for the third hypothesis. For the fourth hypothesis, article was used as independent variable and SBI was used as dependent variable. Participants that scored  $< 4$  on the CCS were categorized as lower-sceptics. For all analyses where CCS was used as a variable, the analysis was first performed with overall scepticism, followed by an analysis performed with trend, impact, attribution and efficacy scepticism separately.

## Results

### Data Preparation

Before testing the hypotheses assumptions were checked. Based on Cook's distance scores, 13 respondents were excluded from analyses as their scores deviated  $> 3$  SDs from the Cook's distance mean. Assumptions of independence and scale of measurement were met through the research design. Statistical analyses (Kolmogorov-Smirnov,  $ps < .001$ ; Shapiro-Wilk,  $ps < .001$ ) indicated that scales measuring Climate change scepticism, Behaviour intentions subscales on Willingness, Planning and Readiness did not meet the assumption of normality. However, visual inspection of the histograms did not reveal clear deviations from normality so the assumption of normality is still met. Levene's tests for CCS and behaviour intentions subscales ( $ps > .215$ ) showed homogeneity of variance across all conditions.

### Descriptive Statistics

The sample size consists of 540 respondents, of which 258 who identified themselves as male and 282 as female. Respondents were categorized in age groups which varied from 15-19( $n=21$ ), 20-29 ( $n=69$ ), 30-39( $n=95$ ), 40-49( $n=94$ ), 50-59( $n=105$ ), 60-69 ( $n=106$ ) and  $>70$  ( $n=50$ ). Half ( $n =269$ , 50%) of the sample reported to eat an omnivore diet, 245 respondents (45%) a flexitarian, 12 respondents (2%) a vegetarian, 10 respondents (2%) a pescatarian and 4 (1%) respondents a vegan diet. Almost all respondents ( $n=535$ , 99%) lived in the Netherlands. The Climate Change Scepticism Scale consisted of four subscales and ranged from 1-7. Respondents' scores per threat condition are shown in Table 1. Scores from the Sustainable Behaviour Intentions scale, which also ranged from 1-7, are shown in Table 2 for each of the condition of threat and article version.

Table 1

*Means and Standard Deviations of Climate Change Scepticism by Threat Condition.*

	Climate Change Scepticism Subscale								
	Trend		Impact		Attribution		Efficacy		<i>n</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Low threat	3.47	0.66	2.62	1.10	3.63	0.66	4.94	0.55	275
High threat	3.55	0.72	2.69	1.21	3.67	0.72	4.53	0.62	265

Table 2

*Means and Standard Deviations of Sustainable Behaviour Intentions by Article Condition.*

Article	Threat	Scale						<i>n</i>
		Willing		Planning		Readiness		
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Control	Low	4.76	1.00	4.48	1.11	4.11	1.58	74
	High	4.60	1.11	4.12	1.34	3.89	1.46	80
Hope	Low	4.70	0.89	4.43	1.05	3.61	1.33	66
	High	4.82	0.99	4.44	1.22	3.99	1.53	69
Empowerment	Low	4.52	1.06	4.19	1.13	3.53	1.59	61
	High	4.58	1.03	4.26	1.12	3.70	1.25	64
Hope & empowerment	Low	4.71	0.94	4.31	1.01	3.85	1.58	74
	High	4.73	0.95	4.36	1.16	4.12	1.33	52

### **The Relationship between a Threat Message and Climate Change Scepticism**

To examine whether ‘Individuals who see a video with a message of high threat posed by climate change will be more sceptical towards climate change compared to individuals who see a video with a message of lower threat posed by climate change’(H1), a GLM was conducted with threat condition as the independent variable, scepticism as the dependent variable, and age, gender and diet as control variables. No significant differences were found on the Climate Change Scepticism Subscales or overall scale between people in the higher



threat condition and people in the lower threat condition ( $p$ 's > .167) and the control variables did not explain any significant difference either. This rejects Hypothesis 1.

## **Hope and Empowerment for Sustainable Behaviour Intentions and Climate Change**

### **Scepticism measured as a Moderator**

To examine whether 'People who have been exposed to a message of both hope and empowerment report behaviour intentions, compared to people who have not been exposed to a message of both hope and empowerment' (H2), a GLM was conducted with article condition and scepticism as the independent variables, SBI as the dependent variable and age, gender and diet as control variables. The effect of overall CCS is significant and negative for SBI regarding willingness ( $\beta = -1.26$ , 95% CI [-1.39, -1.13],  $F(538) = -19.10$ ,  $p < .001$ ); planning ( $\beta = -1.30$ , 95% CI [-1.46, -1.14],  $F(538) = -16.09$ ,  $p < .001$ ) and preparedness ( $\beta = -1.47$ , 95% CI [-1.69, -1.26],  $F(538) = -13.53$ ,  $p < .001$ ), but article condition in general was not a significant predictor for sustainable behaviour intentions,  $p$ 's > .520. This is in contrast with Hypothesis 2. Article condition was only a predictor for SBI among two subgroups, as shown in Table 3. Because increased trend, impact and attribution scepticism were related to lower SBI, as shown in Figure 1 and reported in Appendix 5, an extra GLM was conducted to examine whether the difference in willingness vs. planning and planning vs. readiness changes as scepticism increased. This relation is shown in Figure 2. The difference between willingness and planning increases significantly as efficacy scepticism increases ( $\beta = 0.13$ ,  $p < .001$ ). However, the other findings were not significant ( $p > .05$ ).

