ANALYSIS OF REASONS FOR INDIVIDUALS' INACTION TO LIMIT CLIMATE CHANGE

RECOMMENDATIONS FOR STRATEGIES FOR CLIMATE CHANGE COMMUNICATORS

M. SC. ENVIRONMENTAL AND RESOURCE MANAGEMENT, 2018

UNIVERSITY OF SOUTHERN DENMARK, ESBJERG

MASTER THESIS

Katharina Herwig 461191 [redacted]

Supervisors:
Associate Professor Lars Ravn-Jonsen, University of Southern Denmark Esbjerg, Department of Environmental and Business Economics & Associate Professor Mette Hedegaard Thomsen, Aalborg University Esbjerg, Department of Energy Technology

Esbjerg, June 2nd 2020

SYDDANSK UNIVERSITET
UNIVERSITY OF SOUTHERN DENMARK

AALBORG UNIVERSITET

Solemn Declaration

I hereby solemnly declare that I have personally and independently prepared this master thesis. All quotations in the thesis have been marked as such, and the thesis or considerable parts of it have not previously been subject to any examination or assessment.

Esbjerg, June 2nd 2020

Abstract

Climate change is the biggest challenge of current generations, effecting every single individual. Research has found various factors influencing the extent to which individuals take action to limit climate change and a significant potential for communication to evoke greater action. In this context, climate change action is defined as any action undertaken to lower one self's climate change impact or influence overall climate change impacts. This study aims to identify recommendations for effective communication strategies to increase the extent of climate change action individuals take by first identifying reasons for climate change inaction among individuals. Building on existing work, reasons for climate change inaction among individuals that know, and are aware about climate change and adequate communication provoking greater action are further explored through quantitative and qualitative research.

Based on the current state of scientific literature an online questionnaire was distributed, and later interviews were held to gain an in depth understanding for climate change inaction among individuals that know and are aware of climate change. Analysis of the responses leads to the conclusion that increasing the degree of knowledge and already small changes in wording, will increase individuals' extent of climate change action. Additionally, messages should emphasize positive consequences of actions to limit perceived threat and induce a change in habits, and the impacts of climate change should be localised and personalised. Moreover, the provision of transparency about the climate change impact of actions and products is also recommended, which could be provided by labels. Simultaneously, the use of social media platforms for climate change action communication should be increased as well as communication by educators. Overall, communication strategies should also be designed to encourage conversations among individuals and to strengthen social norms around climate change action. Further research is needed to identify other factors influencing climate change action and to explore the effectiveness of the recommended climate change action communication.

Table of Contents

List of Figures

1 Introduction

Climate change is recognised as the currently most significant, anthropogenically-instigated, global environmental challenge with serious and extensive consequences for humans and the environment (Lorenzoni & Nicholson-Cole, 2007; Whitmarsh, 2011). It is past question that, in industrialized nations, individuals contribute to climate change through high-carbon ways of life (Ortega-Egea, García-de-Frutos, & Antolín-López, 2014; Semenza, et al., 2008).

Individuals' engagement in mitigation activities, also hereafter referred to as climate change action, is therefore recognized as critical to achieving a low-carbon paradigm, to limit the further increase in global average temperature (Lorenzoni & Nicholson-Cole, 2007; Ortega-Egea, García-de-Frutos, & Antolín-López, 2014; Semenza, et al., 2008; Whitmarsh, Seyfang, & O'Neill, 2011).

Though communication about climate change, especially media coverage, has overall increased over the last decades, and significantly raised individuals' awareness about the problem, it has typically failed to evoke permanent and consequent climate change action (Howell, 2011; Lorenzoni & Nicholson-Cole, 2007; Ortega-Egea, García-de-Frutos, & Antolín-López, 2014).

This thesis aims to present reasons for climate change inaction in individuals who know about climate change, to derive recommendations for climate change communication that effectively evoke greater and permanent climate change action.

Therefore, the second chapter presents findings in literature about social-psychological factors influencing climate change action and examples of types of climate change action to be undertaken by individuals. Some of the social-psychological factors include the degree of knowledge someone holds over the issue, their belief in, and attitude towards the issue, as well as the

influence of decision-making processes, including numerous biases and the perception of risk related to climate change.

The third chapter then presents findings of literature related to the effective communication about climate change and climate change action and both, communicators and platforms that are found of great importance, and the storytelling around climate change and climate change action are presented. Findings on storytelling particularly emphasize the importance of framing, influence of emotions and challenges in the communication about greenhouse gases. The figure below shows the interrelation of climate change action and respective communication, as explained in detail in the respective chapters.

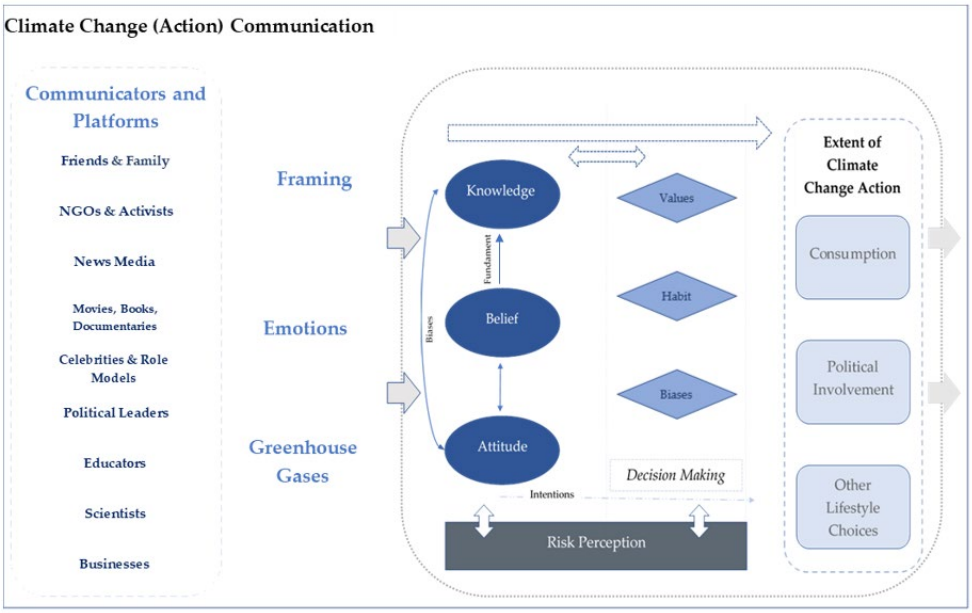


Figure 1: Interrelation of Climate Change Action and Respective Communication, own figure.

To identify reasons for inaction beyond those found in literature and explore the climate change knowledge-action gap of individuals, a questionnaire was designed, and respective data analysed, presented in chapter four. Some of the findings include the influence of the degree of knowledge and certainty about climate change, the importance of educational institutions in communication and interference of optimism bias on climate change action.

Described in the fifth chapter and based on the findings from the questionnaire, additional interviews were then conducted to explore further reasons for inaction. Within the scope of the interviews, a particular importance of communication among friends, families and colleagues, the influence of creating a social media environment inspiring climate change action, and the dire need for greater transparency and accessibility of climate change impact related information of products and actions was identified of importance for greater climate change action.

Lastly, findings on the reasons for climate change inaction and action as well as important climate change communicators and platforms, of both, the questionnaire and interviews are combined, compared to findings in literature and recommendations for actions presented.

2 Climate Change Action

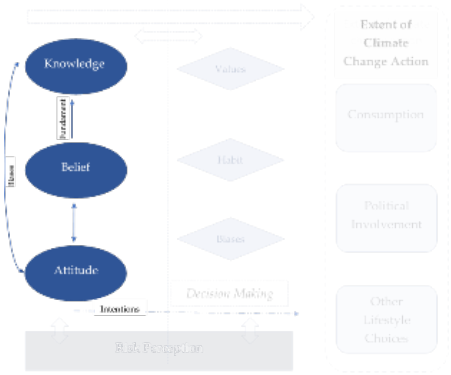
The social-psychological factors influencing climate change action are numerous and the extent to which individuals can take climate action is broad. This chapter first highlights some of the most influential social-psychological factors found in literature, including the degree of relevant knowledge, belief and attitude, interlinked decision-making processes and the perception of risk. The second part of the chapter presents findings of literature on the different types of climate change action individuals may take, including different consumption choices, various measures of political involvement and other lifestyle factors, such as the choice of workplace and employer.

2.1 Social- Psychological Factors

Climate change action is influenced by various co-dependant and interrelated social-psychological factors. This subchapter therefore presents current findings in literature on limitations on the extent of climate change action and respective important influential factors. It is significant to mention that research on factors influencing individuals' climate change actions is limited and often combined with general pro-environmental behaviour,

country specific and reflective of western culture, often contradicting, and in need of further research.

2.1.1 Degree of Knowledge, Belief and Attitude



While the degree of knowledge about, someone's belief in, and attitude towards climate change are all interrelated and influence other, they are also all found to be factors influencing someone's climate change action to certain extends.

Figure 2: Knowledge, Belief and Attitude and climate change action, own figure.

Knowledge

Research on the direct influence of knowledge on climate change action is rather limited and found to contradict each other in findings. However, generally, the knowledge about climate change and its causes is found to have shifted throughout the years and has, overall, increased with the amount of research and media attention (e.g. (Carlson, Grove, Kangun, & Polonsky, 1996; Franzen & Vogl, 2013; Givens & Jorgenson, 2011; Hadler & Haller, 2013; Kilbourne, McDonagh, & Prothero, 1997; Marquart-Pyatt S. , 2015; Sheehan & Atkinson, 2012; Zinkhan & Carlson, 1995)). However, cross-national studies present a great variation in levels of knowledge across and within developing and industrialized nations (e.g. (Diekmann & Franzen, 1999; Fairbrother, 2013; Franzen & Meyer, 2010; Franzen & Vogl, 2013; Gelissen, 2007; Marquart-Pyatt S. T., 2007; Marquart-Pyatt S., 2008; Marquart-Pyatt S. , 2015; Nawrotzki, 2012)).

Moreover, knowledge can be understood and defined differently and vary in its validity, especially within the context of self-reported quantitative and qualitative research (Kvale, 1995). Most studies on climate change knowledge only examine one (e.g., (Gambro & Switzky, 1999; Leeming, Dwyer, & Bracken, 1995; Moore, Murphy, & Watson, 1994) or, at most, two forms of knowledge (e.g. (Hines, Hungerford, & Tomera, 1986/87; Schahn & Holzer, 1990; Schultz P. , 2002), while a Swiss study in 2004 came to the conclusion

that three types of knowledges should be considered when examining someone's climate change behaviour. The study suggests that, before an individual can act to limit global warming, they must have an understanding of the natural states of ecosystems and the processes within them (system knowledge), know what can be done about environmental problems (action-related knowledge), and know about the benefit (effectiveness) of environmentally responsible actions. While the research emphasizes the impact of interrelation between the different forms of knowledge, knowledge on the effectiveness is found to influence individuals' environmental behaviour the most (Frick, Kaiser, & Wilson, 2004).

Adding to that, various studies also propose that simply knowing about climate change is not enough to generate behavioural response in individuals (e.g. (Bang, Ellinger, Hadjimarcou, & Traichal, 2000; Bostrom, Morgan, Fischhoff, & Read, 1994; Jensen, 2002; Kempton, Boster, & Hartley, 1995; Kollmuss & Agyeman, 2002; Reynolds, Bostrom, Read, & Morgan, 2010)). In their comparative study with respondents in 2009 and 1992, Reynolds, Bostrom, Read, & Morgan (2010) also specifically found that, when it came to their own contribution to climate change, respondents were overall struggling to draw a connection. Furthermore, though greatly under-researched, more recent literature indicates a great potential in the understanding of oneself as a causal agent in climate, positively influencing overall pro-environmental behaviour (Tasquier & Pongiglione, 2017).

Belief

Being a fundamental component of knowledge, a belief is an idea that an individual holds as being true (Heimlich, Mony, & Yocco, 2013; Rokeach M. , 2000). Therefore someone's belief of something as the truth is often compared to what is thought to be true by other evidence (Heimlich, Mony, & Yocco, 2013; Rokeach M. , 1968). Despite acquired knowledge, especially age and experience are found to affect what an individual believes to be true (Heimlich, Mony, & Yocco, 2013; Reeder & Brewer, 1979; Rokeach M. , 1973).

Someone's belief in climate change is found to be greatly determined by personal experiences (Ewart, Place, & Sibthorp, 2005), media coverage

(Iyengar & Kinder, 1987), and scientific evidence (Neuman, 2004). Most popular explanations for an increased public belief in global warming include the increase in publishing about the happening of global warming, advances in climate modelling, increase in personal experiences of major climatic events, such as hurricanes, or hotter temperatures, climate change documentaries and media coverage on the potential of more severe climate change impacts (Borick & Rabe, 2010).

While Mainieri, Barnett, Valder, Unipan, and Oskamp (1997) found environmental beliefs to be the strongest predictors of overall environmental behaviour, Vaino & Paloniemi (2013) found a general effect of belief on climate change action. Similarly, Inkpen & Baily (2020) found a correlation of worldview and political ideology and environmentally aware behaviour. Overall, especially the belief in self-efficacy and climate change (or pro-environmental) action effectiveness was found of great importance (Inkpen & Baily, 2020; Mainieri, Barnett, Valdero, Unipan, & Oskamp, 1997; Malandrakis, Boyes, & Stanisstreet, 2011; Swim, Markowitz, & Bloodhart, 2012; Vainio & Paloniemi, 2013)

Attitude

Attitude is generally defined as the affect someone holds over a psychological object, including a person or group of people, an abstract concept or issue, or a behaviour (Eagly & Chaiken, 1993; Fishbein & Ajzen, 1975; Thurstone, 1931). General research on the relation between attitude and behaviour often considers factors of attitude strength (Smith & Haugtvedt, 1994), situational constraints to action (Kaiser, Wölfing, & Fuhrer, 1999; Kaiser & Keller, 2001) and the consideration of intention as a possible mediator of the linkage (Bamberg & Schmidt, 2003; Fishbein & Ajzen, 1975).

It is widely acknowledged as a major proximal factor for ecological intention and behaviour in the environmental literature, including climate change action (Bamberg & Moser, 2007; Kaiser, Wölfing, & Fuhrer, 1999; Ortega-Egea, García-de-Frutos, & Antolín-López, 2014). While some studies have found a significant, moderate association between attitude and pro-environmental behaviour (Bamberg & Moser, 2007; Hines, Hungerford, &

Tomera, 1986/87), the general empirical evidence has been mixed for attitudinal associations with behaviour, complying with a widely reported attitude–action gap (Lorenzoni & Nicholson-Cole, 2007; Ortega-Egea, García-de-Frutos, & Antolín-López, 2014).

One study, for example, found attitudes to be rather weak predictors of behaviour, especially in situations with a high degree of conflict between personal dispositions and situational conditions. While an individual may hold a negative attitude towards the use of fossil fuels, they may also choose to live far from their workplace and commute via an automobile with an internal combustion engine (Corraliza & Berenguer, 2000; Heimlich, Mony, & Yocco, 2013).

2.1.2 Behaviour and Decision-Making

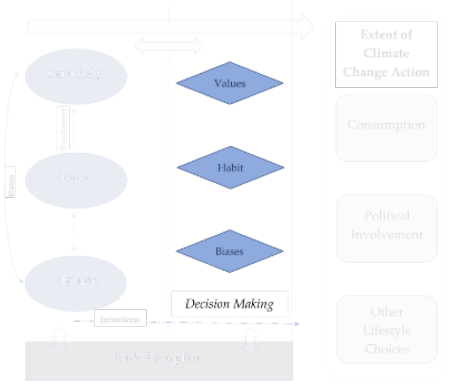


Figure 3: Decision-Making and climate change action, own figure.

Almost all attempts to improve or change things involve decision making (e.g. (Engler, Abson, & von Wehrden, 2019)). Influencing, not only in private consumption, political involvement and other lifestyle choices, understanding individuals' decision making plays a fundamental role in approaching the challenge of global climate change, due to its great determinant on people's climate change actions (Antala & Hukkinenb, 2010; Engler, Abson, & von Wehrden, 2019; Kaaronen, 2017). Findings on relevant parameters impacting decision making despite past experience (Karlsson, Juliusson, Grankvist, & Gärling, 2002), age (de Bruin, Parker, & Fischhoff, 2007), self-control problems (Elster, 1979; Gul & Pesendorfer, 2001), the degree of rationality and instinct (Engler, Abson, & von Wehrden, 2019; Hepburn, Duncan, & Papachristodoulou, 2010; Kahneman D. , 2012; Marshall G. , 2014) and personal relevance (Acevedo & Krueger , 2004; Dietrich, 2010; Hepburn, Duncan, & Papachristodoulou, 2010) are presented in more detail in the following.

Values and Culture

Values can be defined as the part of people's identities that reflect what they believe is worth aiming for, important and desirable in life (Rokeach, 1973; Schwartz, 1992). Personal and cultural values significantly influence one's behaviour (e.g. (Dietz, Fitzgerald, & Shwom, 2005; Richerson & Boyd, 2005)). Consequently, they have also been found of great influence on climate change action (Dietz, Fitzgerald, & Shwom, 2005). The identification with subcultural groups, for instance, is found to influence one's climate change belief and attitude (e.g. (Dietz, Fitzgerald, & Shwom, 2005; Karp, 1996; Leiserowitz, 2007; Opotow & Brook, 2003; Schultz & Zelezny, 1998; Stern, Dietz, & Kalof, 1993)).

Determining environmental values are found to be shaped by a wide range of different influences that reach far beyond one's exposure to the communication about climate change (Crompton & Lennon, 2017). While different lines of research in sociology, social psychology, and political science have been addressing environmental values, especially the idea of altruism being related to environmentalism is found to be well established (Dietz, Fitzgerald, & Shwom, 2005; Merchant, 1992; Stern P. C., Dietz, Kalof, & Guagnano, 1995; Stern & Dietz, 1994).

Based on the general research on altruism, a minimum of three value bases for environmental concern have been developed: self-interest (Kallbekken & Sælen, 2011), humanistic altruism (Dietz, Fitzgerald, & Shwom, 2005), and biospheric altruism (Chung, Kang, Dietz, Jaimes, & Liu, 2019; Dietz, Fitzgerald, & Shwom, 2005; Merchant, 1992; Stern, Dietz, & Kalof, 1993; Stern & Dietz, 1994). Western cultures have historically been associated with egoistic values and the understanding of quality of life based on materialism, enabling the exploitation of natural resources (Merchant, 1992; van Egmond & de Vries, 2011). Simultaneously, biospheric values are being increasingly correlated with pro-environmental behaviours (Clark, Kotchen, & Moore, 2003; Fujii, Gärling, Jakobsson, & Jou, 2004; Schultz P. W., 1998; Stern & Dietz, 1994).

Generally, very few can be said about the exact causes of value change as well as the overall effects of value change on climate change action (e.g. (Dietz, Fitzgerald, & Shwom, 2005)). Additionally, as for the research on attitude-action relation already, most studies about individual environmental values are limited to questionnaires and self-reporting, rather than direct observations of environmentally consequential behaviour. Whereby the values are most commonly related to either concrete behaviours, indicators of behavioural intentions (someone's willingness to do something) and other expressions of concern for the environment (Dietz, Fitzgerald, & Shwom, 2005).