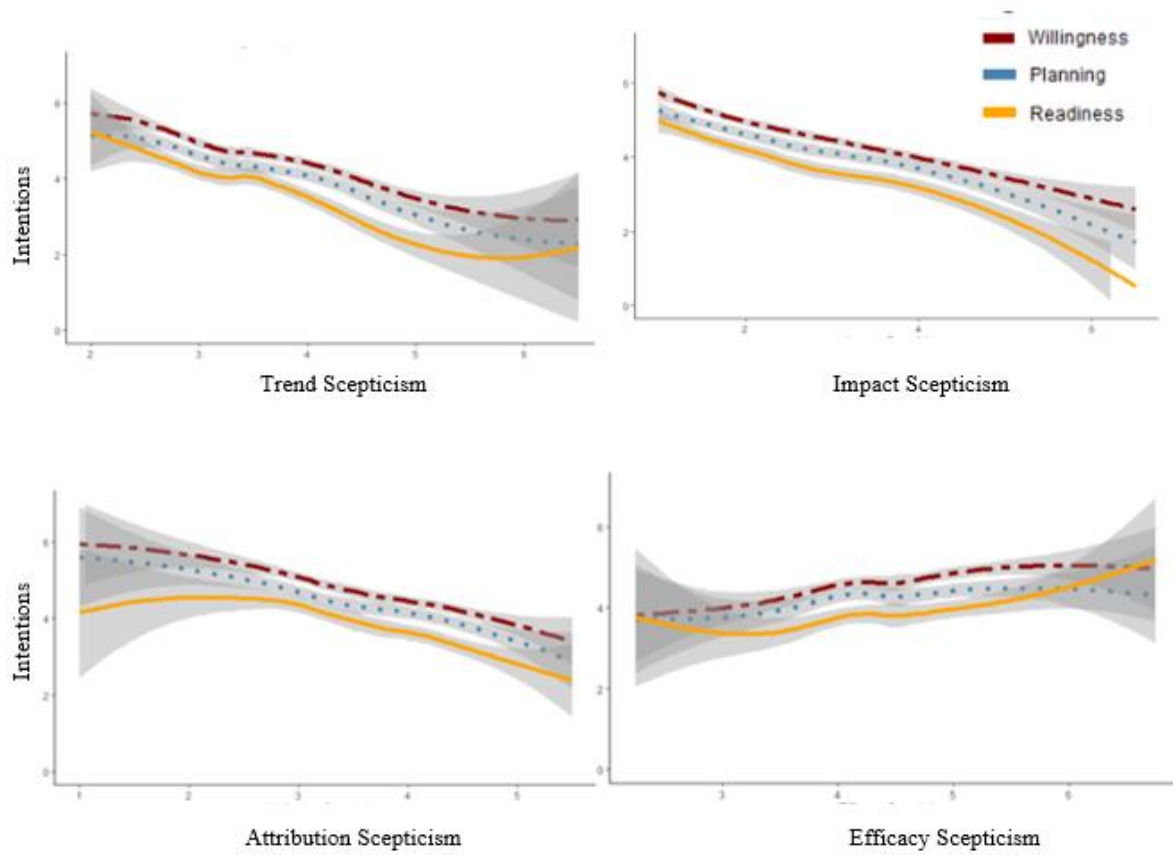


Figure 1. Mean Sustainable Behaviour Intentions as a function of Climate Change Scepticism per Subscale.

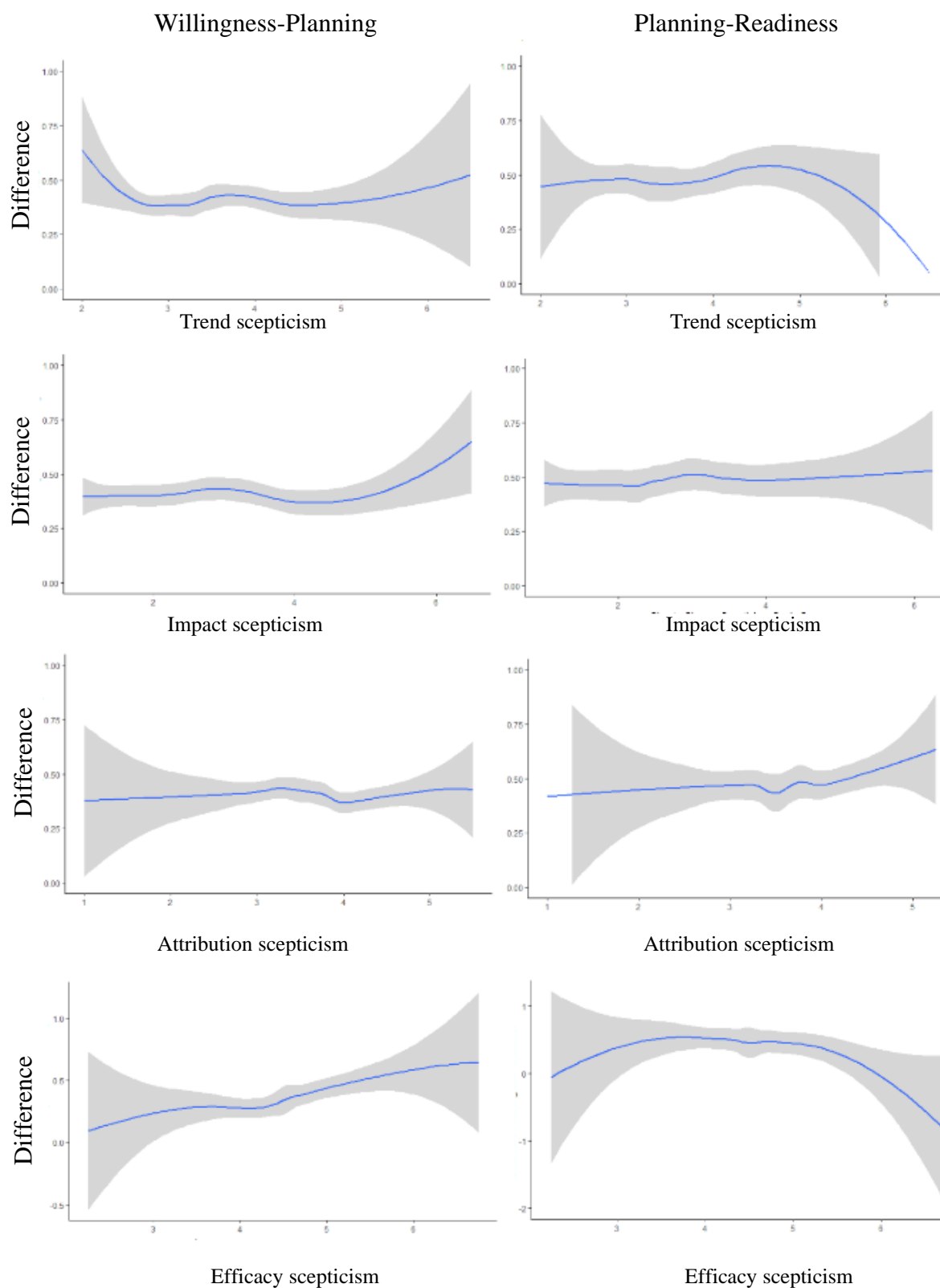


Figure 2. Difference in Intentions (Willingness-Planning and Planning-Readiness) as a function of Scepticism.

The interaction of scepticism and article condition on SBI was not significant,  $p$ 's > .499. This rejects 'Climate change scepticism moderates the effect of a message of hope and empowerment on sustainable behaviour intentions, such that effects will be stronger for higher-sceptics groups than for lower-sceptic groups.' (H3). However, a GLM showed significant differences among subgroups. Because some effects were significant, post hoc tests were conducted. Post hoc comparisons using the Tukey HSD test indicated that the mean score for the article condition hope and/or empowerment was significantly different than the article control condition among multiple subgroups. Simple effects test was used as a follow up test for significant interactions. This test was conducted with R package 'phia' and function 'testInteraction()'. After conducting both GLMs and post hoc tests, only significant findings on both GLM and post-hoc tests were reported in Table 3.