Habits

Habits might easily be compared with a behavioural momentum or a stability of action (James, 1890). In terms of climate change, habitual behaviour is one of the reasons preventing change (Swim, et al., 2011) and is considered one of the most important obstacles to be overcome to minimise global average warming and its impacts (Hobson, 2003). While some habits can slowly be changed, such as the use of seat belts, many others are extremely resistant to permanent change, including eating habits (Maio, Haddock, & Jarman, 2007), which present a great chance of individual climate action (Bruno, et al., 2019). For many people, behaviours defining their contribution to climate change, such as the use of cars, are based in habits and therefore difficult to change (Aarts & Dijksterhuis, 2000; Bamberg & Schmidt, 2003; Klöckner, Ellen, & Hunecke, 2003; Loukopoulos, Jakobsson, Gärling, Meland, & Fujii, 2006), however, not impossible (Matthies, Klöckner, & Preißner, 2006).

Cognitive biases

Cognitive biases are repeated patterns of thinking that may lead to inaccurate or unreasonable conclusions, helping individuals make potentially quicker decisions (Kahneman, Gilovich, & Griffin, 2002). Out of the numerous cognitive biases psychologists have identified to be shared by the human population, a few are particularly important when explaining why humans lack in acting on climate change (Caverni, Fabre, & Gonzalez (eds.), 1990; Engler, Abson, & von Wehrden, 2019; Marshall G. , 2014).

Hyperbolic discounting

Hyperbolic discounting reflects one's perception that the present is more important than the future. It refers to people's propensity to prefer a smaller-sooner reward over a larger-later reward (Grüne-Yanoff, 2015). This bias complicates action to address more distant-feeling, slower and complex challenges, such as climate change action (Hepburn, Duncan, & Papachristodoulou, 2010; Karpa & Tsur, 2011; Partha, 2008; Rubinstein, 2003).

The bystander effect

The bystander effect can most effectively be described by the phenomenon that can be observed when a group of individuals is confronted with a common problem, leading to inaction of every member, based on the assumption that someone else will take, or is already, taking care of it (Darley & Latane, 1968). This effect tends to be stronger, the larger the group (Hortensius & Gelder, 2014; Marshall G. , 2014; Seifert, Krannich, & Guenther, 2019). In regard to climate change, it is found to lead to the assumption that leaders, or other individuals, are doing something about the crisis of global average warming, so one doesn't have to act themself (Marshall G. , 2014; Seifert, Krannich, & Guenther, 2019).

Confirmation bias

Confirmation bias is the tendency to actively choose the evidence that can support one's existing knowledge, attitudes, and beliefs. By doing that, individuals create a pattern, which, when encountering new information, leads to a modification of the information in order to fit into the pattern (Greitemeyer, Fischer, Frey, & Schulz-Hardt, 2009; Lord, Ross, & Lepper, 1979). Individuals who believe in climate change are therefore more likely to say that it's been warmer lately, for instance (Corner, Whitmarsh, & Xenias, 2012; Marshall G. , 2014; Öhlmér, Olson, & Brehmer, 1998).

Availability bias

Availability bias leads individuals to evaluate a topic, concept, method, or decision based on the evidence that is most available to them. Individuals therefore tend to greatly overestimate the dangers of recent events and neglect those imposed by distant factors or those they haven't yet

experienced (Kahneman & Tversky, 1979; Kahneman, Gilovich, & Griffin, 2002). Projected onto weather extremes, availability bias leads to the focus on the most recent event, therefore missing the longer trend by including each successive extreme weather event into their status quo, which then become the new baseline against which one measures change (Marshall G. , 2014).

Status quo bias

Another reason many people find it so difficult to adapt more climate change action, is due to the so-called status quo error. If there are many alternatives, people tend to stick to the ones they had chosen from the start, impeding change (Geng, 2016; Marshall G. , 2014; Samuelson & Zeckhauser, 1988).

Optimism bias

Optimism bias explains individuals' tendency to assume that one faces lower risks than others do (Kahneman & Tversky, 1979). Consequently, research finds an almost universal belief among the public that the environment in someone's own area is under better condition than elsewhere (Beattie, Marselle, McGuire, & Litchfield, 2017; Gifford, et al., 2009; Kahneman & Riepe, 1998) and the risk for overall society greater than the personal risk (Bord, O'Connor, & Fisher, 2000; Leiserowitz, 2005; Tyler & Cook, 1984).

Framing effect

Generally presented as one of the strongest in affecting decision-making processes in literature, and the most important to regard in relation to climate change communication is the so-called framing effect. Depending on how the same information is presented and its elements emphasized, individuals can draw different conclusions from it (Kahneman & Tversky, 2000; Marshall G., 2014). Related to the framing effect is the endowment effect, inflicting individuals to value a good higher that could be lost or given up in comparison to the same good when appearing as a potential gain (Kahneman, Knetsch, & Thaler, 1990; Strahilevitz & Loewenstein, 1998; Thaler R. , 1980).

2.1.3 Risk Perception

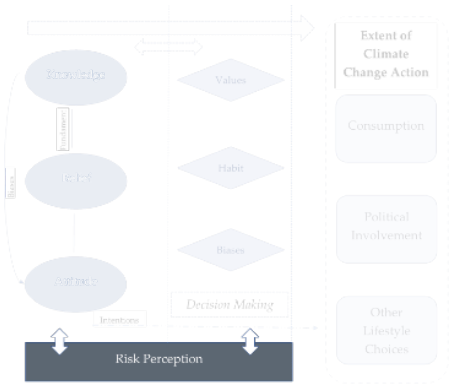


Figure 4: Risk Perception and climate change action, own figure.

Risk perception of climate change is found to be influenced by numerous cognitive factors, such as *knowledge* (Malka, Krosnick, & Langer, 2009; Milfont, 2012; Sundblad, Biel, & Gärling, 2007), *attitude* (Kobbeltved, Brun, Johnsen, & Eid, 2005; Sjöberg, 2006; Sjöberg, 1998; Smith & Leiserowitz, 2012; Sundblad, Biel, & Gärling, 2007) and *certainty of belief* (Lee, Markowitz, Howe, Ko, & Leiserowitz, 2015), *experiential factors*, including perceived residential exposure and direct personal experience (Hamilton-Webb, Naylor, Manning, & Conway, 2017), *socio-cultural factors*, in terms of one's closeness with nature or green self-identity (Mackay & Schmitt, 2019), and *socio-demographic factors,* which, similar to the ones influencing attitude and behaviour, include age and gender (Bradley, L., Chai, & Reser, 2020; Brody, Zahran, Vedlitz, & Grover, 2008; O'Connnor, Bord, & Fisher, 1999; van der Linden, 2015). Additionally, the few research on its relation suggests that the greater the extent to which climate change is viewed as a risk by someone's social referents, such as friends and family, the more someone's own risk perception intensifies (Cialdini, Kallgren, & Reno, 1991; van der Linden, 2015).

Especially its magnitude and the complexity of the problem make climate change a unique risk, as the scale (i.e. global) and timeline involved (i.e. duration over centuries) are an unprecedented combination (Breakwell, 2010; Gifford, et al., 2009; Helgeson, van der Linden, & Chabay, 2012; Weber, 2010).

Generally, while climate change has been found to be perceived as a very serious problem among individuals in the UK, Australia and the European Union (Eurobarometer, 2019; Pidgeon, 2012; Reser, Bradley, Glendon, Ellul, & Callaghan, 2012), comparable studies in China and the United States have found the concern to be much lower and more unstable (Leiserowitz, Maibach, Roser-Renouf, Feinberg, & Rosenthal, 2014; Stokes, Wike, & Carle,

2015). More broadly, individuals in developing countries generally perceive climate change as a higher risk compared to individuals in the Western World (Kim & Wolinsky-Nahmias, 2014).

A broad consensus in literature suggests that an individual's perception and judgement about climate change as a risk generally affects their motivation to act (Bradley, L., Chai, & Reser, 2020; Leiserowitz, 2007; Norgaard, 2011; O'Connnor, Bord, & Fisher, 1999; Semenza, et al., 2008; Spence, Poortinga, Butler, & Pidgeon, 2011; Spence, Poortinga, & Pidgeon, 2012; Tobler, Visschers, & Siegrist, 2012). Overall, the amount of studies indicating risk perception as an important predictor of someone's intention to contribute to a reduction of global warming are increasing. Especially recent research has shown that, though the extent remains uncertain, risk perception in relation to climate change is a predictor of climate change action and pro-environmental behaviour in general (Bradley, L., Chai, & Reser, 2020; van Valkengoed & Steg, 2019). However, the exact influence of risk perception on concrete climate change action is to be further explored.

The influence of different types of knowledges, the certainty about climate, change, the feeling of threat and further factors influencing climate change action are later explored within the scope of the questionnaire and interviews in chapter four and five.

2.2 Types of Action

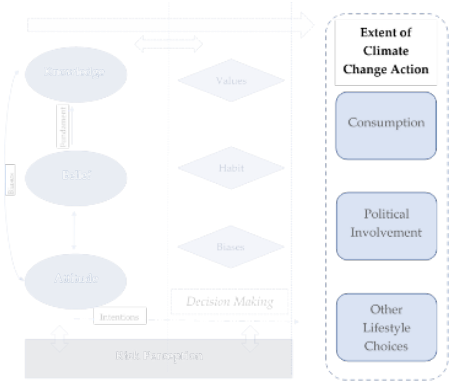


Figure 5: Extent of Climate Change Action, own figure.

There are numerous types of actions individuals can undertake to limit their contribution to climate change. This subchapter particularly highlights the influence of personal consumption on climate change, presents some instruments of political involvement, and explores other lifestyle factors such as family planning and the choice of workplace in relation to its potential for climate action.

2.2.1 Consumption

Exponential economic growth, fuelled by consumption is one of the essential driving forces of climate change and one that can very easily be controlled and influenced directly by individuals themselves (Swim, et al., 2011) and while consumerism may help satisfy basic psychological needs (Gibson, Farbotko, Gill, Head, & Waitt, 2013; Swim, et al., 2011; Zhao & Belk, 2008), it severely contributes to choices that drive climate change (Seyfang, 2009; Swim, et al., 2011; Writer, 2018).

Consumption has various meanings in the different disciplines and related communities (Stern P. , 1997), though it is often only operationalised in monetary terms with a measure of aggregate economic activity or consumer purchases when analysing driving forces of environmental impacts (Common & Stagl, 2005; Krozer, 2016; Swim, et al., 2011; York, Rosa, & Dietz, 2003), disregarding their environmental impact and the consumption of natural resources that are not assigned a monetary value (Swim, et al., 2011).

Therefore, climate change motivated general reduction of an individual's consumption on a monetary level does not always correlate with a linear decrease in the personal carbon footprint. A product purchased, for example, can be more monetary costly than the gas that is used to drive to its point of purchase, yet the drive can have more of an environmental impact than the product purchased there (Ivanova, et al., 2016; Swim, et al., 2011). An effective change in an individual's consumption, as an act of climate change action, therefore has to take the element of environmental consumption into account (McKibben, 2007).

Additionally, through changes in land use, such as deforestation, consumption does not only directly and indirectly influence the emission of greenhouse gases, but also their absorption and the direct reflectivity of the earth (Bosetti, Lubowski, & Elgar (Eds.), 2010; Recanati, et al., 2015; Stern N., 2007), which must ideally also be included when assessing the impact of consumptions on climate change (Swim, et al., 2011).

Critical Consumption and Counter-Consumerism Movements

Some individuals and groups of people are found to have made attempts to

change their behaviour according to the above-mentioned concepts. Some of which include the integration of products and actions into their life that they believe to be more sustainable, compared to previous ones (Behr, 2010; Peattie, 2010). However, often encountering the inability to assess the exact impact of a product or action (Guenther, Saunders, & Tait, 2012).

The extent of influence of counter-consumerism and critical consumption on climate change will depend on the amount of people partaking and the extent to which their altered patterns of consumption reduce greenhouse gas emissions and other climate drivers (Swim, et al., 2011). However, only adopting green patterns of consumption while retaining the same level of total consumption does not limit the degree of global warming sufficiently enough, according to literature (Alfredsson, 2004; Engler, Abson, & von Wehrden, 2019).

Therefore, individuals who practice, so-called, counter-consumerism in an attempt to reduce their environmental consumption are often found to simplify their lifestyles (Bekin, Carrigan, & Szmigin, 2005; Brown & Kasser, 2005; Craig-Lees & Hill, 2002; Lavine, 2006; Thompson, Coskuner-Balli, Deighton, & Belk (Eds.), 2007), repair, reuse or share goods, as well as create their own goods (Elgin, 2000).

2.2.2 Political Involvement

There are several ways for individuals to express their concern about global warming on a political sphere. Generally, it is found that the higher the environmental concern by someone, the bigger their political involvement for the issue (Drews & van den Bergh, 2016; Skamp, et al., 2019). In the following, recent developments in the issue's influence on election turnouts, petitions, and movements, and opportunity for individual climate action are presented.

Climate Votes

Voting can generally be linked to personal values, urgency, education, and other socio-economic factors (Rootes, 1999). Green voting is not only found to be influenced by environmental concern, but also left-wing orientation and post-materialism as attitudes (Judge, 1993).

However, especially in very recent elections, such as the election of the European Parliament in 2019, several European countries saw a notable increase in votes for parties with a strict climate-protection agenda (European Parliament, 2019). One of the countries was Germany, where the Green party experienced an increase in votes by nine percent from 11.5% to 20.5%.

In the USA, a poll in among voters in 2019 has found an increase in climate concern as an influence on their vote, with 14% of the registered voters having listed the protection of the environment and addressing climate change as their priority over all other issues. During the 2016 Presidential election, only 2-6% of registered voters indicated the same priority for the issue. Individuals wanting to vote for a better protection of the environment and a limitation of global average warming, were also found to be most motivated to vote in 2020, compared to those prioritising other issues (Environmental Voter Project, 2019; Wake, 2012).

Generally, it is found that younger voters prioritise environmental agendas the most, with higher votes for green parties among younger individuals (Cowie, Greaves, & Sibley, 2015; Maggini, 2017; Skamp, et al., 2019). In the UK, for example, a questionnaire in which 54% of participants stated that climate change will affect how they vote, found that that increased to 74% for those under the age of 25 (Carrington, 2019).

Movements, Protests and Demonstrations

Among countless other national and international climate action movements, the Fridays-for-Future movement has been particularly active among young people since 2018, with weekly demonstrations on Fridays to express climate concerns (Glenza, 2019). The movement has gained global media attention and has been encouraged by policymakers at the highest level. Especially Greta Thunberg, who was invited to give speeches at high-level global events including the United Nation's Framework Convention on Climate Change's (UN, 2019), Conference of Parties (McGrath, 2019) and the World Economic Forum (Pomeroy, 2020), repeatedly emphasized individual responsibility for emissions. Though, a key part of the protest addresses business managers

and politicians, urging managerial and political change (Fridays for Future, 2020).

Lobbyism and Environmental Organisations

Lobbyism around climate change issues is mostly influenced by big corporations and environmental protection organisations, such as Nextgen America or the World Wildlife Fund (Center for Responsive Politics, 2020) with their respective, contradicting claims and goals (Dialer & Richter, 2019; Gössling & Cohen, 2014). However, individuals can influence lobbyism to push for climate action by joining organisations who lobby for climate change action through financial support, speaking engagements or other forms of rallying (Zetter, 2011). Additionally, individuals' investment choices are also a form of lobbyism or bear the potential of lobbyist work (Poulsen, Strand, & Thomsen, 2010).

Digital Political Participation and Petitions

There are numerous forms of potential digital political participation for individuals, as the internet is found to be increasingly important for political and social change (de Marco, Antino, & Morales, 2012).

Though limited in its influence, petitions, especially online-petitions, are currently a common way in democratic countries, to seek attention from political leaders on a certain issue and press for political agendas (Berg, 2017; Dunlap & McCright, 2010). In addition to petitions as a form of eParticipation, individuals can also join discussion forums to express their ideas and share their values and interests, potentially influencing other people's ideas and values, but also directly communicating with their political representatives, especially on a local level (Trampuš, Sen, Stojanović, & Grobelnik, 2012).

2.2.3 Other Lifestyle Factors

There are numerous other ways individuals perform climate change action, of which some are presented in the following.

Family planning

Though controversially discussed (Vidal, 2015), family planning is one way

to influence the emission of greenhouse gases, as a growing global population is one of the biggest challenges related to climate change (Meadows, Randers, & Meadows, 2004; Swim, et al., 2011; Rieder, 2016). One of the places where environmental concern of potential parents is suspected to influence family planning is the UK, where birth rates are overall decreasing (Swerling, 2019).

Workplace

Another, less controversial and emotional decision that influences one's contribution to greenhouse gas emissions is the choice of workplace (Sadiq, Ollier, & Tyler, 2016). While a lack of literature on the topic must be noted, by working for a company, or choosing a particular occupation, one generally contributes towards its success and supports its related practices in terms of human capital (Ingham, 2007).

Overall, especially changes in attitude towards more climate friendly consumption behaviour, but also political involvement and further lifestyle factors, often fail to translate into actual behaviour (Aertsens, Verbeke, Mondelaers, & Van Huylenbroeck, 2009; Babutsidze & Chai, 2018; Beattie & McGuire, 2016; Röös & Tjärnemo, 2011), contributing to a flawed prediction of marketplace behaviour (Ajzen, 2001; Kraus, 1995).

Findings within the scope of the questionnaire (chapter four) and interviews (chapter five) later allow further insight into the feasibility, limitations to, and popularity of here within identified potential, and further types of climate change action.

3 Climate Change Action Communication

Communication aimed at changing individuals' perception of climate change related issues, and influencing one's degree of action to limit greenhouse gas emissions, in this thesis referred to as climate change action communication, has been strongly influenced by a variety of different communicators across various communication platforms through many different forms of storytelling, as visualised in figure 6 below.

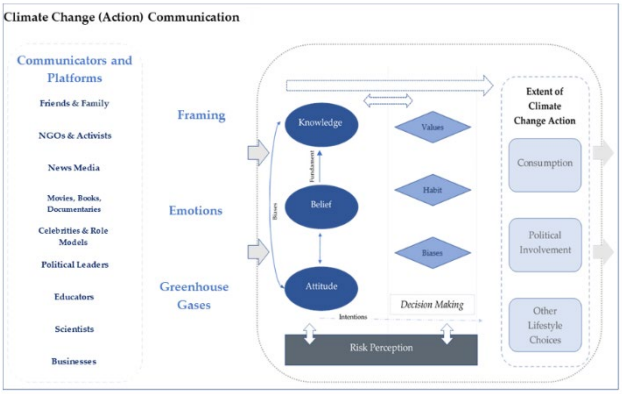


Figure 6: Climate Change (Action) Communication in relation to Climate Chang Action, own figure.