For example, it shows that trend and attribution scepticism moderated the effect of a message of hope and empowerment (vs. control message) on sustainable behaviour planning among males, such that a message of both hope and empowerment increased plans to make sustainable food choices even more as trend and attribution scepticism increased. However, it also shows that the effect of both hope and empowerment decreased sustainable planning as efficacy scepticism increased. Statistic results are reported in Appendix 6.

Table 3. Main Effect of Article condition on SBI and Interaction Effect of Article condition x Scepticism on SBI

Subgroup	Article	Scale				
		Willingness	Planning	Readiness	Will PB Food	
Gender	Male	Hope	Eff* -			
		Empowerment			Trd* +	
		Hope+Emp	Eff* -	Trd** +, Att** +, Eff** -		
Diet	Omnivore	Hope+Emp		Trd** +		
	Flexitarian	Empowerment			Main**-	
Age	20-29	Hope			Main**-	
		Empowerment	Main** -			
	30-39	Empowerment			Att** +	
		Hope+Emp			Att** +	
	40-49	Hope	Main* +			
	60-69	Empowerment			Main* -	Eff* -
		Hope+emp	Eff* -		Eff** -	Eff** -
70+	Empowerment			Att* -		

*Note*

\* =  $p < .10$ , \*\* =  $p < .05$ . Trd = trend, Imp = impact, Att= attribution, Eff=efficacy. + = positive effect, - = negative effect. Main= main effect of article condition (vs. control group) on intention

Will PB food = Willingness plant-based food choices

### Empowerment for Sustainable Behaviour Intentions among Lower-sceptic groups

In order to examine whether ‘Lower-sceptics groups who have been exposed to a message of empowerment report higher sustainable intentions compared to lower-sceptic groups who have not been exposed to a message of empowerment.’ (H4), a t-test was conducted. Differences on willingness, planning and readiness by article were not significant ( $ps < .05$ ).

By partially confirming some of the four hypotheses, the two-pronged research question can be answered: *“To what extent does a sense of threat posed by climate change increase scepticism towards climate change among individuals? And how does a manipulation of hope and empowerment relate to an increase of the intentions to make sustainable food choices for both higher-sceptic groups and lower-sceptic groups ?”* After watching the film clip that shows the impact of climate change, impact scepticism scores were very low and efficacy scepticism scores were relatively high. There was no difference in trend, impact, attribution and efficacy scepticism for the higher threat condition compared to the lower threat condition. That means that threat posed by climate change did not increase scepticism. In general, a message of hope and empowerment did not increase SBI. However, a manipulation of hope and/or empowerment did increase intentions among some subgroups. Remarkably, it also decreased intentions among some subgroups.

## **Discussion**

The aim of this study was to investigate the effect of a threat message posed by climate change on CCS, and to investigate the effect of a subsequent message of hope and/or empowerment on SBI. It was hypothesized that (1) people who see a high threat video will be more sceptical towards climate change compared to those who see a video with a message of lower threat posed by climate change, (2) people who were exposed to a message of both and empowerment report higher SBI than those not exposed to that message, (3) CCS moderates the effect of a message of hope and empowerment on SBI, and (4) lower-sceptics who were exposed to a message of empowerment report higher sustainable intentions compared to lower-sceptics who were not exposed to a message of empowerment. Taken together, this study lends partial support for these hypotheses. This study showed that a message of threat

posed by climate change is not correlated with increased CCS. After both high and low threat messages, impact scepticism was relatively low and efficacy scepticism was overall very high. The gap between sustainable willingness and planning increases as efficacy scepticism increases. Besides that, some subgroups were more likely to report higher sustainable behaviour intentions after reading a message of hope and/or empowerment.

### **Hypothesis 1**

The first hypothesis, that ‘Individuals who see a video with a message of high threat posed by climate change will be more sceptical towards climate change compared to individuals that see a video with a message of lower threat posed by climate change’, was not supported by the current study. Participants in the higher threat condition group were manipulated with a short film clip explaining the dire consequences of climate change. Participants in the lower threat condition group saw a similar film clip, but consequences were framed less direly by the use of music, images and language. It was not possible to present the same content, which is about the consequences of climate change, as completely neutral. The content in the lower threat condition film clip could therefore still be experienced as somewhat threatening. This could cause not only the higher threat condition, but also the lower threat condition to experience a feeling of threat, which could explain the non-significant difference between both conditions. This suggests that when the lower threat condition group was manipulated with content that was framed completely neutral, differences in scepticism between groups could have been significant. In order to research this in a follow-up study, new stimulus materials should be made for a condition with no threat, instead of lower threat.

Besides that, worldview defense theories (Bal & Van den Bos, 2019) explain how a derogatory reaction could be a coping mechanism to deal with threat and uncertainty. The

manipulation in this study was mainly focused on this feeling of threat, while worldview defense theories seems to put emphasis on feelings of uncertainty as well. This study found no support for significant differences in CCS between the higher threat condition compared to the lower threat condition. Further research could examine how a message of uncertainty posed by climate change correlates to CCS.

Both film clips focused on climate change impact. After measuring all four types of scepticism, impact scepticism scores were relatively lower than efficacy scepticism scores. Showing participants what impact climate change has, relates to low impact scepticism and high efficacy scepticism. However, since no measures of CCS were conducted before the threat manipulation, it is not possible to determine whether the film clip had a causal effect on lowering impact scepticism or heightening efficacy scepticism. Conducting follow-up research can study this relationship between exposing people to impact consequences of climate change. Figure 2 already showed how increased efficacy scepticism related to a bigger gap between willingness and planning for sustainable behaviour for this study, so higher efficacy scepticism could be a limiting factor in sustainable behaviour. If follow-up research findings state that exposing people to impact consequences of climate change actually increases efficacy scepticism, framing and presenting such messages should be done carefully. Communication strategies should avoid to indirectly increase any type of scepticism, and interventions to promote sustainable behaviour could consider using communication strategies where they focus less on dire climate change impact consequences.

## **Hypothesis 2**

The second hypothesis, that ‘People who have been exposed to a message of both hope and empowerment report higher sustainable behaviour intentions, compared to people who have not been exposed to a message of both hope and empowerment’, was not supported.