Out of the various means of communication, a few, found of particular importance in regard to climate change action communication, are presented in more detail in the first part of this chapter. The second part of the chapter illustrates the importance of framing in climate change action communication and the potential of emotional storytelling. Lastly it highlights the specific challenges the communication about greenhouse gases poses.

3.1 Communicators and Platforms

The way climate change related information is communicated is found to be greatly influential on someone's knowledge, belief, attitude, and perception of related risks (Carlton, et al., 2016; Hagen, 2013). The communicators themselves, are hereby found to also greatly influence the perception and processing of the message (Attari, Krantz, & Weber, 2019). Whether the communicators presented in the following communicate about its sheer existence, its causes and someone's particular contribution to it, its impacts or effects, or concrete measures of climate change action, communicators send a message, even by not talking about it (Marshall G. , 2014; Priest, 2016).

Despite introducing some of the communicators, this subchapter presents findings in literature of their importance and particular influence on climate change perception, as well as their potential for mobilisation to greater climate change action, while highlighting a spectrum of platforms available to the different communicators.

3.1.1 Friends and family

The discussion of climate change and related concerns with family and friends was rather recently discovered to be a significant predictor of climate

change behaviour, and the few research on its relation suggests that the greater the extent to which climate change is viewed as a risk by someone's social referents, such as friends and family, the more someone's own risk perception intensifies (Ojala & Bengtsson, 2019; Stevenson & Bondell, 2016; Valdez, Peterson, & Stevenson, 2018; van der Linden, 2015). Friends and family are part of individuals' social group and influence their social identity, having the potential to shape their values, believes and attitudes (Turner & Oakes, 1986). Thus, communication about climate change with one's family, friends, and peers may have far more influence on their attitude and behaviour than the warnings of experts, for example (Kahan, Jenkins-Smith, & Braman, 2011; Marshall G. , 2014).

Especially those individuals who are in doubt about climate change and its impacts, are strongly looking at the views of family members and friends for guidance on the issue (Holmes & Star, 2018).

3.1.2 Environmental Organisations and Activists

Despite many governmental organisations, there are also numerous non-governmental environmental organisations with climate change related topics on their agenda, aimed at individuals, policy makers, businesses and other focus groups (Berkley Library, 2020). Despite providing governments and policy makers with expertise and information (Pandey, 2015), climate change organisations also communicate their interest to the general public through organised protests, sponsored campaigns and advertised partnerships with businesses, either self-reporting on their own platforms and channels on social media platforms, or by gaining the attention from the general media, reporting on them and their interests (Vogler, 2011).

3.1.3 News Media

Global news media in its function as an authoritative version of everyday reality is specialised in generating consciousness for the individuals they reach (Gitlin, 2013), thus giving the news media the ability to set the world climate-change agenda and influence global climate change action decision-making processes, as well as attitudes (Shehata & Hopmann, 2012). Though, traditional media such as newspapers, magazines, and network television

news continue to be influential and remain central to the provision of public information, not only regarding climate change (Carvalho, 2010; Evans, Dyll, & Teer-Tomaselli, 2018), their competition for people's attention and trust is increasing. Especially print media has been through many years of declining presence and influence (Priest, 2016) with the increasing influence of social media and online news (Pew, 2019; Priest, 2016). US Americans, for example, are just as likely to use internet-based sources as a primary source of information, as they are to rely on television (Su, Akin, Brossard, Scheufele, & Xenos, 2015). Such shift in dynamic from a rather passive consumption of news to this multi-layered dynamic of active and real-time communication with not only friends and family, but complete strangers, globally, has changed the nature of information transfer greatly (Lewandowsky, Cook, Fay, & Gignac, 2019).

In a study on TV news, Lester and Cottle (2009) found that the perception of climate change as a global crisis would have not been achieved without the media images symbolizing the harmful impacts of climate change on people, communities, and environments globally.

3.1.4 Movies, Books and Documentaries

Despite the described influence of news media, media overall is generally found to have a determining influence on its audience (Ruddock, 2000), especially in the context of climate change (Swain, 2012). A study in the UK, examining the impact of the fictional disaster film *The Day After Tomorrow* on its viewers, found the majority of participants to confirm that the film inspired them to find further information on climate change and possible personal contributions, concluding the general likelihood of long-term impact (Cortese, 2018; Lowe, et al., 2006).

However, overall, little research examining the representation of climate change in documentaries and fictional films has been done so far (Hansen & Machin, 2013; Hansen & Cox, 2015; O'Neill & Smith, 2014), and even fewer research has been carried out analysing how the images presented are constructed and produced (Hansen & Machin, 2013; O'Neill & Smith, 2014). Documentaries often highlight the devastating impacts climate change is

having and will continue to have, some shed light on the impacts of fossil fuel or energy companies, providing documentation of lobbyism against climate change action, or political dynamics or scandals around the issue, though very few give direct guidance to the audience on how to reduce their greenhouse gas emissions. A study carried out in 2019, examined the participants' change in belief in climate change and motivation to take action against climate change, after watching the documentary series *Years of Living Dangerously*. The results demonstrate that documentary storytelling can generate individual's concern and desire to take action. However, while most participants felt concerned about climate change after watching the episodes and expressed a desire to do something about it, very few thought they had the ability to impact climate change or expressed intent to take concrete action. The study also identified the provision of more information about outcomes of actions, description of actions that individuals should take to address climate change, perceptions of collective action, and emotional responses as the greatest potential to influence greater climate change action (Bieniek-Tobasco, et al., 2019).

While there are many educational books addressing the issue of climate change in many relations, often including a model that projects consequences of climate change in the future (Rebolini, 2019), very few fictional and emotional stories address the issue, of which many only provide a storyline far from a realistic scenario (Johns-Putra, 2019). While no study was found to sufficiently explain the relation between reading climate action novels and climate change action, a qualitative questionnaire of 161 US American readers of climate fiction shows that climate fiction can be quite effective at enabling or compelling readers to imagine potential futures and the fragility of human societies and ecosystems (Schneider-Mayerson, 2018).

3.1.5 Celebrities and Role Models

Being famous, celebrities define aspirational lifestyles and desirable consumption for a large media followership (Hanna, Kantenbacher, Cohen, & Gössling, 2018), having considerable influence on consumer culture, the formation of social identity, and social norms (Cohen, Higham, Gössling, Peeters, & Eijgelaar, 2016; Marshall P. , 1997). Especially social media has

proven to be particular important in the process, as the opportunity for frequent and, in terms, personal communication allows celebrities to appear as "immediate strangers" (Schickel, 2000). Compared to earlier decades, where celebrities were more so associated with brands (McCracken G. , 1989), they now represent specific lifestyles, for which they act as role models, especially influencing young people (Gountas, Gountas, Reeves, & Moran, 2012).

With rising public awareness of climate change, celebrities have become increasingly important actors, influencing discourse and action. Celebrities partaking in climate change advocacy include public intellectuals and figures, musicians, actors, politicians, businesspeople, athletes (Boykoff & Goodman, 2009), and more recently also student climate activists (Gössling, 2019).

However, Jordan, Sommers, Bloom, and Rand (2017) affirm that individuals disapprove of hypocrites and place more trust in scientists than in celebrities (Anderson, 2011), raising the question of effectiveness of celebrity climate advocacy and its consequence on moral and social norms surrounding energy-intense forms of consumption (Gössling, 2019).

3.1.6 Political Leaders

While political leaders not only have direct influence on climate change action through climate change policies and other direct influence (Kalantzakos, 2017), their communication on the issue is also of importance in shaping individual's attitudes and behaviour (Marshall G. , 2014).

Especially in the USA political leaders shape the felt urgency for climate change action (Leiserowitz, 2007; Malka, Krosnick, & Langer, 2009; Smith & Leiserowitz, 2012) and political leaders, in democracies, are enhanced by the public's agreement with their ideology and leadership (Beckman, 2009). Furthermore, an Australian study found that partisan polarization at the mass level can be overcome when political leaders agree on common climate change policies (Kousser & Tranter, 2018).

However, as in the case of the president of the United States' announcement to withdraw from the Paris Agreement in June 2017, political leadership against national climate change action is likely to result in an increase in climate change action by opponents of such political ideology (Austin, 2019).

3.1.7 Educators

The frequency, way, and content of educators' climate change action relevant communication can significantly influence someone's climate change perception (Alcott, 2017; Knoblauch & Woolfolk Hoy, 2008). Education can generally be an important pre-requisite to facilitate behaviour change (Azeiteiro, Leal Filho, & Aires, 2018) and the ultimate goal in environmental education is to encourage the development of environmental behaviours, including climate change action (Hewitt, et al., 1997; Hungerford & Peyton, 1976; Pruneau, et al., 2006).

However, a recent study showed formal schooling frequently lacking effective climate change education (Deisenrieder, Kubisch, Keller, & Stötter, 2020; Meehan, Levy, & Collet-Gillard, 2018; Nicholls, 2017). Similarly, a study in Sweden found students from schools with a particular curriculum around environmental sustainability to be more sustainability conscious, compared to students from other reference schools (Isson, Gericke, & Chang Rundgren, 2016).

3.1.8 Scientists

Scientists are at the core of communication around the issue of climate change and their findings are the fundament of the discussion around it (Lynn, 2018). Scientists usually communicate by publishing their findings in peer-reviewed journals that can be read by other scientists and students, presenting at national and international conferences, or teaching at universities, as well as through the public media (Hunter, 2016). Especially when the aim is to reach people who aren't usually concerned about the topic, the media plays an important role in communicating scientific findings (Dudo, 2015). Generally, scientists′ goals include to inform, educate and raise awareness of science-related topics, which may generate support for a study,

or to inform decision making, including political and ethical thinking (Davies & Horst, 2016).

As the leading international scientific body related to climate change research, the Intergovernmental Panel on Climate Change (IPCC) has the mission to provide scientific assessments reports on climate change impacts, future risks, adaption and mitigation options (Lynn, 2018). However, even though the IPCC issued their own standardized guidelines on how to use uncertainty language (Mastrandrea, 2010), the treatment of uncertainty is a major challenge in communicating scientific information (Corner, Lewandowsky, Phillips, & Roberts, 2015).

3.1.9 Businesses

Businesses find several ways to communicate about climate change to the public, specifically their contribution to a reduction in carbon pollution (Reich & Soule, 2016). Especially more recently, and with the need for presence on social media (Li & Stacks, 2015), more and more businesses partake in "climate campaigns" to meet the increasing need of customers for greener products (Atkinson & Rosenthal, 2014). Despite Corporate Social Responsibility reports, which are mandatory for some companies in certain countries (Diehl, Karmasin, Mueller, Terlutter, & Weder, 2017), businesses mainly use marketing campaigns to communicate their green products, business operations or corporations (Reich & Soule, 2016).

One of the main purposes of marketing is the creation of demand for products and thus increasing consumption in general (Meffert, Burmann, Kirchgeorg, & Eisenbeiss, 2019). Hence, communicating marketing messages to consumers, can serve a similar consumption-building purpose. Especially advertising, has therefore been associated with a contribution to widespread environmental degradation (Peattie & Peattie, 2009; Reich & Soule, 2016).

Furthermore, *greenwashing* by businesses promising more environmental benefit than they deliver, has increased sharply in recent years, as businesses try to meet the increasing consumer demand for greener products and services. A marketing research study in the US showed that 98% of products

labelled as environmentally friendly, were found to be results of *greenwashing* (Dahl, 2010; TerraChoice, 2007).

To A noteworthy study in Australia with 125 executives from the top 500 companies on the Australian Stock Exchange, found greater concern for their company's vulnerability in relation to climate change among executives who showed greater engagement with scientific information, translating into a greater perceived need for action (Linnenluecke, Griffiths, & Mumby, 2015).

The influence and potential of communicators and platforms found in literature is later compared to the findings within the scope of the questionnaire and interviews, in the last chapter.

3.2 Storytelling

As explained in the following subchapter, apart from the medium of communication and the communicator itself, the way the story of climate change and respective action to limit it is told also plays a great role in influencing someone's attitude and behaviour towards the issue (Dahlstrom & Scheufele, 2018). The way the stories are framed, particularly the level of emotion it is loaded with, or provokes, as well as the mentioning of greenhouse gases and the greenhouse gas effect, are essential parts of the story, all influencing the effectiveness of its communication and level of action resulting from it (Arnold, 2018; Serrao-Neumann, Coudrain, & Coulter, 2018).

3.2.1 Framing

As described in chapter two (see page 11), individuals are particularly prone to be influenced by the framing effect in relation to all communication influencing one's climate change action. The goal of respective effective communication is therefore to communicate with words and visuals that trigger someone's frames and rebuts opposing frames (Bertolotti & Catellani, 2014; Dean, Fielding, & Wilson, 2019; Gosnell, 2018; Hurlstone, Lewandowsky, Newell, & Sewell, 2014; Lakoff, 2004; Marshall G., 2014; Walker, Kurz, & Russel, 2018).

Proximity

The lack of definite ending to climate change is understood to be a challenge when communicating the issue, as the challenge infinite problems impose are more complex and difficult to process (Bieniek-Tobasco, et al., 2019).

It is a deeply embedded feature of one's cognitive framing to define things by their closeness, prioritising those with affect closer to the present than those in the future (Karpa & Tsur, 2011; Marshall G. , 2014; Partha, 2008; Rubinstein, 2003). Hence, it is a challenge and problem at the same time that climate change is not necessarily a story told in the present, but rather in the future, leading to individuals believing that they personally will not be affected, making the problem appear less imminent (Brügger, Dessai, Devine-Wright, Morton, & Pidgeon, 2015; Zanocco, et al., 2018).

Hyperbolic Discounting

Individuals are generally found to be a lot more averse to short-term costs than long-term costs, preferring certainty over uncertainty (Marshall G., 2014). Especially when losses are expected in the future, rather than the present, individuals are more willing to take risks and respond less to them (Huber & Viscusi, 2006). Presenting and communicating rational cost-benefit analyses related to a progressive increase in global average temperature, such as those included in *The Stern Review*, showing a bigger decrease of income in the future, compared to the present (Stern N., 2007), therefore does not necessarily stimulate a sense of threat or motivate action (Dasgupta, 2008).

Though, people are not generally disposed to disregard every uncertain, but long-term loss, as they seem to be in regard to climate change. Individuals commonly make insurance payments to protect themselves from losses caused by events with great uncertainties, as part of the social norm, for example (Dionne & Harrington, 2014).

Social Norm

For a long time already, communicators are hoping to be able to use the power of social norms and conformity, to guide individuals towards low-carbon behaviours (Marshall G., 2014) Especially in matters of collective issue, such as climate change, individuals need to see and know that they are

not the only ones acting, before altering their behaviour, in potentially uncomfortable ways (Bearden & Etzel, 1982; Kallgren, Reno, & Cialdini, 2000). Generally, due to the lack of a penalty or reward system, the motivation for anonymous acts of altruism, are very low, though one's self-interest can be overridden by strong group identity and visible social norm (Marshall G., 2014)

In a rather popular experiment in the USA, for example, the response to changing messages on towel racks of hotel rooms regarding environmental behaviour in terms of reuse of towels by guests, found the most successful message to speak to a social norm by quoting how many other guests already helped in saving the environment by reusing their towel (Goldstein, Cialdini, Griskevicius, Deighton, & Luce, 2008).

Uncertainty

The factor of uncertainty is likely to play a key role in the effectiveness of climate change communication as many studies found uncertainty about future outcomes one of the main explanations for people's inaction on climate change (e.g. (Hine & Gifford, 1996; Serrao-Neumann & Low Choy, 2018)). As previously mentioned, the subject of uncertainty is particularly prone to be miscommunicated or -understood between scientists and the general public, due to the professional caution expressed by scientists when presenting their findings, often being understood as unsureness (Corner, Lewandowsky, Phillips, & Roberts, 2015).

The debate about uncertainty is also often manipulated to support the interests of those who oppose action or, those aching to be in the middle of it (Marshall G., 2014). Frank Lutz, advising communication specialist for President George W. Bush in 2002, for example, advised the Republican party to fuel the debate around scientists' indifference around the issue after finding out that the environment was the domestic issue on which George W. Bush was most vulnerable (Burkeman, 2003).

Someone's confirmation bias may additionally influence one's perception of the communicated uncertainty (Marshall G. , 2014).

Lack of common enemy

The story of climate change lacks an external common enemy or motive that can be fought together, the "good ones" and the "bad guy" (Marshall G., 2014). Especially journalism is used to the narratives of good and bad, clear and concrete events, and causes to report on (Youngblood, 2016). Climate change, in its evolving and complex nature is hard to connect to those and journalists routinely fail to connect extreme weather to climate change (Public Citizen, 2018), so powerful storms, wildfires and heat waves are not covered as climate stories (Climate Chat, 2020; Marshall G., 2014).

Climate Change versus Global Warming

The terminology of the phenomenon itself is something to affect the discussion severely, already (Hardisty, Johnson, & Weber, 2010; Hardisty, Beall, Lubowski, Petsonk, & Romero-Canyas, 2019; Marshall G., 2014). Members of the Republican party, for example, consequently changed their use of *global warming* to describe the phenomenon to *climate change* after they had been advised to do so in 2002, as the latter is less likely to be associated with the burning of fossil fuels (Burkeman, 2003). A search on google trends, comparing the web search for *global warming* and *climate change* between 2004 and 2019 showed an overall shift in searches from a dominant search for global warming in 2004, to a dominant search for *climate change* in 2019 (Google Trends, 2020).

Though, the phenomenon remains the same, the terminology used does play an important role (Hardisty, Johnson, & Weber, 2010; Hardisty, Beall, Lubowski, Petsonk, & Romero-Canyas, 2019; Marshall G., 2014). Reports on climate change scenarios, use "warm" and "hot" interchangeably, for example (Ereaut & Segnit, 2006; Nerlich, Koteyko, & Brown, 2010), potentially allowing a more comfortable attitude towards the issue when using the first, as is explored further within the scope of the questionnaire for this thesis.

Beyond the terminology of temperature, a study in 2009 found Republican participants five times more willing to pay for a surcharge on a flight ticket, when it was called a "carbon offset" than when it was framed a "carbon tax",

making it sound more voluntary (Hardisty, Johnson, & Weber, 2010; Marshall G., 2014).

3.2.2 Emotions

Framing information or telling a story triggering certain emotions is thought to be an effective way to influence someone's attitude towards climate change and alter their behaviour (Salama & Aboukoura, 2018). However, the story of climate change does not seem to be told emotionally very often (Blake, 1999; Marshall G., 2014).

Information-deficit model

A lot of climate change campaigns are structured around the understanding that individuals simply need to have more information on climate change in order to act more climate change friendly, also referred to as the *information-deficit model* (Howell, 2014). However, this idea has been broadly criticised in its ability to change behaviours, create intent or cause climate change action (Blake, 1999; Kellstedt, Zahran, & Vedlitz, 2008; Ockwell, Whitmarsh, & O'Neill, 2009), with many researchers advising that climate change messages should focus on triggering emotions rather than the provision of factual information to engage recipients in climate change action (e.g. (Ereaut & Segnit, 2006; Klöckner C. A., 2011; Moser, 2007; Pooley & O'Connor, 2000; Salama & Aboukoura, 2018)).