A message of hope and/or empowerment was not related to higher sustainable behaviour intention. For some subgroups, a message of both hope and empowerment seemed to have an opposite effect: their sustainable intentions were lower compared to those in the control group. As reactance theory argues, reactance is a form of resistance that can arise when someone's behavioural freedoms are eliminated (Dillard & Shen, 2005). Participants who read a message of hope and empowerment were forced to read an article that emphasized the need to behave sustainably. An explanation could be that the length of the article in the hope and empowerment condition group, and the idea that they only were able to go to the next question in the survey after a certain amount of seconds, felt like a restriction. Besides that, the threat posed by climate change was emphasized earlier and behaving sustainably was highly valued in the article, which could result in a higher emotional response for some people, followed by reactance. Future research could study this reactance by using a pretest-posttest design. This method can compare participants reactance and measure the degree of change occurring as a result of the manipulation, by having one measurement before the manipulation and one measurement after the manipulation. To study reactance more in-depth, a better approach to measure reactance could be by Dillard and Shen's (2005) reactance measure. This model examines the role of perceived freedom to threat (e.g. using the stem "The message tried to manipulate me"), negative cognitive responses (e.g. by writing down whatever came to mind after reading the message) and anger (e.g. questioning "Did you feel aggravated while viewing this message") as each relates to reactance. Numerous studies provide support for this operationalization (Quick & Kim, 2009; Rains & Turner, 2007). This measurement can be conducted after the manipulation articles that were used in this study.

While analyses were conducted for the second hypothesis, extra findings showed a relation between higher CCS and lower SBI regarding willing, planning and readiness. This is

in line with earlier findings (Gifford, 2011). Therefore, this confirms that it is vital to find ways to increase this group's sustainable behaviour, since intentions of higher sceptics lack behind compared to lower sceptics. Findings showed that the gap between willingness and planning among higher efficacy sceptics was bigger compared to the gap among lower efficacy sceptics. Even though CCS has been associated with lower sustainable intentions before, an exponential growth in the gap between willing and planning related to increasing efficacy scepticism was somewhat an unexpected finding. Follow-up research could investigate this non-linear relationship and study how this ultimately relates to actual behaviour. If increasing efficacy scepticism goes along with an exponential growing aversion towards sustainable behaviour choices, the challenge in finding a strategy to stimulate sustainable behaviour is of great importance.

### **Hypothesis 3**

The third hypothesis, that 'Climate change scepticism moderates the effect of a message of hope and empowerment on sustainable behaviour intentions, such that effects will be stronger for higher-sceptic groups than for lower-sceptic groups', was partly confirmed because effects were found for specific subgroups. A remarkable effect was found among males. The message of hope and empowerment seemed to indicate higher planning intentions as their trend and attribution scepticism increases. However, this effect was not found for willingness and readiness. This effect on planning intentions appeared to have an opposite effect for efficacy scepticism. The effect of hope and empowerment seems to depend on what kind of sceptics they are: trend, attribution or efficacy sceptics.

Besides that, Table 3 did not only report significance on  $p < .05$ , but also showed significance on  $p < .10$ . This means that the results found due to chance might be higher, but overall it also indicates that a messages of hope and/or empowerment are more likely to evoke

certain reactions among specific groups (e.g. males). Even when p-values are more lenient, the increase or decrease in sustainable intentions among females, vegetarians and vegans are not related to a message of hope and/or empowerment.

#### **Hypothesis 4**

The fourth hypothesis, that ‘Lower-sceptics groups who have been exposed to a message of empowerment report higher sustainable intentions compared to lower-sceptic groups who have not been exposed to a message of empowerment’ was not supported at all. Contrary to the expectation, SBI reports of lower-sceptic groups in the empowerment condition were not higher than reports in the control group. Differences in sustainable behaviour intentions between hope + empowerment condition and control condition were not found.

#### **Policy implications**

From a public policy perspective, there is need to understand the role of communication strategies in promoting sustainable behaviour and how effectiveness of communication tools differ per subgroup. As this study shows, males respond different to some messages than females do. And most important to realize, the group of sceptics is not homogeneous. Further research should advise policy makers based on new insights in communication strategies. Following this, policy makers can develop and implement activities and strategies to alleviate for example greenwashing and misinformation regarding sustainability and climate change.

#### **Limitations, validity and reliability**

A pre-measurement could have been used to study how much scepticism increase due to the first manipulation. However, the survey consisted of two scales already and because of

the time, no third scale was added to the survey. However, using control groups for the second manipulation and using manipulation and attention checks improved the validity.

The Cronbach's alpha of the scales was measured for the item-to-total correlation. All Cronbach's alpha's were relatively high enough to assume internal consistency, except for the SSC scale ( $\alpha = .53$ ). Cronbach's alpha's of the subscales were underestimating the true reliability, because every subscale had only four items. Adding more items to the subscales could increase internal consistency.

A first limitation of the study is that it only focuses on the relationship between a message of hope and/or empowerment and sustainable food choices. These findings do not say anything about behaviour intentions related to traveling or housing. It would be also of interest to consider how a message of hope and/or empowerment relates to SBI related to housing and traveling. Follow-up research can study this relationship. The current study was only focused on food choices, instead of sustainable behaviour in general, so it describes only one aspect of sustainable behaviour.

A second limitation of the study is that it only measures intentions on one specific moment and it does not measure intentions over time, or actual behaviour. Follow-up research can study the effectiveness of messages of hope and/or empowerment over time. Alternatively, follow-up research could investigate to what extent one's intentions overlaps with actual behaviour.

## **Conclusion**

Whilst a distinction was found for SBI among higher vs. lower sceptics, a message of hope and/or empowerment was not effective for everyone to increase SBI. For some subgroups it seemed to work the other way around, because it decreased SBI. This shows how

crucial it is to adapt the communication strategy to the target group. Trend, impact, attribution and efficacy sceptics seem to respond differently from each other. Not only differences were found between high and low sceptics, but also within this group of sceptics based on socio-demographics characteristics. These findings show how a message of hope and empowerment can be helpful for some subgroups to overcome CCS and that it is possible to increase SBI with the use of a good and well-considered message.

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## Appendix 1: Ethical Approval

<p><b>P.O. Box 80140, 3508 TC Utrecht</b></p> <p>The Board of the Faculty of Social and Behavioural Sciences Utrecht University P.O. Box 80.140 3508 TC Utrecht</p>	<p><b>Faculty of Social and Behavioural Sciences</b></p> <p>Faculty Support Office Ethics Committee</p> <p><b>Visiting Address</b></p> <p>Padualaan 14 3584 CH Utrecht</p>
<p><b>Our Description</b>                    20-406</p> <p><b>Telephone</b>                            030 253 46 33</p> <p><b>E-mail</b>                                    FETC-fsw@uu.nl</p> <p><b>Date</b>                                        31 August 2020</p> <p><b>Subject</b>                                  Ethical approval</p>	

### ETHICAL APPROVAL

Study: Climate skepticism vs. Willingness to adopt sustainable behavior

Principal investigator: M. Bal

This research project does not belong to the regimen of the Dutch Act on Medical Research Involving Human Subjects, and therefore there is no need for approval of a Medical Ethics Committee.

The study is approved by the Ethics Committee of the Faculty of Social and Behavioural Sciences of Utrecht University. The approval is based on the documents send by the researchers as requested in the form of the Ethics committee and filed under number 20-406. The approval is valid through 31 August 2021. Given the review reference of the Ethics Committee, there are no objections to execution of the proposed research project, as described in the protocol. It should be noticed that any changes in the research design oblige a renewed review by the Ethics Committee.

Yours sincerely,



Peter van der Heijden, Ph.D.  
Chair

## Appendix 2: Climate change scepticism scale

### Klimaatsepticisme

1. Ik geloof dat er bewijs is dat het klimaat verandert  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
2. Ik denk dat klimaatverandering een serieus probleem is voor de samenleving  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
3. Klimaatverandering is niet meer dan een natuurlijk proces  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
4. Ik weet niet zeker of klimaatverandering echt impact gaat hebben op ons milieu  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
5. We kunnen niet veel doen om milieuproblemen op te lossen  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
6. Ik twijfel of klimaatwetenschappers wel het hele verhaal vertellen  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
7. Ik denk dat de grote bezorgdheid over het milieu overdreven is  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
8. Ik weet niet zeker of we de opwarming van de aarde kunnen stoppen  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
9. De mens is verantwoordelijk voor de opwarming van de aarde  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
10. De meeste uitspraken over klimaatverandering zijn waar  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
11. Ik weet niet zeker of klimaatverandering veroorzaakt wordt door natuurlijke of menselijke processen  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
12. Het oplossen van klimaatproblemen is tijdsverspilling  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
13. Ik maak me druk over de gevolgen van klimaatverandering  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
14. Het is onzeker dat menselijke activiteiten klimaatverandering hebben veroorzaakt  
*Helemaal oneens*                    2        3        4        5        6        *Helemaal eens*
15. Het is niet zeker dat de aarde opwarmt

*Helemaal oneens*                    2       3       4       5       6       *Helemaal eens*

16. De mens heeft weinig effect op de opwarming van de aarde

*Helemaal oneens*                    2       3       4       5       6       *Helemaal eens*

## Appendix 3: Articles

### Control



#### Klimaatverandering in Nederland

Iedere dag maak je als mens zo'n 30.000 keuzes, waarvan zeker een paar honderd actieve keuzes zijn. Ook op gebied van duurzaamheid maken we dagelijks meerdere keuzes: Neem je de fiets of ga je met de auto naar de supermarkt? Kies je voor biologisch of ga je voor goedkoop? Steeds meer mensen houden zich bezig met de effecten van klimaatverandering en hoe we deze tegen kunnen gaan met duurzame keuzes. Er valt echter nog veel winst te behalen.



### Hope

#### De weg naar een duurzamere samenleving

Volgens wetenschappers is het zeker nog mogelijk om de opwarming van de aarde tot 1,5 °C te beperken. Ze zijn hoopvol dat we klimaat-verandering nog effectief kunnen tegengaan door de uitstoot van broeikasgassen snel te beperken.

Steeds meer bedrijven dragen hier ook al hun steentje aan bij. Niet alleen kleine ondernemingen, maar ook multinationals zoals ASML en Philips investeren fors in duurzaamheid.

*"De technologie die we nodig hebben om een duurzame transitie te maken wordt met de dag effectiever en goedkoper",*

Frans van Houten, CEO Philips

Als we hier vol op inzetten kan Nederland over tientallen jaren een land zijn met groene steden, een circulaire landbouw, met meer ruimte voor bos en water. Hier hebben we niet alleen zelf profijt van, maar ook de natuur en toekomstige generaties.

Naast bedrijven en overheden, kunnen ook burgers genoeg doen om duurzamer met de aarde om te gaan. Het is aan ons de keuze wat de volgende stap in de goede richting zal zijn.

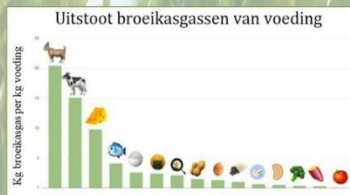


## Empowerment

### Kleine aanpassingen maken een groot verschil

Met kleine veranderingen in ons gedrag kunnen we al veel minder broeikasgassen uitstoten, wat een groot positief effect heeft op het milieu. Door vaker afval te scheiden, producten te kiezen met minder verpakkingsmateriaal, lokaal en seizoensgebonden te eten, of door minder dierlijke producten te eten help je het klimaat.

De veestapel is voor een groot deel verantwoordelijk voor de uitstoot van broeikasgassen. De productie van zuivel en vlees kost daarnaast veel water en land.



Weet je welke impact jij al hebt door je biefstuk af en toe over te slaan? Een stukje biefstuk staat gelijk aan 45 keer douchen of 257 keer de wc doortrekken. Daarnaast stoot koeienmelk zo'n drie keer meer broeikasgassen uit dan bijvoorbeeld plantaardige sojamelk.

Kortom, met een paar kleine gedragsveranderingen kunnen we klimaatverandering al tegengaan!

*Het is aan ons de keuze wat de volgende stap in de goede richting zal zijn.*

*Dus, welke switch ga jij maken?*



#### Appendix 4: Intentions for sustainable food choices

Ik omschrijf mijn voedingspatroon als:

Omnivoor: Ik eet vlees/vis en dierlijke producten

Flexitairisch: Ik eet één of meerdere dagen per week geen vlees en vis

Vegetarisch: Ik eet geen vlees en vis

Pescotarisch: Ik eet geen vlees, wel vis

Veganistisch: Ik eet geen vlees, vis en andere dierlijke producten (zoals zuivel, eieren, honing, etc.)

*Omnivoor:*

Ik wil minder vlees eten

Ik wil minder vis eten

Ik wil minder dierlijke producten (melk, yoghurt, kaas, honing of andere producten van dierlijke afkomst) eten

Ik wil vlees/vis vaker vervangen voor een vegetarische vervanger

Ik wil minder dierlijke melk drinken

Ik wil minder kaas eten

Ik wil minder eieren eten

Ik wil vaker biologisch eten

Ik wil vaker voedingswaren eten die lokaal verbouwd zijn.

Ik wil vaker eten kopen met minder verpakkingsmateriaal

Ik wil minder vaak eten weggooien

Ik wil vaker seizoensgroente en -fruit eten.

Ik wil minder bewerkte voeding eten

Ik ben van plan om komende maand minder vlees te eten

Ik ben van plan om komende maand minder vis te eten

Ik ben van plan om komende maand minder dierlijke producten (melk, yoghurt, kaas, honing of andere producten van dierlijke afkomst) te eten

Als ik komende maand de keuze heb tussen vlees/vis en een vegetarische optie, kies ik vanaf nu vaker voor de vegetarische vervanger, zoals bijvoorbeeld een vleesvervanger, tofu, tempeh, bonen, peulvruchten.