In spite of need of further research, especially stories around heroes, or potential role models seem to be able to persuade the recipient more than simple facts around climate change (Jones, 2014; O'Neill & Nicholson-Cole, 2009).

Level of risk perceived

Disaster framing is a common approach used for climate change communication in order to create a fear appeal intended to motivate mitigation action, such as in the movie *The Age of Stupid* (Howell, 2014).

Yet, numerous studies have found the opposite to be important factors to motivate climate change action (e.g. (Bieniek-Tobasco, et al., 2019; O'Neill & Nicholson-Cole, 2009; Ojala, 2012; Ojala, 2015; Witte & Allen, 2000)). While

these studies all present limitations of fear in inducing change in behaviour, they undermine the importance of hope in engagement. Especially feelings of hopelessness, depression or apathy were most often found to hinder motivation to change behaviour, whereby shock, anger and optimism were found to trigger interest in climate change action (Bieniek-Tobasco, et al., 2019).

Visual representation

Even though a growing body of research is starting to focus on the importance of images in climate change studies, little research has been conducted on the perception and composition of such images (e.g. (Cortese, 2018; Hansen & Machin, 2013; O'Neill & Smith, 2014)). Visual representations of climate change and the environment in the media shape the way an individual perceives the matter, leading to a naturally given assumption of what is seen (Marshall G., 2014). Some images, for example, are so broadly distributed that they are almost embedded in Western culture, leading to forget how they were constructed, such as the polar bear on a melting ice sheet (Cortese, 2018).

A contextual analysis of the representation of climate change in the media in 2009, suggested that moving images on TV play a significant role in individuals supporting climate change action. More than half of the TV news coverage on climate change analysed in the study relied on symbolic and spectacular visuals (Cortese, 2018; Lester & Cottle, 2009).

Especially newspapers and magazines frequently use four different types of images. The first type are images showing the impact of climate change, preferably through before-and-after pictures of, for example, retreating glaciers and polar bears struggle to swim to an ice flow (Cortese, 2018), the second type are images showing the causes of climate change which are likely to be portrayed with images of smokestacks, deforestation, transport and fossil fuels. A third type portraits images personifying climate change through pictures of celebrities, activists, or politicians, and lastly, graphs. However, there are different national preferences for frequency of use on the types and their concrete effectiveness is yet to be studied (Cortese, 2018;

Nerlich & Jaspal, 2013; O'Neill, 2013; O'Neill & Smith, 2014; Smith & Joffe, 2009).

3.2.3 Greenhouse Gases

The communication around climate change is found particularly challenging in the sense that carbon is seen as an abstract issue, often lacking detail and tangibility beyond carbon budgets and its trading ability (Moolna, et al., 2018; Moser S., 2010).

Carbon dioxide, methane and other greenhouse gases have very different properties in terms of their greenhouse effect and longevity of remain in the atmosphere. They also arise in certain natural environments and have different interactions with local ecosystems and economies (e.g. (Shurpali, Agarwal, & Srivastava, 2019)). Mapping all these different qualities and possible impacts in the form of a standardized number reduces a very complex problem to one thing that is believed to still not be understood by the average individual.

Especially when wanting to provide guidance on climate change action, the communication is additionally complicated by the tangibility of greenhouse gas measurements (Pandey & Pandey, 2011). However, an internationally agreed ISO standard for quantifying the carbon footprint of products, published in 2018 (ISO, 2018) may bring change by providing guidance and uniformity.

Since no research on the effectiveness of the inclusion of those gases and metrics in overall climate change communication was found, it is suggested to be subject of further research.

Some of the novel findings in literature on suggested framing and storytelling to evoke greater climate change action are later compared, with the findings within the scope of the questionnaire and interviews, in the last chapter.

4 Questionnaire

To add to the research on reasons for climate change inaction among individuals presented in the second chapter, an online questionnaire was created and conducted. The questionnaire also included questions relevant for the exploration of potential communication strategies to increase climate change action. After an explanation of the form, structure and conduction of the questionnaire, the results of the questionnaire are presented, followed by limitations and derivations for the interviews.

4.1 Form and Structure of Questionnaire

To collect data to explore reasons for climate change action and inaction, an online questionnaire was created. Microsoft Forms was found the most suited to collect the data and conduct the questionnaire, especially while conforming with the EU Data Protection Directive.

The questionnaire and a preliminary introduction that provides information about the scope of the questionnaire and can be found in Appendix A. To achieve a reasonable balance between maximum evaluability and minimum disincentive, 24 questions were chosen for the questionnaire. To limit unwanted distracting effects, the design was kept in blue and the questions were precisely and clearly formulated. Additionally, the use of foreign words was avoided to prevent misunderstandings and reduce the scope for interpretation.

A variety of different forms of questions were asked in the questionnaire, including open ended questions, Likert scale questions, multiple choice questions, ranking and rating questions, demographic questions and statements to which participants were asked to agree or disagree. To minimise the risk of participants not finishing the questionnaire, not all questions were mandatory and the long statement-questions, to which participants were asked to agree and disagree, were split in two, whereby shorter questions were put in front. Additionally, the first two questions, where participants were asked to describe their first association with “heat” and “warmth” were put in the beginning to avoid the influence of other

questions in the questionnaire on the answers. Sensitive, demographic questions were then asked at the very end of the questionnaire when the participants were almost done, to reduce the likelihood of someone not finishing the questionnaire. For that reason included, not all of the demographic questions were mandatory, including one about the participant's ethnicity (Rattray & Jones, 2007). The answer options are titled and categorically arranged to achieve a uniform understanding among the respondents. Furthermore, the even number of possible answers in questions 4, 5, 6, 7 and 14 prevent the tendency to choose the middle (Moosbrugger & Kelava, 2008).

Questions 9 and 13 are especially designed to identify action gaps among participants. While question 9, directly asks the participant to indicate a score on how much climate change action they take in comparison to what they know they could take, question 13 asks the participants to indicate their attitude towards numerous possible actions presented, including extra payment for CO_2 neutral shipping, altering of travel destinations and diet habits.

To explore the potential of wording on climate change action communication question 1 and 2 asks the participants for associations to the words "heat" and "warmth". Later, question 12 also asks participants to choose from alternative options to name climate change to derive implications for recommendations on effective communication.

Question 3 is designed to explore the importance of climate change to the respondent, while question 4 explores the certainty the participant holds about the happening of climate change. To add to the exploration of the attitude, question 6 asks about their belief in humans' ability to limit climate change to a 2°C increase. If the respondent does believe in the ability, they are asked to state whether they believe humanity is going to do so successfully or whether they are unsure about that, in question 6.1. In case someone does not believe that climate change can be limited to a 2°C increase, participants are asked to indicate a reason in question 6.2.

Question 7 is asking the participant whether they have a sustainable role model, and if so, who that is in order to be able to explore the potential of having a role model on climate change action by comparing the results of those respondents who do, with those who do not.

To explore the participants' knowledge on climate change, question 5 asks whether the participant is aware how much CO_2 they are "allowed" to emit annually to stay within the planetary boundaries. In question 11, respondents are later asked to indicate their level of confidence in explaining the impacts and causes of climate change, the greenhouse gas effect, and their ability to assess a product's sustainability in regard to greenhouse gases, but also other factors of sustainability. Both, the causes of climate change and ability to assess a product's sustainability by its emissions explore the respondents' action-related knowledge, while the indicator for the confidence in explaining the greenhouse gas effect and impacts of climate change explore their system knowledge (Frick, Kaiser, & Wilson, 2004).

To explore the felt personal proximity of climate, question 14 was designed, asking to state the believed harm of climate change on different people. Furthermore, respondents are also asked to describe the emotion most fitting to global average warming to explore the degree of concern and worry about it among the participants.

To avoid the built-up of guilt among participants to not do enough, upon reflecting their own actions and attitude throughout the questionnaire, very personal questions with a high degree of reflection regarding their own actions and less reflective ones were mixed throughout the questionnaire to avoid too much bias and optimistic answers. Especially questions 8 and 17, in which participants were asked to disagree or agree, included very mixed statements to avoid as much bias as possible, exploring very different topics, including consumption patterns, the wish for incentives, and many communication-related statements.

To learn about the communicators that influenced the participants' climate change related knowledge, they are asked to rank whom and where they believe to have learned most about climate change from in question 16. To

avoid respondents not changing the rank presented in the beginning, the options are ranked in the opposite order that was found during the pre-tests. To additionally gain more information about the role of the different educational institutions, participants are asked which institutions they remember being educated in about climate change. Both questions are mainly important for later communication-related implications.

Lastly, despite their age, gender, and education, the participants are also asked to indicate which country they live in, allowing for a later exploration of correlation in that regard. Since, contrary to materialism, indigenous values and cultures are found to lead to a higher environmental awareness and more action to protect the environment, including action against progressive global average warming (Banerjee, 2002; Hawke, 2012; Kelbessa, 2005; Mercer, Christesen, & Buxton, 2005; Michell, 2005; Royal, 2012; Snodgrass, et al.; Voeller, 2011), respondents are also asked about their ethnicity. Hence, an exploration of results by ethnicity is additionally thought to be interesting, though dependent on the voluntary indication of respondents.

4.2 Conduction of Questionnaire

After several pre-tests with friends and family members to optimise the questionnaire, the online questionnaire was initially shared in three different Facebook posts from the author's personal Facebook page on April 24th, 2020 at around 2pm CEST, in accordance with research of engagement patterns on social media (Arens, 2020). The first post was addressed at every Facebook friend and members of the Facebook groups for the respective years of students of the Master Study Programme Environmental and Research Management at the University of Southern Denmark. Additionally, a QR-code leading to the online-questionnaire upon scanning, was set as a profile picture on all other social media, including WhatsApp for the duration of the questionnaire.

As can be seen in Appendix B, the post addressed at potential respondents informs them about the general topic of the questionnaire, the scope within it is being processed and analysed, the time needed to participate, the handling of their data, contact details for questions and comments and asks

participants to share the questionnaire with friends or family. The engagement was especially high during the first couple of hours upon posting and particularly benefitted from comments, shares and "likes" of friends, keeping the post relevant. After eleven days and 122 participants (n), the questionnaire was deactivated and later deleted. A side effect of the online questionnaire in the course of this work is the attention that the topic generates, as parts of the questionnaire have a strong reflective character.

4.3 Evaluation and Results of Questionnaire

To identify, evaluate and compare the results of the questionnaire, automatically generated raw data can be exported from Microsoft Forms into Microsoft Excel. To analyse the data, Microsoft Excel and SPSS were used, with the latter specifically allowing to test for correlations. First, the data was uniformly prepared in Excel. Despite the open text questions, the majority of answers to the questions are ordinally scaled. To analyse the data, it was prepared with distinct values for all worded scales, as can be seen next to the respective scales in Appendix A. Open text answers were respectively clustered in different numbered categories, as can be seen further on in this chapter.

4.3.1 Descriptive Results

When asked to indicate the relation of their effort in reducing their greenhouse gas emissions in comparison to how much they know they could do to reduce them, not a single participant stated to do 100 % of what they know they could do, showing that an action- gap, indeed, exists among participants. On average, participants are found to do 60% of what they know they could do, though people most often stated they do 70% of what they know they could do as can be seen in figure 7, below.

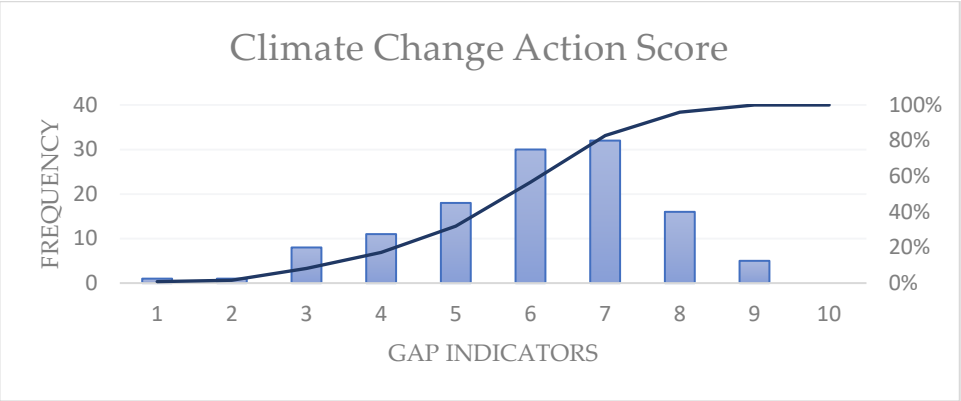


Figure 7: Histogram question 9: action gap, own graph.

In terms of the participants' knowledge on climate change, participants were most "absolutely confident" in explaining (26.2%) the greenhouse gas effect, relating to system knowledge. Contrary, participants have shown to be least confident in their ability to judge a product's sustainability in terms of greenhouse gas emissions, reflecting important action-related knowledge. However, 4.9% of participants did state absolute confidence in it, whereby slightly more participants (9%) were absolutely confident in judging a product's sustainability in other terms, including toxins and potential of plastic pollution. To add to that, 63.1% of participants agreed to find it challenging to distinguish between other environmental pollution and pollution through greenhouse gases. Also, when asked in question five, only 25% of participants said they are aware of how much CO_2 they are allowed to emit annually to stay within the planetary boundaries. Additionally, the general limitation of self-reporting especially holds true for those questions about the participants' knowledge, since it is hard to know for them what they do not know. That way, the participant might think they know and are able to, for example, assess a product by its sustainability in terms of greenhouse gases, though, someone else might call the reason for that indication insufficient, and find themselves not able to, with the same knowledge or information.

When it comes to the participants' attitude, 45% of the 122 say that global warming is very important to them, 34% even said it was extremely important to them, 18% said it is somewhat important to them, only 3% said

it is not too important to them and no one chose the option to indicate no personal importance at all. Reflecting their belief, the participants also indicated a high degree of certainty that global warming is happening, with 94% either indicating to be extremely, or very sure that it is happening as shown in figure 8 below.

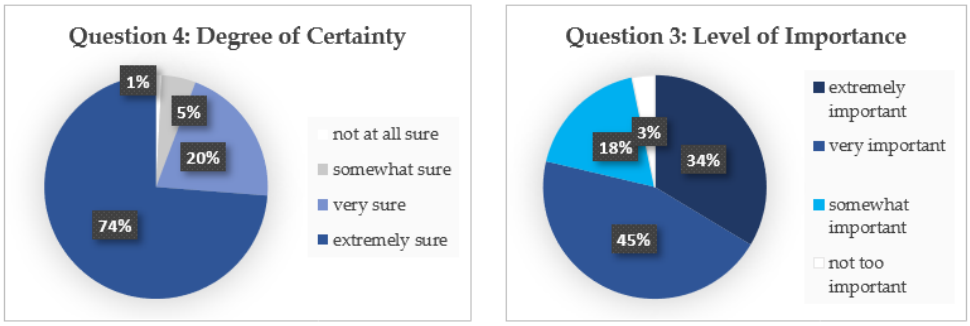


Figure 8: Question three and four: degree of certainty that climate change is happening and level of importance climate change has to the participants, own graphs.

When it comes to hope and motivation, 70 % of the participants said they believe in the ability of humans to limit global average warming to a 2°C increase. However, only 7% of those agreed that they are going to do so successfully, when asked in the follow-up question. Out of the 30% of respondents that indicated they believe humans cannot limit global warming, almost half chose political inaction as a reason, followed by the unwillingness of humans in general. One person also said that humans cannot limit global warming because it is not caused by humans.

In relation to values and social norm, only 39.9% of participants agreed to feel social pressure to reduce their greenhouse gases. Though, 80.3% feel a personal responsibility to alter their behaviour to achieve current climate targets. Additionally, only 26.2% of participants often take things from nature, but are found to agree more often to regard their consumption choices as a vote to the practices of the company they support therewith, compared to all 122 participants.

When asked to write down the most fitting emotion to describe how respondents feel about global average warming, respondents wrote a variety

of different emotions. Presented in figure 9 below, those most often described are scaredness, followed by worry, anxiety, and concern. Many participants also described themselves to feel mostly nervous, frustrated, and angry. Only one person said they feel primarily optimistic and three people stated to feel indifferent. Also, when asked in a later question, almost 70% of participants agreed that the threat of an increase in global average temperature by 2°C is something they cannot relate to anything they have ever experienced before. Those 30% that can relate did not describe very different emotions from those who cannot.

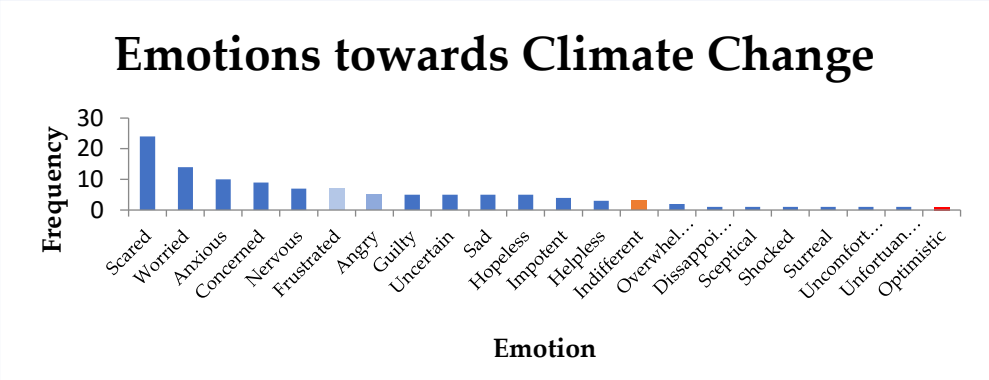


Figure 9: Frequency distribution emotions question 10, own graph.

Similarly, when asked in question 14, how severely the respondents believe different groups of people, including themselves, will be harmed by global warming, many respondents indicated high levels of harm. Respondents feel that they themselves would be the least harmed out of the options presented, followed by people in the country they live in, which is likely to be explained by an optimism bias of respondents. As can be seen in figure 10, participants overall believe future generations of people to be most severely harmed by global warming, followed by people in "developing" countries and people in other "developed" countries.