Ik ben van plan om komende maand minder dierlijke melk drinken. Wanneer ik dit toch wil drinken, vervang ik het voor plantaardige melk, zoals sojamelk, amandelmelk, havermelk of kokosmelk.

Ik ben van plan om komende maand minder dierlijke kaas eten. Wanneer ik dit toch wil eten, vervang ik het voor plantaardige kaas.

Ik ben van plan om komende maand minder eieren eten of verwerken in recepten

Ik ben van plan om komende maand vaker eten te kopen wat biologisch is verbouwd

Ik ben van plan om komende maand vaker eten kopen wat lokaal verbouwd is

Ik ben van plan om komende maand vaker eten te kopen met minder verpakkingsmateriaal

Ik ben van plan om komende maand minder vaak eten weg te gooien. In plaats daarvan vries ik het in, eet ik het de volgende dag op, of deel ik het met anderen.

Ik ben van plan om komende maand voeding wat geïmporteerd is uit landen buiten Europa, per vliegtuig zijn vervoerd of zijn gekweekt in een verwarmde kas vaker te vervangen voor seizoensgroente en – fruit uit Nederland.

Ik ben van plan om komende maand bewerkt voedsel zoals fast food, frisdrank en kant- en klaar maaltijden vaker te vervangen voor rauwe, onbewerkte voeding zoals groenten en fruit.

Ik ben bereid om meer te betalen voor mijn voeding, als ik weet dat het duurzaam is

Ik ben bereid om meer te betalen voor mijn voeding, als het een duurzaam keurmerk heeft

Ik ben bereid om meer te betalen voor een vegetarische of veganistische vleesvervanger

Ik ben bereid om meer te betalen voor een alternatief op dierlijke producten: bijvoorbeeld melk, kaas, yoghurt, kwark

#### *Vegetarisch:*

Ik wil minder dierlijke producten (melk, yoghurt, kaas, honing of andere producten van dierlijke afkomst) eten

Ik wil minder dierlijke melk drinken

Ik wil minder kaas eten

Ik wil minder eieren eten

Ik wil vaker biologisch eten

Ik wil vaker voedingswaren eten die lokaal verbouwd zijn.

Ik wil vaker eten kopen met minder verpakkingsmateriaal

Ik wil minder vaak eten weggooien

Ik wil vaker seizoensgroente en -fruit eten.

Ik wil minder bewerkte voeding eten

Ik ben van plan om komende maand minder dierlijke producten (melk, yoghurt, kaas, honing of andere producten van dierlijke afkomst) te eten

Ik ben van plan om komende maand minder dierlijke melk drinken. Wanneer ik dit toch wil drinken, vervang ik het voor plantaardige melk, zoals sojamelk, amandelmelk, havermelk of kokosmelk.

Ik ben van plan om komende maand minder dierlijke kaas eten. Wanneer ik dit toch wil eten, vervang ik het voor plantaardige kaas.

Ik ben van plan om komende maand minder eieren eten of verwerken in recepten

Ik ben van plan om komende maand vaker eten te kopen wat biologisch is verbouwd

Ik ben van plan om komende maand vaker eten kopen wat lokaal verbouwd is

Ik ben van plan om komende maand vaker eten kopen met minder verpakkingsmateriaal

Ik ben van plan om komende maand minder vaak eten weg te gooien. In plaats daarvan vries ik het in, eet ik het de volgende dag op, of deel ik het met anderen.

Ik ben van plan om komende maand voeding wat geïmporteerd is uit landen buiten Europa, per vliegtuig zijn vervoer of zijn gekweekt in een verwarmde kas vaker te vervangen voor seizoensgroente en – fruit uit Nederland.

Ik ben van plan om komende maand bewerkt voedsel zoals fast food, frisdrank en kant- en klaar maaltijden vaker te vervangen voor rauwe, onbewerkte voeding zoals groenten en fruit.

Ik ben bereid om meer te betalen voor mijn voeding, als ik weet dat het duurzaam is

Ik ben bereid om meer te betalen voor mijn voeding, als het een duurzaam keurmerk heeft

Ik ben bereid om meer te betalen voor een vegetarische of veganistische vleesvervanger

Ik ben bereid om meer te betalen voor een alternatief op dierlijke producten: bijvoorbeeld melk, kaas, yoghurt, kwark

### *Pescotarisch*

Ik wil minder vis eten

Ik wil minder dierlijke producten (melk, yoghurt, kaas, honing of andere producten van dierlijke afkomst) eten



Ik wil vis vaker vervangen voor een vegetarische vervanger

Ik wil minder dierlijke melk drinken

Ik wil minder kaas eten

Ik wil minder eieren eten

Ik wil vaker biologisch eten

Ik wil vaker voedingswaren eten die lokaal verbouwd zijn.

Ik wil vaker eten kopen met minder verpakkingsmateriaal

Ik wil minder vaak eten weggooien

Ik wil vaker seizoensgroente en -fruit eten.

Ik wil minder bewerkte voeding eten

Ik ben van plan om komende maand minder vis te eten

Ik ben van plan om komende maand minder dierlijke producten (melk, yoghurt, kaas, honing of andere producten van dierlijke afkomst) te eten

Als ik komende maand de keuze heb tussen vis en een vegetarische optie, kies ik vanaf nu vaker voor de vegetarische vervanger, zoals bijvoorbeeld een vleesvervanger, tofu, tempeh, bonen, peulvruchten.

Ik ben van plan om komende maand minder dierlijke melk drinken. Wanneer ik dit toch wil drinken, vervang ik het voor plantaardige melk, zoals sojamelk, amandelmelk, havermelk of kokosmelk.

Ik ben van plan om komende maand minder dierlijke kaas eten. Wanneer ik dit toch wil eten, vervang ik het voor plantaardige kaas.

Ik ben van plan om komende maand minder eieren eten of verwerken in recepten

Ik ben van plan om komende maand vaker eten te kopen wat biologisch is verbouwd

Ik ben van plan om komende maand vaker eten kopen wat lokaal verbouwd is

Ik ga komende maand vaker eten kopen met minder verpakkingsmateriaal

Ik ben van plan om komende maand minder vaak eten weg te gooien. In plaats daarvan vries ik het in, eet ik het de volgende dag op, of deel ik het met anderen.

Ik ben van plan om komende maand voeding wat geïmporteerd is uit landen buiten Europa, per vliegtuig zijn vervoer of zijn gekweekt in een verwarmde kas vaker te vervangen voor seizoensgroente en – fruit uit Nederland.