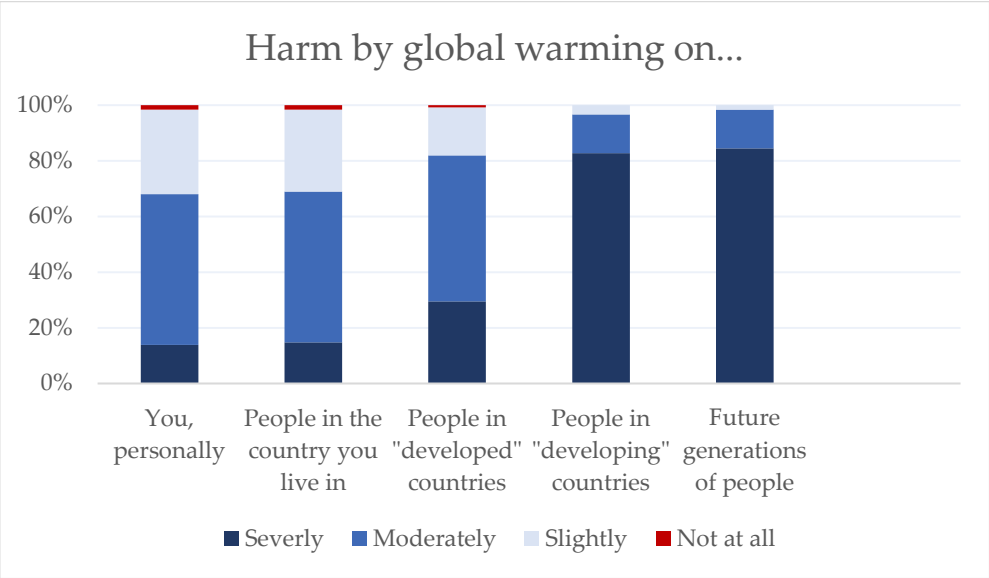


Figure 10: Expectance of harm of global warming on different groups, own graph.

In more detail, only 13.9% of participants think they will personally be severely harmed by global warming, whereby the majority of respondents (82.8%) believe that people in "developing" countries will be severely harmed. The most expected to be severely harmed are future generations of people with 84.4% of participants believing in their severe harm, 13.9 in moderate and only 1.6% in slight harm. Those two respondents forming the 1.6% are male, between 55-64 and 35-44 years old, have both chosen *climate shift* as the most appropriate description in question 12 and indicated to feel indifferent when asked to described the most fitting emotion about climate change. Additionally, they are either only slightly or medium confident in explaining the impacts of global average warming and other factors asked in question 11 and both said the issue is "*not too important*" to them in question three. While one of them is very sure global warming is happening, the other is only somewhat sure.

In terms of personal experience, 81.1 % or participants agreed they are certain to have personally experienced the effects of climate change already, while only 57.4% agreed to be able to feel a temperature change of 1°C to 3°C. Those found certain to have experienced the effects already, also indicated that they personally, or the people in their country will severely or moderately be

harmed by global average warming as a response to question 14 slightly more often compared to all participants.

While 62.3% of participants agreed to clearly see the personal benefit in their overall reduction of greenhouse gases, 64.8% of participants have made it a goal of theirs to reduce their CO_2 emissions. When asked in question 13, which actions the participants "already always undertake", "could imagine doing more often", or "cannot imagine ever doing" to lower their greenhouse gas emissions, the three actions participants most stated to always do already are shopping with a shopping list (71.9%), repairing broken items if they still can be repaired (60.3%) and prioritising the longevity of a product in their consumption choices. By order, comparing products by emissions (74.4%), buying locally-sourced food (71.9%), paying extra for CO_2-neutral shipping(69.4%), prioritising companies with CO_2-neutral operations (68.6%) and second hand shopping for furniture (61.2%) and clothes (60.3%), as well as paying CO_2-offsets for the medium of transportation they use (60.3%) are the options that participants most "can imagine doing more often". However, when asked in question eight, 44,3% of participants agreed to often buy things they don't really need, for which the percentage is, only slightly lower among those who said they always shop with a shopping list (39%) in question 13.

Adding to the exploration of participants' consumption, 96.7% of participants agreed that they wish the corporations they buy from were putting more effort into a low-emissions business. Also, 91.8% of participants agree that they wish for more incentives to live more sustainable and 77% of participants regard their consumption choices as a vote to the practices of the company that produces the product.

In terms of political climate change action, when asked to agree or disagree to statements, only 35.2% of respondents agreed to have signed one or more petitions aimed at the reduction of greenhouse gases. Though, 70.5% of respondents agreed that the last time they voted, the party's or person's climate change action agenda was one of their key decision factors. Notably, only 67% of respondents who believe global average warming cannot be

limited to a 2°C increase, due to lack in political action in question 6 and 6.2, agreed that the last time they voted, the climate change action agenda was one of their key decision factors, which is slightly less than the overall percentage (70.5%).

Relating to potential communication recommendations and social norms, most participants are found not to have a sustainable role model. Though, of the 32% that do have a sustainable role model, 50% said it was a friend of theirs, 41% said it was a public figure and 9% have a family member they consider a role model in terms of sustainable living, some even having multiple role models.

To explore important communicators and platforms, when asked to rank in order where they learned most about climate change from, 39.3% of the participants indicated that they learned most about climate change from educational institutions and 22.1% learned the least from their family or friends. Overall, educational institutions were where participants learned most from about climate change, followed by the news, social media, climate change documentaries, family and friends, and lastly TV shows, books, movies or leisure magazines, as shown in figure 11 below. When asked to agree or disagree in question eight, only 37.7% of participants agreed to like watching climate change related documentaries, having seen all of the ones they know of.

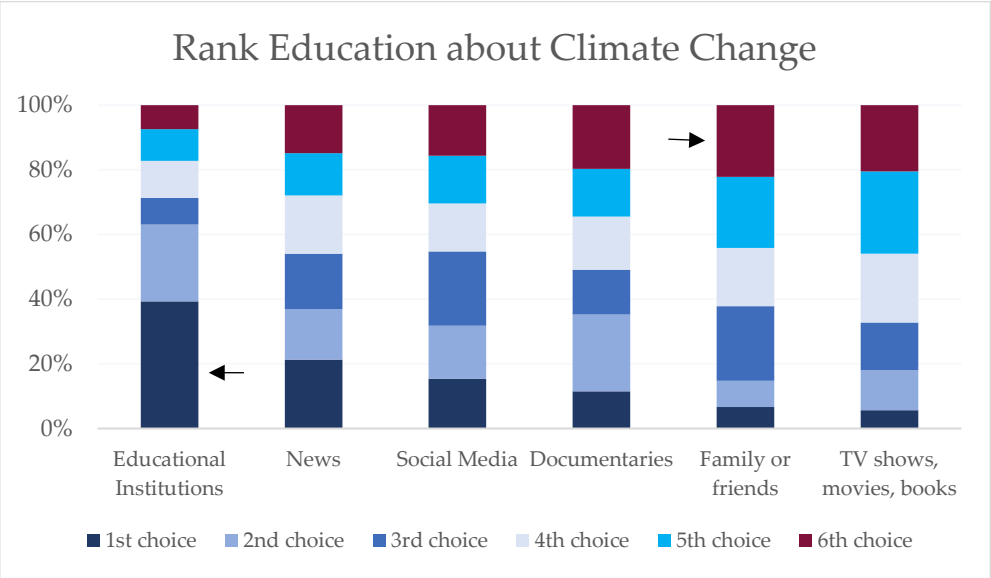


Figure 11: Rank Education about Climate Change, own figure.

Also, when asked in a later question, only 36.6% of participants agreed to know of a story, movie, book or play that portrays a realistic image of the impact average global warming will have in about 40 years.

Additionally, 67% of participants remember being educated about climate change in high school (or at age 14-18), 35% in middle school, whereby only 20.5% remember being educated about the issue in primary school and 2.4% remember being educated about it in kindergarten already.

The great majority of respondents was between 18 and 25 years old as 46% of participants were between 25 and 34 years old and 42.6% were between 18 and 24. Only four percent were between 55 and 64 years old and both three percent of participants were under the age of 18 and between 45 to 54 years old. Only one participant was between 35 and 44 years old when participating in the questionnaire.

Limiting the exploration of a correlation between ethnic background and other answers, only 74 of the 122 participants indicated their ethnicity when asked to, provided that they felt comfortable to do so.

Most of the participants stated to live in Europe, with 46% living in Germany and the neighbouring countries Denmark (28.6%) and Austria (2%). Additionally, one person living in each Luxembourg, the Netherlands, Italy, Norway, Sweden, Spain, Iceland, and Estonia participated, as well as three people from Greece and six people from the UK. Five percent of participants were also from New Zealand and one participant each live in Vietnam and the USA.

In terms of education, 82% of participants have completed high school, 66.3% have a bachelor or are enrolled in a bachelor programme and 50.1% of participants have a master's degree or are enrolled in a master programme.

Lastly, 58.2% of participants identify as female, 40.1% as male and one person as non-binary.

4.3.2 Correlations

To additionally examine whether correlations can be determined between different answers of the participants, especially regarding their confidence in climate-change related knowledge, the importance the issue has to them and their belief in climate change, to actions they indicated doing to lower their emissions and the personal effort score they have given themselves, the respective data has been tested by means of SPSS. All tables referred to can be found before the Appendix, attached to the end of the thesis. Results of the Pearson correlations (r) are evaluated according to Cohen J. (1988) with a correlation coefficient between 0.3 and 0.5 showing a moderate correlation, and between 0.1 and 0.3 showing a small correlation. Additionally, according to Fisher R. A. (1956) a p-value below 0.05, shows a high level of significance and a 95% confidence interval was set for the two-sided level of significance for the respective t-tests presented in the following.

To test the hypothesis that the degree of relevant knowledge the participants hold influences their extent of climate change action, a bivariate correlation was tested via Pearson's correlation coefficient, between the answers in question 11 and 13. This method is particularly fitting due to its implication of strength of covariation between the standardised variables and suspected linear relationship (Field, 2018). To be able to test whether the knowledge

positively influences climate change action, the mean of the attitudes towards the 15 different actions presented in question 13 were calculated for every participant within SPSS, combining them in one variable per respondent. Also hereafter often referred to as mean climate change action. As can be seen in table 1, the findings show that indeed, knowledge positively influences the participants' climate change action. However, differences between the influences of the various aspects were found. The biggest effect was found for the confidence in explaining the impacts of climate change action (n= 121, r= .306, p< .01), with a coefficient between 0.3 and 0.5, showing a moderate correlation, and a p-value below 0.01, showing a high level of significance. As presented in the figure below, the effects for the other options were small, yet significant.

	Impacts	Causes	GHG effect	Sustainability by emissions	Sustainability by other means
Activities	.306**	.181*	.198*	.231*	.250**

** = p< .01; *= p< .05, n= 121

Figure 12: Table correlations knowledge and climate change action, own table.

Notably, 6.25% (coefficient of determination r^2) of the indicated extent of climate change action in question 13 can be explained by the level of confidence in the participants' ability to assess a product by other means of sustainability than emissions, whereby the confidence in assessing a product by its emissions only explains 5.3%. However, the different options asked within question 11 also affect each other with great significance, especially the causes and the greenhouse gas effect. Overall, the average knowledge and level of confidence implied in question 11, explains 9.61% (r^2) of the average climate change action indicated in question 13, as can be seen in table 2.

To further test the influence of knowledge on the extent of climate change action, the Pearson correlation was also explored for the results of question 11 and the self-reported score of climate change action in question 9. As can be seen in table 3, the test did confirm a correlation, with the confidence in explaining the impacts. Similar to the extent of climate change action in

question 13, the highest positive correlation, with a moderate effect, explaining 14% (r^2) of the score (n= 122, r=.374, p< .01) was found for the impacts of climate change. Additionally, the confidence in explaining the causes of climate change (n=122, r= .233, p< .01), the greenhouse gas effect (n= 122, r= .259, p< .01) and in assessing a product's sustainability in terms of its emissions (n= 122, r= .256, p< .01) all show a small positive effect on the participants' extent of climate change action. Overall, the average system and action-related climate change knowledge indicated in question 11a to d, explain 12 % (r^2) of the score given in question 9, as can be seen in table 4.

Similarly, an examination of the hypothesis that the degree of climate change system knowledge someone holds (indicated in question 11a and c) influences their certainty about its existence, found it to be true. As can be seen in detail in table 5, the degree of confidence in explaining the impacts of climate change (n= 122, r= .319, p< .01) and the greenhouse gas effect (n= 122, r= .301, p< .01) both were found to have a moderate effect on the participants' certainty.

Another hypothesis found to be true is the positive effect of the belief that climate change can be limited to a 2°C increase (question 6) on overall, mean climate change action (question 13). Though small (n= 121, r = .218, p< .05), the participants' belief in humans' ability to limit the increase of temperature explains almost 5% of the overall, mean climate change action as shown in table 6. Additionally, since only one participant stated to believe that global average warming is not caused by humans and the remaining either indicated to believe that humans can limit global average warming to a 2°C increase, or disbelieve, a one-sample t-test was performed, grouping those who believe and don't believe, showing a significant difference between the groups. As can be seen in table 8, participants who believe in the ability, on average, do more of the climate change action options listed in question 13, compared to those who do not believe in humans' ability.

Furthermore, a significant correlation was found between the level of personal importance someone assigned to climate change (question 3) and their extent of average climate change action (question 13). Shown in table 9,

a moderate positive effect (n= 121, r= .434, o< .01) was found, explaining that the more important the issue of climate change is to someone, the more climate change action they practice, explaining 18.8% (r^2) of the extent of climate change action. As can be seen in table 10, when examining the differences between the possible actions listed, moderate effects were found for a vegan or vegetarian diet, an altering in travel destinations and shopping with a shopping list to avoid buying unplanned items. However, other options of climate change action, including the choice for a medium of transportation with a low CO_2 emission imprint, repairing broken items when they still can be repaired or using green electricity were found without significant effect of the level of importance on the extent they are taken.

Using the Pearson Correlation again, the effect of knowledge on the personal importance of climate change, the answers to the level of confidence in explaining the different climate change related issues (question 11a, b, c) and the indicated level of personal importance of the topic (question 3) were examined. Shown in table 11, again the strongest effect was found for the level of confidence in explaining the impacts of global average warming (n= 122, r= .318, p< .01), showing a moderate effect. The positive effects of the confidence in explaining the causes of climate change (n= 122, r= .217, p< .05) and the greenhouse gas effect (n= 122, r= .279, p< .01) on the level of importance indicated are small. Although a correlation was found, its direction however remains hard to interpret, as the importance may also influence the level of knowledge and degree of confidence, since one's optimism bias leads one to collect information that fits into their frames and agrees with their beliefs (Lord, Ross, & Lepper, 1979). Lastly, the answers in question 11a to c and question 3, overall explain 9.4% of the relation between knowledge and level of importance as shown in table 12.

The level of certainty that climate change is currently happening was found to have an overall moderate positive effect on mean climate change action, explaining 16.2% (r^2) of the extent of action, as shown in table 13. Especially the climate change action of eating a vegan or vegetarian diet (n=121, r= .327, p< .01), again, and the prioritisation of products from companies with CO_2-

neutral operations (n=121, r= .317, p< .01) are found of moderate effect, as can be seen in table 14.

To see whether someone's knowledge on how much CO_2 equivalents they are allowed to emit annually (question 5) influences their overall mean climate change actions (in question 13), the answers of those who knew were compared to the answers of those who did not know, using an independent samples t-test. Those who did know how much CO_2 equivalents they are allowed to emit annually are found to overall do the climate actions listed in question 13 to a greater extent than those who indicated to not know, as shown in table 15. In more detail, the extent of the actions of a vegan or vegetarian diet, buying of locally-sourced food, second-hand shopping for furniture and technological devices, the altering of travel destinations, prioritisation of products with high longevity and from companies with CO_2-neutral operations, as well as the comparison of products by emissions was found to be significantly higher for those who indicated to know how much CO_2 equivalent they are allowed to emit annually, with details presented in table 16.

Additionally, those who agreed to have made it a goal of theirs to limit their CO_2 emissions were found to indicate significantly higher degrees of confidence in explaining the climate change related topics, asked in question 11 (shown in table 17), as well as to indicate a higher score in question nine, when asked to indicate how much the participants do to limit their emissions, compared to what they know they could do, as can be seen in table 18. Shown in table 19, those who have made it a goal of theirs to reduce their emissions, are found to do more of the possible actions presented in question 13 "always already", than those who have not. In addition to that, those who believe that humans can limit global average warming to a 2°C increase are also found to take greater extent of overall average climate change action, compared to those who disbelieve in humans' ability, as can be seen in table 20. Further, feeling personal responsibility to alter ones climate change behaviour is also found to positively influence both, the average climate change action (question 13) and the self-reported climate change action score, shown in tables 21 and 22. Similarly, seeing a personal benefit in reducing ones

greenhouse gases is also found to positively influence both climate change action indicators, as can be seen in tables 23 and 24.

When it comes to communication, a significant positive relation was found between discussing the topic of climate change with friends and family and the self- reported score in question nine, as shown in table 25. Also, often discussing climate change with strangers is found to have a positive influence on the extent of climate change action indicated in question 13 as can be seen in table 26. Shown in table 27, the same was found for those who like watching climate change documentaries, having watched all of them and their self-reported score. However, knowing a story, movie or book that portrays a realistic image of the impact global average warming will have within the next 40 years does not affect that score, as presented in table 28.

Also no difference in the effect on the self-reported score was found on respondents' belief in personal severe harm by climate change (table 29), whether the effects of climate change can be felt globally (table 30), or personally already (table 31), and the ability or disability to relate the threat to anything previously experienced (table 32). Furthermore, neither does feeling social pressure to limit emissions (table 33), nor often taking things directly from nature positively affect the self-reported climate change action score (table 34). Additionally, also no significant effect was found of having a role model on the overall extent of climate change action (table 35) and self-reported climate action score (table 36).

To conclude, overall, the degree of knowledge and certainty someone holds over climate change, as well as their belief in the ability to limit its increase to 2°C are found to influence their climate change action. Furthermore, despite various other aspects, intention-setting and the awareness about benefits positively influences the extent of action taken. Documentaries, discussions with close ones and strangers, as well as educational institutions are identified to present great potential for communication that evokes greater climate change action.

4.4 Limitations and Derivations for Interviews

Though, thoroughly designed and tested, the questionnaire and related quantitative research were limited in various factors to regulate its scope and minimise the time voluntary participants would spend on it to ensure enough responses. While it did not include all social and psychological factors found in literature, it especially excluded some factors related to someone's motivation to take action to lower their emissions, including details about cultural and personal values as they are thought to better be explored within the scope of experimental settings, measuring action instead of depending on self-reported information. Additionally, more open text questions would have been beneficial to gain deeper inside into reasons for climate change inaction, though they would have prolonged the questionnaire further and were therefore decided against.

Furthermore, the questionnaire only directly examined the optimism bias of respondents and the framing effect in some questions, leaving other relevant biases to be explored through interviews or further research, as that would have taken a different questionnaire set-up and a deeper behavioural studies and psychological analysis. However, the influence of biases in participants responding to the questions are acknowledged. Especially the central tendency bias could not be avoided in some of the multiple-choice questions with an uneven number of choices (Moosbrugger & Kelava, 2008). Multiple-choice questions were also designed to avoid the participants' inability or unwillingness to answer by making them mutually exclusive (Choi & Pak, 2005) most of them time, however, not always. Additionally, some of the questions could be interpreted differently, depending on the belief of the participants in climate change. Especially the climate change action score, one is asked to indicate in question nine, but also other questions depend on the self-evaluation of the participants' knowledge, which is difficult to generalise and assess, as one usually doesn't know what they don't know, but also believe things to be true that are invalid (Kvale, 1995; Rokeach M. , 1968).

Furthermore, especially the questions where respondents were asked to agree or disagree are especially prone to acquiescence bias, potentially having led respondents to not read the full statement and just agree. Though

that can be prevented by asking inverted questions (Krosnick J. A., 1999), it would have prolonged the questionnaire even further. Another effect often associated with questions where respondents are asked to agree or disagree to a series of statements is the straight line effect, when questionnaire participants give identical answers to items in a series of questions with the same response scale, which may reduce data quality (Kim, Dykema, Stevenson, Black, & Moberg, 2019).

It can also not be excluded that certain answers were influenced by the telescoping effect, leading to respondents remembering events having happened more recently than they actually have and new events as further in the past than they actually happened (Jabine, U.S. National Reserach Council, & Research Seminar on Cognitive Survey Methodology, 1984).

Even though taken under consideration when designing the questionnaire, the influence of the questions on responses to each other, and the introduction with a broad description of the research topic are expected to have influenced the responses. Additionally, though, the use of foreign words was avoided to minimise misinterpretation of statements or questions, it cannot be excluded that some questions still allowed for different interpretations and even definitions.

Moreover, many aspects potentially influencing one's climate change action, or climate change perception, were not explored, including the participants having children or general family planning. However, the latter was decided against because the group the questionnaire was shared among was not expected to have children yet.

Despite the questionnaire being limited to respondents living in democratic and financially wealthy countries, a differentiation between ethnicities could not be undertaken as only about half of respondents indicated their ethnicity. Also, a lack of variety in different countries of residency among participants limited an exploration of the influence of cultural values further.

The biggest limitation, however, is the variety in respondents as the majority of respondents are within the same age range, from very privileged countries,

especially within the European Union, and overall enjoy high academic education. Additionally, the respondents follow a snowball principle as they were acquired on Facebook, hence in some proximity to the researcher or researcher's friends.

Though some effects were found, of which the direction is not always obvious, the results are limited in its sufficiency to explain why individuals do not take more climate change. It is therefore particularly important to explore that described gap in more detail through qualitative research in the form of interviews.

5 Interviews

To add to the findings of the questionnaire on individuals' relevant system and action-related knowledge about, extent of, and especially forms of common climate change action and its perceived effectiveness, interviews were conducted. The interview questions specifically aim to find reasons for individuals' action and inaction, as well as potential solutions to increase the extent of action taken through effective communication.

5.1 Form and Structure of Interviews

To gain the desired results within the scope of this thesis, semi-structured interviews were found to be the most effective form. While the interviewer guides the interview through a set of predetermined questions, no optional answers are given. That form of interview allows the interviewees to express their thoughts freely and empowers them to take the conversation into another direction, allowing the interviewer to explore things or reasons they may not have thought about or cannot expect, and for the conversation to be expanded through new points of view (Brinkmann & Kvale, 2014; Brinkmann & Kvale, 2018; Galletta, 2013).

As can be seen in the general guideline for the interview in Appendix C, the questions are designed to lead from more general questions to personal questions, asking the interviewees about their personal efforts, influences

and motives to explore their beliefs, attitudes, knowledge, motives for climate change action and influences on their knowledge, belief and attitude.

While the first question (a) is designed to find out about the interviewees' belief in climate change and necessity of action, the second question (b) is designed to explore the interviewees' attitude towards climate change, to be able to explore the importance of hope on climate change action. The next question (c) is designed to find out about the interviewee's climate change knowledge and explore whether personal climate change action measures and action-related knowledge is mentioned within that scope.

Next (d), the interviewees are asked what they generally believe to be the most effective ways of climate change action and which of them they personally do to explore the extent of their knowledge on climate change action and evaluate their validity to further proof an action gap and explore differences and its influence on behaviour, including the effect of potential invalid information.

To become more personal and explore the interviewees' personal climate change action and especially their reason for, and selection of climate change action, the extent of action, limitations and selecting process are asked about in question (e). Question (f) serves as a follow-up, to explore motivation for climate change action measures that have already been undertaken by the interviewees and assess what influenced them. To lean into that more, the following question (g) is specifically designed to explore why certain climate change action is not being undertaken, though the interviewee is aware of its effect. It also asks the interviewee to name what they are missing to take those actions and limit their emissions further.

To explore the influence of family and friends and importance of personal communication about the topic, the next two questions ask the interviewees about the frequency they discuss climate change action measures, including purchase behaviours and lifestyle choices with others close to them (h) and to reflect on the influence of the climate change concerns of those close to them (i). The following questions aim to explore the influence and importance of the interviewees' action-related knowledge on climate change

(j) and climate change action (k) on their personal behaviour. Specifically, asking how the interviewees assess a product's or action's climate change impact.

The next questions aim to explore whether the interviewees experience any feelings of personal risk imposed by climate change, but also on others (l) and find out whether potential feelings of risk motivate action. In addition to that, the following question is designed to explore what the respective level of perceived risk is influenced by (m) to derive potential recommendations for effective communication. Lastly, the interviewees are asked whether they believe their climate change actions create a difference and if so, what difference (n), to explore further drivers of climate change action.

The questions were compiled to limit the interviews to a maximum of 30 minutes to prevent demanding too much time from the interviewee, but assure all information needed can be asked for (Galletta, 2013).

5.2 Conduction of Interviews

Before conducting the interviews, the questions were tested on friends and family first, to gain an understanding of possible replies and whether the goal of the interviews can be achieved by the guidelines designed.

To conduct the actual interviews, friends were asked to suggest friends who were willing to be interviewed. This selection was made to create some distance between the interviewer and interviewees to assure that no related pre-existing knowledge about the interviewee would hinder the outcome of the interviews, as the other option would have been to directly interview friends.

In the end, six volunteers were found, of which three live in Germany, two in New Zealand and one in Denmark. All interviewees agreed to the usage of their answers within the scope of this research. To guarantee their anonymity all names have been pseudonymised wherever needed.

Name	Gender	Age	Education	Place of Residence	Form of Interview	Date of Interview	Appendix No.
Ludwig Helmer	M	20	High School Diploma B. Sc. Mechanical Engineering (ongoing)	Hamburg, DE	in person	11.05.2020	D
Jacob Bremming	M	26	B. Sc. Architecture; M. Sc. Architecture Professional	Auckland, NZ	via Zoom	12.05.2020	E
Nadia Bulker	F	25	New Zealand Diploma of Business	Auckland, NZ	via Zoom	12.05.2020	F
Isla Grim	F	24	M.Sc. Environmental and Resource Mgmt. (ongoing) B. Eng. Environmental Science	Esbjerg, DK	in person	15.05.2020	G
Marlene Riemer	F	24	B. Sc. International Logistic Mgmt.	Hamburg, DE	via Zoom	17.05.2020	H
Karsten Hellwig	M	57	Dipl. Ing. Precision Engineering; Dipl. Ing. Physics	Hamburg, DE	via Zoom	18.05.2020	I

Figure 13: Table of relevant information about the interviewees, own table.

As can be seen in the table above, out of the six interviews, two were conducted in person, while the other four were conducted online via the video communication platform Zoom. In addition to the information provided above, only Karsten Hellwig has children and despite him, Nadia Bulker and Jacob Bremming have completed their academic education, currently pursuing full-time jobs, while the other three interviewees are students. All transcripts of the interviews can be found in chronological order, in the respective appendices D to I, as can be seen in the table.

As the answering of the questions asked throughout the interview requires a certain degree of reflection, the guideline of the interviews was sent to the interviewees two days before their conduction. It additionally served as a measure to prevent miscommunication and understanding in case of poor connection when using Zoom.

Due to the semi-structured nature of the interviews, the questions were not necessarily asked in the specific order and deepening questions were asked when needed to assure sufficient results. Interviewees also openly answered the questions, though to different extents.

Additionally, it was considered to assure that the questions were asked without implying any kind of judgement or wish for a certain response to prevent interviewees from telling untruths and assure the usability of responses to explain the influences of climate change action and reasons for inaction (Brinkmann & Kvale, 2018).

5.3 Evaluation and Results of Interviews

After the transcription of the interviews, they were processed in the computer-aided qualitative data and text analysis software MAXQDA for evaluation. The software allows for users to group, categorise, and explore similarities or differences between interviewees through coding, as well as to quantify and visualise the results. The chapter first presents findings regarding the social-psychological factors and types of actions described by interviewees, followed by the findings regarding respective climate change action communication platforms and communicators.

Overall, every interviewee is found to believe in the increase of global average temperature, due to human activity. However, none of the participants believe that current climate change action is sufficient to limit the average warming to a 2°Celsius increase and some even gave ideas on climate change action that is needed on a political scale.

Furthermore, despite Isla Grim, all interviewees expressed a lack of hope or faith in the limitation of an increase to 2°C. Two of the interviewees described to particularly find limited faith due to current political leadership.

> I don't have faith in world governments to do what needs to be done.
> *- Jacob Bremming*

Nevertheless, it does not appear as if the lack of hope greatly enables climate change inaction, but rather creates more will to contribute, or simply the aim to "limit the increase by whatever we can and the lower the increase is, the better" (Karsten Hellwig).

When it comes to the attitude, all interviewees presented themselves as conscious of their contribution towards the increase of global average temperature by emitting greenhouse gases. Respectively, four of the

interviewees believe the general consciousness about climate change and possible actions to be the basis of climate change action among individuals. One suggesting that respective consciousness arises from the knowledge available to one, as this is how her awareness was created.

Moreover, the interviewees all described different scenarios in which they have altered their behaviour after gaining new information from various sources, including friends, family, partners, advertisements and scientific literature, even changing the importance the topic held for them. Similarly, a lack of knowledge and inability to assess the difference between, and exact impact of products is often described as a reason limiting greater action.

> Actually, I don't know and that's something which makes me worry, because I think many people do not know what they personally can do to limit the global warming and carbon dioxide emissions very good. – Karsten Hellwig

Additionally, comfort and the compromise of it is something also mentioned by the interviewees to limit the extent of climate change action. Nadia Bulker and Jacob Bremming also described themselves as too "weak-willed" to take more action, in terms of the latter not changing to a fully vegan diet, for example. Also, especially when it comes to the means of transportation, comfort, saving time and the price appear to influence the extent of action and decision between alternatives as none of the interviewees described a willingness to not travel at all.

None of the interviewees described to feel particular personal risk imposed by climate change action. Though, some described the awareness of changes in local weather patterns, they all feel a certain level of security, while expressing worry for others.

> Personally, I am not so scared of the risk that would fit me, personally, because I'm in one of the richest countries of the world. So, I don't have to be scared about that, because I know everything will work out for me. I believe in my government, and I believe in Europe in general, I believe in the European Union. – Isla Grim

Describing the greatest personal risk is Jacob Bremming, who believes his life will "feel smaller", presenting him and his generation with "less opportunities to do things globally, like travel". Furthermore, he fears a collapse of certain economic sectors and a related threat to his family.

> I worry we will be part of a transition generation where we go from having so much to so little. And, it makes me worried for future generations. – Jacob Bremming

Despite many of the interviewees recognising some kind of privilege related to their economic situation, but also their residence in countries of great wealth and social security, some describe to feel personal responsibility to take climate change action or understand them as a duty.

> Well, first of all, it is our responsibility to look at our everyday choices and make those who have the least impact, when it comes to the footprint, for example the CO_2 footprint. – Ludwig Helmer

Isla Grim went even further, explaining that one of her main motivations for climate change action is the aim to protect more vulnerable people and future generations, as well as her future children whom she wants to enable the same future she has. She also went on to describe that she understands herself as a role model and similarly to Marlene Riemer, is determined to inspire others to join their climate change action, especially through leading by example, but also direct education. Jacob Bremming and Ludwig Helmer also described to suggest lower emissions alternatives to friends and colleagues, when able to.

Furthermore, all interviewees described collective action as their driver and reason to believe in the effectiveness of their actions and some form of comfort in knowing that other individuals are also taking action.

> Although a single individual might not make a huge difference, just as "no snowflake ever felt responsible in an avalanche", the mass of individuals makes a difference. Being part of a movement that is engaging in lowering its ecological footprint increases the mass itself and therefore the impact it has. So, the personal impact my choices might have is small, however what my choices contribute to a mass of choices aimed at lowering CO_2 emissions makes a larger change. – Ludwig Helmer

When it comes to the decision-making processes related to climate change action, especially the choice between alternatives, the final decision is often described to be dependent on the situation.

> I just think it is situational. When it comes to transportation, it's a question of convenience. […] For the food, it is also about compromise. I enjoy parmesan, I don't want to give that up. So, the way I select really is more about the compromises I am willing to take and the switches most at hand, or available to me. It also helps to be reminded, though. […] It's all about how convenient it is for me to be "green". […] Though, sometimes I wonder whether to take the chickpeas in the aluminium can, the paper carton or the glass, I just don't know, so I will switch it up, or go by price. - Marlene Riemer

One factor that is noteworthy is that all interviewees appear to understand the limitation of their emissions as part of their overall environmental contributions.

> […] that is most of the time also connected with self-awareness and green living in general. So, minimalism and so on. – Isla Grim

Interviewees often confused other means of environmental protection for climate change action or described their related decisions as overall "eco-friendly", "sustainable" or "green", leading to the understanding that their overall environmental concern influences their climate change action related decision-making, sometimes even conflicting it.

While none of the interviewees describe to do everything, they know they can do to limit their emissions, the interviewees describe a variety of different ways they personally take climate change action and suggest ways others could. The two types of actions most often described by the interviewees are dietary habits and the choice of personal means of transportation.

Especially the aspect of personal transportation was mentioned by every single one of the interviewees as a climate change action they are aware of and include in their lifestyle. Although the interviewees stated that they were not aware of the specific emissions related to the different means of transportation, general guidelines could be identified. Some of which are the use of a bike, or public transportation, instead of a car and the use of a train

instead of a flight or car ride. Especially limiting flying was mentioned by everyone as one of the actions individuals can take to lower their emissions. However, some interviewees also emphasized that they are especially unwilling to generally give up travel as it majorly influences their lifestyle. Hence, they are searching for ways to include comfortable travel, but also limit their emissions. For which Nadia Bulker explains to pay a carbon offset fee, when booking flights. While none of the interviewees mentioned to know exactly how influential the different means of transportations are, Karsten Hellwig described to use the one he believes to have the lowest emissions.

In terms of dietary decisions, all interviewees, but Karsten Hellwig, described to eat a vegan or mostly vegetarian diet and believe to personally limit their emissions by avoiding eating meat or other animal products. However, only three described the emissions related to the consumption of animal products as one of the factors leading up to their change in dietary habits.

> Food! Go vegan or go home. Veganism is the best way to stop global warming as not only the animals suffer and create big amounts of greenhouse gases, including transport, etc., but also the huge amounts of rainforest being grubbed for feeding fields. It is disgusting when you think about it. All this rainforest gone, just to feed the animals we are then eating. – Marlene Riemer

However, all five believe a strict vegan diet to be one of the most impactful changes individuals can make to lower their emissions. Additionally, everyone mentioned to integrate whether the desired food is in season or has travelled from far, into their consumption decision, often prioritising local products. Karsten Hellwig described it as one of the only factors he knows to asses a product's carbon footprint by and as "something you can know when you go shopping", as food products in the European Union must be labelled with the country of their origin (European Commission, 2020). Especially the two interviewees living in New Zealand described their efforts to limit the shipping of products from overseas, or the selection of the slowest means of shipping, if it cannot be avoided. Marlene Riemer also mentioned that one of her personal biggest goals to reduce her emissions further is the waiving of

online shopping, though the efforts are not going very well, as she describes ordering off Amazon as “too easy”.

Another aspect mentioned by the interviewees to be avoided is fast fashion. Especially the two female interviewees described to buy second-hand clothing when they can and avoid fast fashion brands or find an alternative of better quality, extending its longevity. While Ludwig Helmer emphasized to thoroughly research alternatives for textiles from small and sustainable brands, upon purchase to be informed, Jacob Bremming described trying to make his new clothes last longer.

Overall, interviewees described to have made swaps in the past to avoid single-use items and replace them with products of longer durability to avoid waste, but also overall production and transportation, reflecting ways of critical consumption. Some of the swaps mentioned include drinking tap water instead of bottled water, use of reusable shopping bags, and bee-wax towels.

Further reflecting in critical consumption, Jacob Bremming and Isla Grim both aim to reduce the overall amount they consume and believe it to be an effective tool for everyone to limit their emissions. Adding to that, Ludwig Helmer emphasized that he believes that less is not necessarily better and believes it to also be of importance to assess a desired product holistically, including what kind of company’s business practices are supported with purchase. In efforts to consume less buying second-hand furniture and cars were also mentioned by some of the interviewees. However, the economical aspect of second-hand purchases did influence some of those choices as well. Another action mentioned to reduce consumption is the saving of energy and electricity by switching off the lights when not particularly needed and the repairment of products if possible.

The use of an individual’s voice on a political scale was particularly emphasized as a strong instrument to create climate change action on a broader scale. Interviewees emphasized the importance of vote to influence climate change policies and possible carbon taxes or other regulations, especially on businesses and more particularly, on oil companies, to limit the

combustion of fossil fuels at the source. Additionally, mentioned in that relation were protests and more specifically, marches to voice concern addressed towards politicians. A lack of political inaction is also overall described as demotivating on personal action.

> This is something the people can't do without the politics. It doesn't matter how many kilometres I drive with my bike, if VW, Audi, BMW, Porsche and so on, can still do whatever they want. Plus, this is extremely demotivating. My efforts are being expected but are not being valued at all while the big companies can still do whatever. […] it is frustrating to feel like it is up to the individual. Systematic restrictions must come in place, holding everyone accountable. So, I do wish for recognition in the sense that I try, and I am conscious, and I want the politicians and companies to see that and do the same.
> – Marlene Riemer

Nadia Bulker also described often discussing improvement opportunities for companies to lower their emissions with her partner and the hope that companies who produce high-quality products, also develop more eco-friendly business practices. Though the main reason she prefers to purchase products of higher quality is the expectancy of them being more durable and in that sense, cheaper in the long run.

Furthermore, James Bremming, now working for an architecture company, also describes that a focus on sustainability were one of the values he looked for in the companies he applied to after graduating.

When it comes to the communicators of climate change and climate change action, everyone described to be surrounded by friends, partners and or family who also take climate change action and communicate about it. Interviewees particularly described situations in which they communicate with friends, family, and colleagues about alternatives or concrete behavioural changes that will benefit a lowering in emissions, or the environment in general. Often also describing to benefit from those conversations by gaining knowledge about certain products and brands, or overall assessment strategies.

> For example, a friend just recently told me that avocados need a lot of water and they need to be shipped and all that sort of stuff, so the next week I was at a restaurant, we ordered, and I thought, well, I could take the avocado salad, which would be nice, but didn't because I knew then that it's almost on the same level as red meat when it comes to water consumption per kilogram. So, just because a friend told me a fact and enlightened me in that way, I changed how I thought about avocados. – Ludwig Helmer

Despite friends and family, especially education and communication through educators or in an educational setting are found to have influenced the climate change action of the interviewees.