Ik ben van plan om komende maand bewerkt voedsel zoals fast food, frisdrank en kant- en klaar maaltijden vaker te vervangen voor rauwe, onbewerkte voeding zoals groenten en fruit.

Ik ben bereid om meer te betalen voor mijn voeding, als ik weet dat het duurzaam is

Ik ben bereid om meer te betalen voor mijn voeding, als het een duurzaam keurmerk heeft

Ik ben bereid om meer te betalen voor een vegetarische of veganistische vleesvervanger

Ik ben bereid om meer te betalen voor een alternatief op dierlijke producten: bijvoorbeeld melk, kaas, yoghurt, kwark

### *Veganistisch*

Ik wil vaker biologisch eten

Ik wil vaker voedingswaren eten die lokaal verbouwd zijn.

Ik wil vaker eten kopen met minder verpakkingsmateriaal

Ik wil minder vaak eten weggooien

Ik wil vaker seizoensgroente en -fruit eten.

Ik wil minder bewerkte voeding eten

Ik ben van plan om komende maand vaker eten te kopen wat biologisch is verbouwd

Ik ben van plan om komende maand vaker eten kopen wat lokaal verbouwd is

Ik ga komende maand vaker eten kopen met minder verpakkingsmateriaal

Ik ben van plan om komende maand minder vaak eten weg te gooien. In plaats daarvan vries ik het in, eet ik het de volgende dag op, of deel ik het met anderen.

Ik ben van plan om komende maand voeding wat geïmporteerd is uit landen buiten Europa, per vliegtuig zijn vervoer of zijn gekweekt in een verwarmde kas vaker te vervangen voor seizoensgroente en – fruit uit Nederland.

Ik ben van plan om komende maand bewerkt voedsel zoals fast food, frisdrank en kant- en klaar maaltijden vaker te vervangen voor rauwe, onbewerkte voeding zoals groenten en fruit.

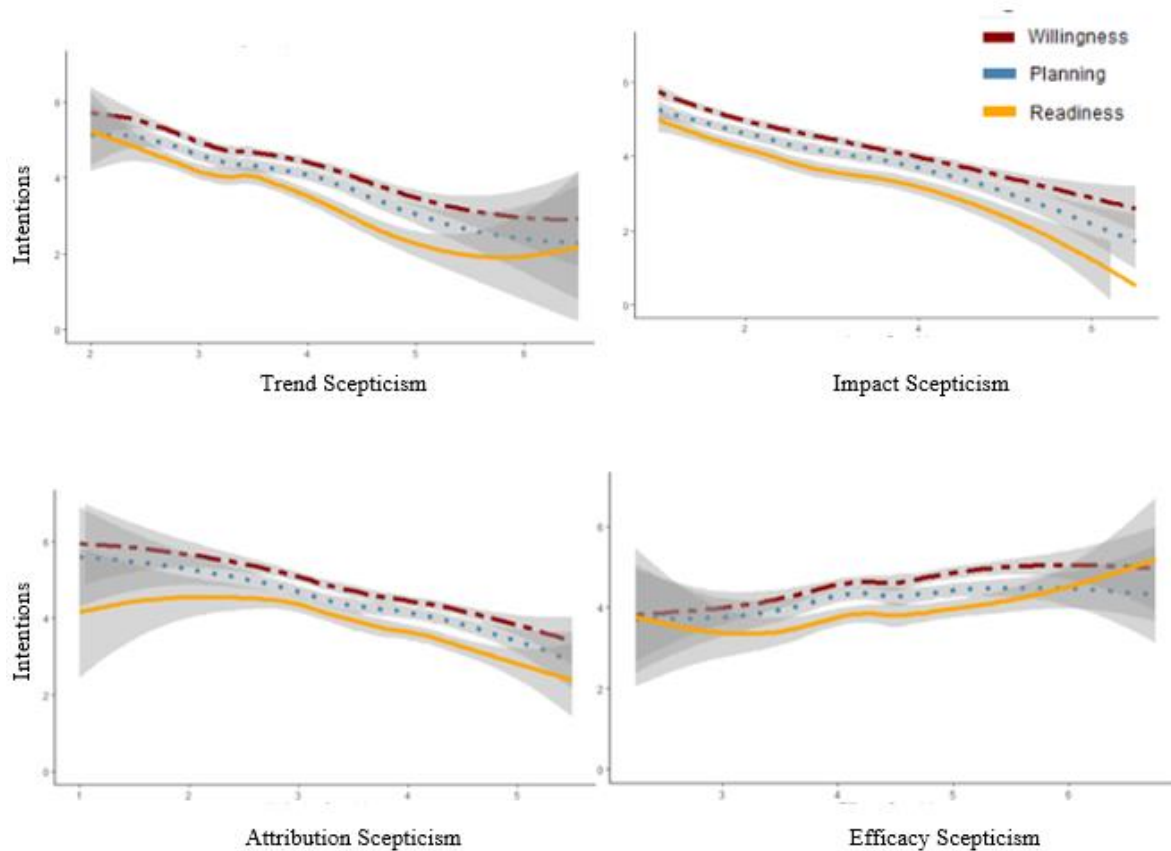
Ik ben bereid om meer te betalen voor mijn voeding, als ik weet dat het duurzaam is

Ik ben bereid om meer te betalen voor mijn voeding, als het een duurzaam keurmerk heeft

Ik ben bereid om meer te betalen voor een vegetarische of veganistische vleesvervanger

Ik ben bereid om meer te betalen voor een alternatief op dierlijke producten: bijvoorbeeld melk, kaas, yoghurt, kwark

## Appendix 5: Figure Statistics



Trend/willingness: The effect of trend scepticism on willingness is statistically significant and negative (beta = -0.76, 95% CI [-0.86, -0.66],  $t(538) = -14.39$ ,  $p < .001$ )

Trend/planning: The effect of trend scepticism on planning is statistically significant and negative (beta = -0.77, 95% CI [-0.89, -0.64],  $t(538) = -12.14$ ,  $p < .001$ )

Trend/readiness: The effect of trend scepticism on readiness is statistically significant and negative (beta = -0.92, 95% CI [-1.08, -0.76],  $t(538) = -11.19$ ,  $p < .001$ )

Impact/willingness: The effect of impact scepticism on willingness is statistically significant and negative (beta = -0.55, 95% CI [-0.61, -0.49],  $t(538) = -19.18$ ,  $p < .001$ )

Impact/planning: The effect of impact scepticism on planning is statistically significant and negative (beta = -0.54, 95% CI [-0.61, -0.47],  $t(538) = -15.20$ ,  $p < .001$ )

Impact/readiness: The effect of impact scepticism on readiness is statistically significant and negative (beta = -0.63, 95% CI [-0.72, -0.53],  $t(538) = -13.13$ ,  $p < .001$ )