> That lecture just made me realise that it cannot happen that I am having whole year strawberries in the supermarket and we are creating a desert in the middle of Europe. – Isla Grim

Karsten Hellwig, who is the only one who does not remember being educated about climate change or related action in school or university states that, apart from his family, his main source of information are news media and articles in scientific magazines. However, he also described that he prefers to ride the train as an alternative to flying, ever since seeing an advertisement from the railroad company advertising for the train to be the alternative of less emissions. Other interviewees also described the importance of scientific literature and related magazines for them to gain more information on climate change action and better assess alternatives.

The news media is also found to have influenced other interviewees in their climate change action, especially in the portrayal of collective interest and action. However, despite traditional news media, Isla Grim and Marlene Riemer both mentioned the social media content they consume to greatly influence their climate change awareness and extent of climate change action.

> Once I express interest for one climate change related page on Instagram, for example, more and more pop up in my feed, which I am then suggested to follow, and also inspired by. Though, the information shared is not very detailed and needs to be fact-checked, it certainly introduces me to issues I otherwise would only hear from friends about. – Marlene Riemer

Both women describe to have built an environment for themselves, on the social media platform Instagram, in which they are presented with information about tips on swaps for single-use products, and further concrete climate change actions, but also recommendations for new documentaries, or relevant research findings.

In addition, Jacob Bremming also described to have read several science-fiction books based on post-climate change worlds, with either possible dystopias, or worlds in which humans have adapted to the altered climate, which have influenced his perception of risk related to climate change. Notably, he was the only interviewee to describe any concrete personal risk expected through climate change.

Similarly, Nicole Bulker said she has gained most of the information influencing her climate change risk perception from David Attenborough documentaries on BBC Earth, even though they focus rather on the animal kingdom than humans. Ludwig Helmer furthermore described a children TV-show to have been particularly influencing through his early learning. He described the show to have taught him what climate change is, the major causes and effects, and even ways to reduce his personal emissions by, for example, switching off the lights or taking shorter showers.

Overall, the main limiting issue commonly described by all interviewees is the lack of information and the need for reliable sources of information.

> Another aspect definitely is no knowledge! So many people, including me, are often not aware about the effects of their actions, and I believe we need more, better material on the topic from credible sources.
> – Marlene Riemer

It appears many of the interviewees are actively seeking information to lower contributions to the increase of global average temperature, yet are critical about the credibility of sources. As Marlene Riemer described, she always fact-checks information before taking them as given.

The most desired aspect of communication expressed by the interviewees, is one that allows transparency and supports their assessments with

information available at the source and as simple as possible. While some described to actively research the carbon footprint of certain products upon purchase, the majority described some sort of proximation to evaluate the impact of a product, wishing for stricter guidelines on communication about the climate change impact and overall more transparency. Some even expressing they are willing to accept a higher price or compromises in the product's function, if transparency would in turn be guaranteed and a respective assessment enabled.

> […] if I would just know that product A is more sustainable than product B and they are comparable in their function, it would be quite easy. I'd imagine it to be a little bit more expensive, but that is okay. As long as I don't have to change too much. I mean, even if there are slight differences in the product, if the transparency was given, I would still pick the one with the lower carbon-dioxide footprint, or more sustainable one. Just because for that reason and I would then be willing to compromise in the product's function itself.
> – Karsten Hellwig

A tool that was mentioned by many of the interviewees are labels, preferably directly on the product for an assessment at point of purchase, including websites of online retailers and producers. Some also expressed that, ideally, the label would be mandatory and politically implied.

Additionally, some interviewees also described that the communication about climate change action itself and influencing others to also take action, is the biggest impact they personally have in limiting the increase of global average warming, believing to function as a role model.

To conclude, numerous factors limiting climate change action among the interviewees have been identified, including the unwillingness to compromise in terms of comfort, to change habits and to limit their lifestyles overall. However, the most important limiting factor identified is the lack of transparent information about the climate change impacts of products and actions. Especially discussions among close ones about concrete climate actions are found of great influence on the extent of climate change action

taken. Furthermore, social media is recognised to present great potential for effective climate change action communication.

5.4 Limitations

Firstly, it is noteworthy that all interviewees live in a highly developed country with high social security, receiving, or having received a high degree of education, some even in the field of natural sciences or environmental science, differing from the average population. However, no influence could be taken on the diversity of interviewees as the research is based on voluntary participants.

Despite the lack of demographic diversity, only an overall very small group of people were interviewed due to the extent of this research. Additionally, the guideline and amount of questions asked were kept reasonably limited and could have focussed more on presenting interviewees with different climate change communication options and concrete examples of climate change inaction to then identify more reasons in their own behaviour. Especially exact decision-making processes could have been examined further or the influence of values to examine their concept of climate change as a possible part of their overall environmental protection aims. However, this is thought to be more appropriate for studies within the scope of behavioural and neurological psychology.

6 Recommendations for Strategies for Climate Change Action Communicators

This chapter combines the findings of the questionnaire and interviews with the findings of the literature presented in the second and third chapter. Based on the combined analysis, recommendations for communication strategies to increase climate change action among individuals are then presented. Firstly, the findings on reasons for climate change inaction, including limited action, are presented, thereafter communicators and platforms found to be of particular importance are described. And lastly, various recommendations on the framing and overall storytelling of climate change and climate change

action to inspire more action are presented, with a particular focus on the option of labelling.

6.1 Reasons for Climate Change Action and Inaction

Most of the reasons explored in the questionnaire and interviews were linked to concrete actions like the means of commute or dietary habits, and few can be generalised. Especially the interviewed group of individuals showed to do an overall above average level of current climate change action. Therefore, motivating and influencing factors that induced these taken measures were identified. It is furthermore highly likely, that climate change inaction can, in turn, be explained by the lack of these factors.

Similar to some of the research presented in chapter two (see page 4-5), a lack of knowledge and awareness about concrete climate change actions is found to be one of the main reasons for climate change inaction, in both, the interviews and questionnaire. More particularly, interviewees even actively named the lack of action-relate knowledge as one of the main reasons for their climate change inaction. Those, who were more confident in explaining climate change action related issues in the questionnaire, also undertook climate change action to a bigger extent. Knowing how much CO_2-equivalents an individual is allowed to emit annually to stay within the planetary boundaries with their personal contribution is also found to lead to greater climate change action within the scope of the questionnaire. Hence, unawareness about it potentially leads to a limitation in action. Additionally, interviewees also described various situations in which they have altered their behaviour after having received information on how they can limit their emissions directly. One interviewee, for example, trades flights for train-rides when he can, after having received the information that that option is related to lower emissions. Similarly, another interviewee does not eat avocados anymore, after having received information from a friend about the environmental impact.

Confirming consensus in literature, the results of the questionnaire find the individuals' certainty about the happening of climate change to influence the extent of climate change action taken. Hence, uncertainty about it may enable

climate change inaction. In turn, someone's certainty about the happening of climate change is found to be at least influenced to some extent by the degree of related knowledge within the scope of the questionnaire (see page 47).

When it comes to climate change actions that the interviewees know they could undertake to lower their emissions, a variety of reasons for inaction was presented. Many interviewees, for example, described comfort as a reason for the continues use of their own car to cover distances that could be covered by, what they believed, other means of transportation with lower emissions for the same distance. Time was also presented as a factor, specifically influencing the decisions around transportation that are overall thought to bear great climate change action potential. Similar to reasons found in literature (see page 9), some interviewees also describe themselves as "too weak-willed" or simply unwilling to limit themselves to an extent where it drastically influences their habits. Another important factor described is the monetary value, or price of an item, which influences the purchase decision and lead to climate change inaction. This has been particularly described in relation to the purchase of flight tickets, compared to other means of travel, where the price was so low that the interviewee saw the bigger benefit in saving the money, rather than the emissions. An additional reason for inaction as described by some interviewees is the unwillingness to compromise their current lifestyle and keep the status quo. Additionally, some interviewees also described a willingness to pay a higher price for a product, or pay a carbon offset, if that means they can preserve status quo. Another interviewee also described something that she would like to do less to limit her emissions as "too easy", meaning it is convenient to her.

In accordance with literature (see page 5-6), the belief that climate change can be limited to a 2°C increase, is further important in terms of its influence on climate change action, as participants of the questionnaire who did not believe in the ability are also found to take climate change action of smaller extent.

Furthermore, the degree of importance of the issue to the individual is additionally found to influence climate change action. Hence, the less important, the fewer climate change action is undertaken. The level of importance, in turn, can be increased through an increase in relevant knowledge.

Similar to the importance of intention-setting found in literature (see page 11), results from the questionnaire show a positive influence of making a reduction of greenhouse gas emissions a goal. It is therefore thought that wanting to reach that goal will lead an individual to less climate change inaction and influence their decision-making.

One of the main influential factors described by interviewees on their climate change actions is the environment they are surrounded by. Similar to findings in literature on the importance of social-norms and cultural values (see page 6-7), social-conformity is found a potential reason for inaction. Equally, all interviewees who already take great climate change action, or are including their impact on climate change in their decision-making, described to be surrounded by a partner, friends or family whom they discuss their actions with and who share the relevant awareness and knowledge. Hence, if an individual is surrounded by other people who are not aware of those relevant aspects, they could potentially be less likely to care about taking climate change action themselves, to fit in with their surrounding social group (Cialdini & Goldstein, 2004).

Similarly, the belief in one's climate change action effectiveness is found to be an important factor of climate change action within the scope of the interviews, and a lack thereof might explain inaction. Within the scope of the questionnaire, often discussing the topic with friends and family, as well as strangers is also found to positively influence the extent of climate change action (see page 50).

As all of the participants in the questionnaire and every interviewee lives in a comparably wealthy country with a high degree of social security, personal responsibility is described and found to be one of the drivers of climate change action. More detailed, 80.3% of participants in the questionnaire feel

personally responsible to alter their behaviour in order to achieve current climate targets. Furthermore, feeling personal responsibility is found to be positively influencing the extent of climate change action taken by the respondents. Lacking the feeling of responsibility to take action may therefore be a factor affecting inaction. Contrary, based on the results of the questionnaire, social pressure is not found to influence climate change action significantly. However, one interviewee describes to alter his behaviour to more climate change action, around his colleagues, due to the social setting.

Contrary to findings in literature (see page 13), the level of personal risk perceived by climate change was not found to influence the extent of climate change action significantly.

However, while one interviewee described particular personal worry, mainly the worry about future generations, people in less economically strong countries, or their own children, was found to be a reason for climate change action. In accordance with findings in literature presented in chapter two, a lack of altruistic values may further explain inaction. Similarly, and as found in literature (see page 8-9), higher environmental values may also influence climate change action. However, this research did not find a relation between the extent of climate change action and higher personal environmental values, expressed through a closeness to nature.

Furthermore, a wish for incentives was expressed by 91.8% of respondents in the questionnaire to lower their greenhouse gas emissions. A lack of incentives could therefore be a reason for inaction, as those respondents to the questionnaire who feel a personal benefit to alter their behaviour to achieve current climate targets are found to take more climate change action (see page 49).

Additionally, those interviewees who described a particular disbelief in the current extent of global climate change action to limit climate change to a 2°C increase due to political inaction, emphasized the importance voting has to them and how some of them encourage others to vote. In that sense, an urge for political change causes climate change action.

Even though the results of the questionnaire do not allow the conclusion of a positive influence of a role model on climate change action, two of the interviewees described to have had positive related influence on colleagues or friends by acting as a role model.

However, the biggest finding of the interviews, particularly, explaining climate change inaction among those who are aware about their influence and already engage in some form of lowering their emissions, is the inaccessibility of information and opacity of related greenhouse gas emissions to products or actions of their interest.

6.2 Communicators and Communication Platforms

As presented in chapter three, communicators and the platforms they communicate on, significantly influence one's perception and understanding of climate change and related actions to minimise it. The communicators and platforms with the biggest influence on the communication of climate change and climate change action relevant knowledge, are educators and educational institutions. However, also other communicators and platforms were described of great importance within the scope of the interviews and questionnaire, including the news media, social media, but also movies, books, documentaries, and advertisements. Also, friends and family, or the general personal environment of an induvial were particularly found to influence action-related knowledge, mostly in form of concrete recommendations for climate change action.

6.2.1 Educators and Educational Institutions

Both, participants in the questionnaire and all interviewees in their twenties indicate to have been personally greatly influenced by educators or in educational institutions in terms of climate change action related knowledge. As described with the results of the questionnaire, almost 40% of the participants indicated that they learned most about climate change from educational institutions. Additionally, 67% of participants remember being educated about climate change in high school (or at age 14-18), 35% in middle school, 20.5% remember being educated about the issue in primary school already and 2.4% even remember being educated about it as early as in

kindergarten. In accordance with literature about the role of education in general (see page 24), four of the five younger interviewees also described their educational knowledge gained in school, or university to have been particularly influencing in their climate change perception and guidance towards climate change action.

With respect to educational institutions, many interviewees also described the importance of scientific literature to them and on their climate change and climate change action knowledge.

6.2.2 Friends, Family and Close Ones

Though 22.1% of the respondents in the questionnaire indicated to have learned the least from their family or friends about climate change, out of the options presented in the respective question, interviewees have found their friends, family, partner, sometimes even colleagues to have the biggest influence on their climate change action. One of the reasons being that they present the interviewees with action-related knowledge, including suggestions on how to lower their emissions and share their knowledge about particular products that can be swapped for other, longer-lasting ones, or encourage them to adapt their behaviour to them, by, for example only drinking tap water around the office, instead of bottled drinks. Respondents indicating to often discuss the topic of climate change with their friends and family are also found to take greater climate change action, showing some kind of correlation. These findings validate the preceding studies presented in chapter three (see page 20) on the positive influence of discussing climate change with friends and family on climate change behaviour. Additionally, the specific potential of a leverage in communication influenced by educational institutions to inspire discussions among friends and family is found a solution in literature. Particularly, to overcome the influence of socioeconomic status on climate change action communication (Valdez, Peterson, & Stevenson, 2018). George Marshall (2014) also describes a need for common and authentic people to communicate climate change and related actions to limit its progress. Similarly, one interviewee describes to be very confused and almost discouraged to partake climate change action when she finds her friends being unauthentic about their actions. Overall, as

described in chapter three, individuals disapprove of hypocrites, raising the question of effectiveness of celebrity climate advocacy and its consequence on moral and social norms surrounding energy-intense forms of consumption.

6.2.3 News Media

Similar to the importance of news media found in literature (see page 20-21), both, interviewees, and respondents in the survey are found to be influenced by the communication about climate change through the news media. Especially the oldest interviewee described to have most of his climate change knowledge from news media. Similarly, respondents in the questionnaire on average, ranked the news media as the second most influential communicator on their climate change knowledge.

6.2.4 Social Media

In addition to the rather recent findings in literature, emphasizing the importance of social media in overall communication, but also that of climate change knowledge and climate change action influencing content (see page 21), respondents of the survey have, on average, ranked social media as the third most important influence on their climate change knowledge.

Furthermore, interviewees are mentioned the use of Instagram as particularly influential, giving them the opportunity to create an environment that provides them with relevant climate change action related content on the platform. Such content was described to, for example, have led to the suggestion of new documentaries and products.

Therefore, especially scientists are advised to communicate and share their findings on social media platforms to reach more individuals from different educational and academic backgrounds.

6.2.5 Movies, Books and Documentaries

Respondents, on average, ranked documentaries higher than TV shows, movies and books in their influence on respondents' climate change knowledge. However, only few respondents agreed to know a story, movie or book that portrays a realistic image of the impact global average warming

will have in within the next 40 years. As described in chapter three, this might be due to very few fictional and emotional stories addressing the issue, of which those who do many only provide a storyline far from a realistic scenario (Johns-Putra, 2019).

Furthermore, watching climate change related documentaries is found to positively influence the extent of climate change action. While it was not examined within the scope of the questionnaire, one interviewee particularly describes the influence science-fiction literature has on his perception of risk related to climate change on him personally. He was found to be the only interviewee to be able to articulate concrete worries and expectations of its influence on him personally. As described prior in chapter three, the overall potential of climate fiction to enable readers to imagine potential futures and the fragility of human societies and ecosystems has also been found in literature.

Overall, more empirical research on climate change literature and art is urgently needed as it is thought to bear great potential in influencing climate change action.

6.2.6 Businesses

97% of respondents in the survey agreed to wish the corporations they like to buy from were putting more effort into a low-emission business. Therefore, businesses making such efforts are strongly advised to include their efforts in their corporate communication.

Furthermore, as described by interviewees, a standardised, systematic transparency about businesses' climate change impact should be mandatory by regulation, which can only be achieved through political involvement. Respectively, interviewees also described numerous times that they wished for more transparency regarding product's and action's greenhouse gas emissions, emphasizing their dependency on product information.

Furthermore, as described in chapter three (see page 23-24), and confirmed by interviewees, political leaders also shape the felt urgency for climate

change action and political leaders, in democracies, are enhanced by the public's agreement with their ideology and leadership.

6.3 Storytelling and Framing

Climate change can be understood and defined as many different problems, including an economic, technical, energy, land use, governance, and moral problem. It is multivalent and can be interpreted in a variety of self-serving ways and related information also constantly evolves and changes. Therefore, there is no one right solution to communicate climate change and climate change action (Marshall G., 2014). However, the effectiveness of communication is greatly influenced by the way the message is framed and the story told (Lakoff, 2004).

This chapter summarises important findings on framing and storytelling from the questionnaire and interviews to compare them and expand it with preceding research introduced in the first two literature chapters to derive recommendations for climate change action communicators.

6.3.1 Providing System, Action-Related and Effectiveness Knowledge

Similar to the findings in literature (see page 4-5), knowledge, especially on the effectiveness of climate change action, is found to influence climate change action heavily. Therefore, when communicating information, especially the knowledge structure should be regarded. If someone, for example, lacks the basic understanding of climate change (system knowledge), they may only be able to understand parts of action- related information communicated. Similarly, only communicating scientific climate change knowledge, without concrete climate change action knowledge, is found to limit climate change action (Bieniek-Tobasco, et al., 2019). Lastly, even if both, action-related knowledge, and system knowledge are present, the information about effectiveness is found to be greatly influential. Therefore, knowledge-based education should include all three different knowledges to assure the greatest possible climate change action (Frick, Kaiser, & Wilson, 2004). As mentioned in the previous chapter, especially educational institutions should design their programmes to inspire the discussion about climate change and climate change action in other

environments outside the educational institutions. More specifically, it is found to be important that, especially action-related knowledge and information on effectiveness, is shared among friends, families and partners, which should be promoted through schools and other educational institutions, as well as on the various channels of NGO's, and especially on social media profiles.

However, all information should be framed regarding the later provided strategies on how to trigger positive emotions, in accordance with criticism regarding the information-deficit model presented in chapter three (see page 30).

However, building an environment around oneself that enables one easier access to information should be promoted by, for example educators, but also public figures on social media. One climate change action-promoting profile on the social media platform Instagram, could promote other, similar profiles, to broaden the sources of information of their followers. Additionally, profiles of NGO's promoting climate change action, could advertise on social media platforms, broadening their range of influence.