Attribution/willingness: The effect of attribution scepticism on willingness is statistically significant and negative (beta = -0.62, 95% CI [-0.73, -0.51],  $t(538) = -10.88$ ,  $p < .001$ )

Attribution/planning: The effect of attributions scepticism on planning is statistically significant and negative (beta = -0.61, 95% CI [-0.74, -0.48],  $t(538) = -9.14$ ,  $p < .001$ )

Attribution/readiness: The effect of attribution scepticism on readiness is statistically significant and negative (beta = -0.68, 95% CI [-0.86, -0.51],  $t(538) = -7.82$ ,  $p < .001$ )

Efficacy/willingness: The effect of efficacy scepticism on willingness is statistically significant and positive (beta = 0.33, 95% CI [0.19, 0.47],  $t(538) = 4.60$ ,  $p < .001$ )

Efficacy/planning: The effect of efficacy scepticism on willingness is statistically significant and positive (beta = 0.20, 95% CI [0.03, 0.36],  $t(538) = 2.36$ ,  $p < .05$ )

Efficacy/readiness: The effect of efficacy scepticism on readiness is statistically significant and positive (beta = 0.32, 95% CI [0.11, 0.54],  $t(538) = 3.03$ ,  $p < .01$ )

### Appendix 6: Table Statistics

Table 3. Main Effect of Article condition on SBI and Interaction Effect of Article condition x Scepticism on SBI

Subgroup	Article	Scale				
		Willingness	Planning	Readiness	Willingness plantbased food	
Gender	Male	Hope	Eff* - (1)			
		Empowerment			Trd* + (2)	
		Hope+Emp	Eff* - (3)	Trd** + (4), Att** + (5), Eff** - (6)		
Diet	Omnivore	Hope+Emp				
	Flexitarian	Empowerment		Trd** + (7)	Main**- (17)	
Age	20-29	Empowerment		Main**- (8)		
		30-39	Empowerment		Att** + (9)	
		Hope+Emp			Att** + (10)	
	60-69	Hope	Main*+ (18)			
		Empowerment			Main* - (11)	Eff* - (12)
		Hope+emp	Eff* - (13)		Eff** - (14)	Eff** - (15)
	70+	Empowerment			Att* - (16)	

*Note*

\* =  $p < .10$ , \*\* =  $p < .05$ . Trd = trend, Imp = impact, Att= attribution, Eff=efficacy. + = positive effect, - = negative effect. Main= main effect of article condition (vs. control group) on intention

- (1) The interaction effect of article [hope] and efficacy scepticism on SBI is statistically non-significant and negative (beta = -0.67, 95% CI [-1.22, -0.12],  $t(250) = -2.40$ ,  $p > .05$ )
- (2) The interaction effect of article [empowerment] and trend scepticism on SBI is statistically non-significant and positive (beta = 0.58, 95% CI [0.12, 1.05],  $t(250) = 2.47$ ,  $p < .10$ )
- (3) The interaction effect of article [hope and empowerment] and efficacy scepticism on SBI is statistically non-significant and negative (beta = -0.68, 95% CI [-1.21, -0.15],  $t(250) = -2.52$ ,  $p > .05$ )

- (4) The interaction effect of article [hope and empowerment] and trend scepticism on SBI is statistically significant and positive (beta = 0.75, 95% CI [0.27, 1.23],  $t(250) = 3.05$ ,  $p < .01$ )
- (5) The interaction effect of article [hope and empowerment] and efficacy scepticism on SBI is statistically significant and negative (beta = -0.89, 95% CI [-1.50, -0.27],  $t(250) = -2.81$ ,  $p < .01$ )
- (6) The interaction effect efficacy scepticism on article [hope and empowerment] and efficacy scepticism is statistically significant and negative (beta = -0.89, 95% CI [-1.50, -0.27],  $t(250) = -2.81$ ,  $p < .01$ )
- (7) The interaction effect of article [hope and empowerment] and trend scepticism on SBI is statistically significant and positive (beta = 0.71, 95% CI [0.22, 1.21],  $t(261) = 2.81$ ,  $p < .01$ )
- (8) The effect of article [hope] on SBI is statistically significant and negative (beta = -1.34, 95% CI [-2.34, -0.34],  $t(65) = -2.62$ ,  $p < .05$ )
- (9) The interaction effect of article [empowerment] and attribution scepticism on SBI is statistically significant and positive (beta = 1.61, 95% CI [0.56, 2.66],  $t(87) = 3.01$ ,  $p < .01$ )
- (10) The interaction effect of article [hope and empowerment] and attribution scepticism on SBI is statistically significant and positive (beta = 1.70, 95% CI [0.47, 2.93],  $t(87) = 2.71$ ,  $p < .01$ )
- (11) The effect of artikel [empowerment] is statistically non-significant and negative (beta = -0.91, 95% CI [-1.66, -0.15],  $t(102) = -2.35$ ,  $p > .05$ )
- (12) The interaction effect of article [empowerment] and efficacy scepticism on SBI is statistically non-significant and negative (beta = -1.47, 95% CI [-2.69, -0.26],  $t(98) = -2.38$ ,  $p > .05$ )
- (13) The interaction effect of article [hope and empowerment] and efficacy scepticism on SBI is statistically non-significant and negative (beta = -0.68, 95% CI [-1.21, -0.15],  $t(250) = -2.52$ ,  $p > .05$ )
- (14) The interaction effect of article [hope and empowerment] and efficacy scepticism on SBI is statistically significant and negative (beta = -1.70, 95% CI [-2.93, -0.47],  $t(98) = -2.72$ ,  $p < .01$ )
- (15) The interaction effect of article [hope and empowerment] and efficacy scepticism on SBI is statistically significant and negative (beta = -1.76, 95% CI [-2.90, -0.61],  $t(98) = -3.01$ ,  $p < .01$ ; Std. beta = -0.79, 95% CI [-1.30, -0.28])
- (16) The interaction effect of article [empowerment] and attribution scepticism on SBI is statistically non-significant and negative (beta = -1.66, 95% CI [-3.01, -0.30],  $t(42) = -2.40$ ,  $p > .05$ )
- (17) The effect of article [empowerment] is statistically significant and negative (beta = -0.90, 95% CI [-1.37, -0.42],  $t(241) = -3.70$ ,  $p < .001$ )
- (18) The effect of article [1] is statistically non-significant and positive (beta = 0.75, 95% CI [0.16, 1.35],  $t(90) = 2.48$ ,  $p > .05$ )

## **Apendix 7: Syntax**

Statistical analyses were conducted with R and thus the syntax is saved in a R Markdown file. The syntax is attached externally.