Furthermore, a particular potential for documentaries to focus on action-related knowledge is found, with literature also suggesting the further provision of additional material beyond the documentaries themselves. Additional material could be provided on social media platforms, websites, and other means used for promotions as it should be advertised for within the documentary and its promotion (Bieniek-Tobasco, et al., 2019). Since documentaries are found to positively affect the extent of climate change action individuals take, organisations and individuals funding climate change action communication should consider their investment in documentaries.

6.3.2 Choosing the Right Terminologies

The consideration of concrete wording chosen to communicate not only climate change action, but the relevant system knowledge of climate change, even ranging as far as weather reports and campaign speeches, is an important framing factor influencing the inspiration of climate change action

(Hardisty, Johnson, & Weber, 2010; Hardisty, Beall, Lubowski, Petsonk, & Romero-Canyas, 2019; Marshall G., 2014).

As shown by the results of the questionnaire and supported by findings in literature (Ereaut & Segnit, 2006; Nerlich, Koteyko, & Brown, 2010), the slight difference of the interchangeably used words "heat" and "warmth" may already influence the perception of the message, when, for example, reporting on climate. While "warmth" is associated with rather comforting things and situations, "heat" is associated with rather dangerous and stressful things and situations. Similarly, Richard Betts, who leads the climate research arm of Britain's meteorological monitoring organisation, says that instead of "*climate change*" or "*global warming*", "*global heating*" should be used to describe the phenomenon, since it is more correct (Watts, 2018). Consequently, as described in chapter three (see page 29), great efforts to support the common use of *"climate change"* and limit other terms that allow a greater association with the burning of fossil fuels, must be revised.

Similarly, it is suggested to explore whether a change from the commonly used terminology "low-carbon" to a term including "high" insinuates a difference on its perception, as "high" is a universal frame for status and power, whereby low is one for infertility and social failure (Marshall G., 2014).

Social media profiles, just like traditional media, movies, books, and documentaries should all assure an understanding of the information communicated. One aspect being the accurate translation of scientific information to be understood by lay-people. Communication strategies should be shifted from uncertainties and probabilities towards tangible risks and concrete presentations of climate change actions (Corner, Lewandowsky, Phillips, & Roberts, 2015; Hine & Gifford, 1996; Marshall G., 2014; Serrao-Neumann & Low Choy, 2018; Watts, 2018).

6.3.3 Communicating Risk, but Preserving Hope

While respondents in the survey and most of the interviewees indicated the feeling of rather small personal risk, an altruistic feeling of risk for others, including future generations, was commonly found. However, when asked

to write the emotion most fitting to describe their feeling about climate change, many of the respondents described anxiety, scaredness and worry. Literature suggests that a fear of the effects of climate change, especially to the extent of anxiety may be built on silence, causing repression and denial and should be avoided (Marshall G., 2014; Ojala & Bengtsson, 2019). Not communicating about it is therefore no solution.

To avoid anxiety that leads to paralysation or denial (e.g. (Bieniek-Tobasco, et al., 2019; O'Neill & Nicholson-Cole, 2009; Ojala, 2012; Ojala, 2015; Witte & Allen, 2000)) and restore faith in a limitation of global average warming, especially interviewees describe the communication about action from political leaders as particularly contradicting. However, describing to find their grounding in the assurance that their friends, partner, or family also take climate change action. Therefore, again, a communication among friends, families and partners should be induced and advised for by respective communicators. As suggested by Ojala and Bengtsson (2019), especially the loss of hope among young adults must be prevented to assure climate change action.

News articles, social media posts, and other forms of report on climate change solutions and particular actions are therefore thought to positively influence the hope in the ability to limit the increase of global average temperature to 2°C (Feldman & Sol Hart, 2018; Smith & Leiserowitz, 2014; White, Habib, & Hardisty, 2019). Stories evoking optimism generally are described to be helpful in preventing fear and to positively influence climate change action (Malkani, 2017), and, as presented in the next subchapter, the attitude of the surrounding environment is found to influence individuals' hope.

However, within the scope of the interviews, a positive influence on climate change action has also been found for the interviewee that had a clear ability to express his expected limitations by climate change and therewith related risks, which he had gained from science-fiction literature. It is therefore possible that such storytelling is able to translate the potential risk into actually felt risk, inspiring climate change action (Jones, 2014; O'Neill &

Nicholson-Cole, 2009). Furthermore, it appears to be important to communicate the interlinked schema of climate change, including employment, the economy and crime, aspects of life that are thought to be more tangible and relatable to the individual than an overall increase of global average temperature.

To avoid creating a state of negative emotions that are too intense, and rather inspire more effective, subtle activation of negative emotions (Meng & Trudel, 2017; Peloza, White, & Shang, 2013; White, Habib, & Hardisty, 2019), the following aspects should be considered.

To prevent a feeling of such intense fear that leads to inaction, communicators should use moderate fear appeals, combining them with information about efficacy and concrete ideas for action (Li S.-C. S., 2014; Osbaldiston & Sheldon, 2002; White, Habib, & Hardisty, 2019).

To evoke climate change action from the feeling of guilt, subtle hints leading to an individual questioning their own self-standards of action are found to be more influential and climate change action-provoking than guilt appeals (Peloza, White, & Shang, 2013). Additionally, guilt shared by a collective, evoked by the communication on a country's significant carbon footprint, is also found to lead to greater climate change action (Ferguson, Branscombe, & Reynolds, 2011; Mallett, Melchiori, & Strickroth, 2013; White, Habib, & Hardisty, 2019).

An inclusion of unquestionable, imminent, relatable risks, complemented by concrete recommendations for actions are consequently believed to be the most effective way to communicate risks, leading to greater engagement by individuals. However, further research is strongly suggested.

6.3.4 Strengthening Ecological Social Norms, Values, and Green Identity

As described briefly prior, social-conformity and the environment one is surrounded by is greatly found to influence one's climate change action. Despite the already recommended evocation of conversations within that environment by communicators and the importance to encourage the

building of a respective network, images and stories catering social conformity are thought to additionally be influential. Consequently, especially social media platforms allowing the sharing of videos and images have been identified to bear one's potential to create a respective environment. The dynamic that can be created by the increasing communication of desired social norms has also been briefly explained in chapter three, where a study was introduced finding hotel guests more likely to reuse their towels when told that others are also already doing that to save emissions (Cialdini, Kallgren, & Reno, 1991). However, it is important to prevent a narrative that divides into those who care about climate change and those who don't (Marshall G., 2014).

A narrative of "us" and collective action may also overcome the previously described lack of common enemy found in literature, as the power of social norms and conformity has the potential to guide individuals towards low-carbon behaviours (Dean, Fielding, & Wilson, 2019; Hurlstone, Lewandowsky, Newell, & Sewell, 2014; Walker, Kurz, & Russel, 2018). Even though less spectacular and more uncomfortable, especially news media should include a narrative of cooperation, mutual interest, and commonalities. As described in chapter two, and found to be true among interviewees, individuals need to see and know that they are not the only ones acting, before altering their behaviour in potentially uncomfortable ways, as the feeling of collective action is found to support the important believe in the effectiveness of action. However, it is also advised against to emphasize unwanted social norms, but to focus on wanted social norms.

Despite, communicating messages relating to environmental or personal values may evoke climate change action. An example is the communication about the personal responsibility for the deforestation of rainforest, when purchasing products with palm oil (Fowler, et al., 2011), strengthening values of environmental care, fairness and respect. Furthermore, communication should aim to inspire individuals to make the reduction of their personal emissions a goal. More specifically, individuals should be invited to generate the related benefits of a reduction of their emissions in their own words, as this is thought to result in more consequent action (Marshall G., 2014).

The fact that there were no findings of a substantial influence of respective role models on climate change action within the results of the questionnaire does not support the suggestion that a portrayal of people who lead by example may increase climate change action, found in literature (see page 23 & 30). Whereas the descriptions from interviewees having inspired others by their actions leads to the suggestion that leading by example, accommodated by a concrete description of possible actions, will have a positive impact. This contradiction should be explored further in future research.

However, it is strongly suggested that individuals who know lifestyle and consumption guidelines for the personal reduction of one's -climate change impact, share those guidelines with their environment. Despite personal conversations, social media is also thought to provide adequate platforms for that.

The knowledge that others are also taking climate change actions encouraged the interviewees beliefs, that their own climate change action would be effective. This captures a suite of processes that involve adopting a problem-solving attitude and shifting to a more pro-environmental attitudinal and behavioural position (Bradley, L., Chai, & Reser, 2020). Therefore, stories and images about other individuals taking action should be presented and, once more, conversation amongst individuals should be inspired.

Additionally, communication including appeals towards binding moral values, such as duty, authority, and consistency with in-group norms, is found to lead to more climate change action, especially among conservative individuals. Furthermore, individualising moral values such as fairness and empathy are found to particularly evoke climate change action among progressive individuals (Kidwell, Farmer, & Hardesty, 2013; White, Habib, & Hardisty, 2019).

Moreover, as described by interviewees, their climate change action appears to be part of a whole environmental concept, serving some degree of green identity. It is therefore found of importance to further research how an isolation of the topic throughout the communication channels influences climate change action.

6.3.5 Overcoming Biases

The proposed influence of biases on decision making in the context of climate change has been validated by the findings of the questionnaire and interviews. Especially the optimism bias could be shown to have a significant impact on climate change action. The following table lists recommendations for communication strategies to overcome the identified biases.

Hyperbolic discounting	- Communicate emphasizing benefits of climate change action and shifting the focus towards future generations (Wade-Benzoni, Tenbrunsel, & Bazerman, 1997; White, Habib, & Hardisty, 2019; Zaval, Markowitz, & Weber, 2015) - Communicate personal, imminent and tangible risks (e.g. by means of weather reports) - Focus on short-term costs and gains (Dasgupta, 2008).
The bystander effect	Communicate emphasizing personal responsibility, focussing on personal contributions and concrete suggestions for action
Confirmation bias	- Actively invite opposing opinions into the conversation or address information at unusual recipients, emphasizing evidence for arguments - Avoid possibilities and uncertainties
Availability bias	Communicate with an emphasis on time, possibly visualising time frames or evolvements by means of time bars
Status quo bias	Focus on the positive consequences of change (Weber, 2010)
Endowment effect	Avoid the framing of losses and emphasize gains (Kahneman, Knetsch, & Thaler, 1990; Strahilevitz & Loewenstein, 1998; Thaler R., 1980).
Optimism bias	Localise and therefore personalise communication about risks, effects and impacts (Blake, 1999; King, 2019; Leiserowitz A. , 2006; Scannell & Gifford, 2013)

Figure 14: Recommendations for measures of communication to minimise biases, own table.

To add to the suggestions presented in the table above, labels on energy-efficient appliances should compare energy costs rather than savings (Bull, 2012; Min, Azevedo, Michalek, & de Bruin, 2014; White, Habib, & Hardisty, 2019). Also, if loss framing cannot be prevented, it is most effectively communicated when provided with information on how to engage in the promoted action (White, MacDonnell, & Dahl, 2011) and a focus on future

benefits of the climate change action (Reczek, Trudel, & White, 2018; White, Habib, & Hardisty, 2019).

To overcome habits, intention-setting is found to be of particular importance (Aarts & Dijksterhuis, 2000; Aiaanse, M., De Ridder, De Wit, & Kroese, 2011). Communication, eliciting intention, or goal setting (including challenges) are therefore suggested to support a change in habit. As mentioned prior, letting the individual word the goal and intention, as well as reasons themself is believed to lead to a greater chance of achievement and change in habit (Marshall G., 2014).

Furthermore, a reframing of choice-option labels supports a change of habits and status quo (Zaval, Markowitz, & Weber, 2015; Weber, 2010; Weber, 2015). This may involve a new conceptualization of happiness, independent from consumption (Weber, 2015).

6.3.6 Connecting Personal Experiences and Evoking Emotions

Though the importance of personal experience of climate change impacts, as found in literature (see page 6) was not found within the scope of the questionnaire or interviews, this chapter presents recommendations for communication strategies that connect personal experiences of climate change impacts with climate change actions. Furthermore, the chapter suggests framing strategies that evoke positive emotions, leading to greater climate change action.

Even though no increase in climate change action among those who have personally felt the impacts of climate change already, compared to those who have not, was detected within the scope of the questionnaire, individuals are found to generally be able to detect changes in temperature. Furthermore, numerous studies have found a relation between changes in weather experience and the perception of climate change (Akerlof, Maibach, Fitzgerald, Cedeno, & Neuman, 2013; Brody, Zahran, Vedlitz, & Grover, 2008; Joireman, Truelove, & Duell, 2010; Krosnick, Holbrook, Lowe, & Visser, 2006; Reser, Bradley, Glendon, Ellul, & Callaghan, 2012; Spence, Poortinga, Butler, & Pidgeon, 2011; van der Linden, 2015; Zaval, Keenan, Johnson, & Weber, 2014). It is therefore suggested that, especially news reports include

the relation between changing weather patterns and climate change in weather reporting to increase certainty about it and provoke urgency to action. Ideally, climate change action measures would also be presented.

As described in chapter three, the story of climate change is not very often told in an emotional way. However, as also explained, the positive framing of messages is often found to positively influence climate change action (see page 31). Furthermore, stemming from a sense of responsibility, provoking the moral emotion pride through communication, is found to lead to greater climate change action, for example (Antonetti & Maklan, 2014; Lerner & Keltner, 2000; White, Habib, & Hardisty, 2019).

As described in chapter three, especially images and visuals have the ability to communicate and provoke emotions that are positively influencing climate change action (see page 31). It is therefore suggested to carefully choose images that speak to the emotional brain. Even though, further research is needed on the most effective images to present, previous research has, for example, found personalised images and messages to be more effective than generalised ones (Marshall G., 2014). Moreover, especially cute animals have been found an effective object of communication, leading to climate change action (Wang, Mukhopadhyay, & Patrick, 2017) as it is driven by the increased tenderness when responding to such appeals (White, Habib, & Hardisty, 2019).

6.3.7 Increasing the Accessibility and Visibility of Information

The inability to assess products and actions in terms of their impact on climate change is found to be the biggest limitation to climate change action, especially within the scope of the interviews. As described in chapter five, interviewees present the general willingness to take greater climate change action, hindered by a lack of transparency and information. Additionally, those participants in the survey that indicated to know how much CO_2 they were allowed to emit, took overall more climate change action. Furthermore, interviewees often described the wish for labels on products and overall consumer information at the point of-purchase as a means of guidance and support in the assessment process towards more climate change action.

Provided that retailers and producers, including web shops, want to communicate the impact of their products, a great potential for the influence at direct point-of-purchase was found. One interviewee specifically describes to have to be reminded to assess the climate change impacts of her purchases. However, a general lack of significant findings regarding optimal point-of-purchase communication by retailers to evoke greater climate change action is noted. It is therefore suggested that more studies are designed to explore most effective communication strategies at the point of purchase to generate greater climate change action.

Climate change labelling, also often generally comprised in eco-labelling is a tool to communicate the respective attributes of a product (Parguel, Benoît-Moreau, & Larceneux, 2011). Their attention-grabbing nature, being easily understandable, and (ideally) consistent across categories, enables consumers to make better informed decisions (Borin, Cerf, & Krishnan, 2011; Taufique, Vocino, & Polonsky, 2017; Thøgersen, 2000). It has furthermore been suggested that the respective labelling appears more transparent if issued by a third party, therewith validating the claims (Manget, Roche, & Münnich, 2009). However, it is important to note that some work suggests that eco-labels, in general, do not influence consumer food selections (Grunert, Hieke, & Wills, 2014; White, Habib, & Hardisty, 2019).

However, labels which specifically indicate carbon emissions have been found to influence consumer behaviour. A study published in 2015 found that individuals, beyond taking the carbon label into consideration when making product decisions, also ask for detailed information on the label. Additionally, the study suggests that firms should be preparing for how the labels may affect consumer choice (Groening, Inman, & Ross, 2015).

One company that is found to integrate an eco-label, including the transparency about their CO_2-impacts on (soon) all of their products, is the Berlin- based vegan food corporation Veganz Group AG. The corporation, which has announced the inclusion of the label, provided by the Swiss Eaternity Institute in early 2019, communicates full transparency about the cooperation regarding the labelling process on its website (Veganz, 2020).

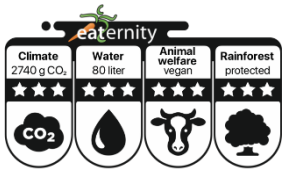


Figure 15:Eaternity Score, (Eaternity, 2020).

The company provides the Eaternity Institute with all the information necessary for a concrete and precise life cycle analysis. With which the institute then calculates a quantitative analysis of the environmental impact of a product over its entire life cycle and compares it to the impact of 100,000 other supermarket products to then give it a score. As can be seen in figure 15, the label also includes a score on the products' water use, animal welfare and protection of the rainforest. Potential customers can additionally scan the products with the App CodeCheck, to find out detailed information about the food items (Eaternity, 2020).

In an interview with Moritz Möller, Head of Marketing and E-Commerce at Veganz Group AG, he described broad positive feedback from customers to the introduction of the score on their products. The company, before introducing the score, thoroughly evaluated the risks of an introduction to a market in which companies do not practice the transparency the company does. Additionally, the company funded a nutritional study, which found 87% of vegan participants to eat a vegan diet for reasons of environmental protection and 74% to particularly appreciate product labels (Veganz, 2019). Furthermore, he described the particular chance for the company to improve their production further, especially in terms of sourcing, based on the lifecycle assessment results from the Eaternity Institute. Overall, the company appears to have identified the provision of extensive transparency as a great market positioning potential. The full interview can be found in Appendix J.

In a conversation via mail, Sebastian Gries from the Eaternity Institute also stated to receive great feedback from their customers, who, despite using the label as a marketing-subject, primarily follow the goal of having a third party identify the score and impact of their product in a simple and credible way. He also stated the transparency of the numbers, facts and data provided by the institute to be the significant difference compared to climate neutrality labels. Additionally, he said to believe that general interest in the topic of sustainability regarding food consumption will increase within the next years

and expects more producers to integrate the institute's score. However, it is currently difficult to assess expected market penetration. The full conversation can be found in Appendix K.

Overall, it is suggested that researchers continue to study methods of labelling and ways to improve and visualise the lifecycle assessment itself.

6.4 Limitations

The biggest limitation of the presented research is the representativeness the findings of the quantitative and qualitative research hold. Both scientific methods relied on the participation of voluntary individuals. As a result of distribution via social media being the only liable option, a snowball principle could not be prevented, which led to overall low diversity. Overall, respondents and interviewees were found to be highly educated, mostly between the age of 18 and 34 and to be living in a country with a high standard of socio-economic security. Furthermore, the perceived importance and level of certainty about the happening of climate change were high.

The, by far, oldest interviewee, engaging in the least climate change action, described not to have been educated about climate change or possible actions to lower emissions in any educational setting or institution, gaining his knowledge through traditional media or his family. It is therefore likely that recommendations for strategies for climate change communication should be formulated very differently when addressing individuals over the age of 35, or less academically educated, as their system knowledge is likely to differ from that of the interviewees and participants in the survey.

Additionally, often, recommendations of action were derived from described, or identified reasons for action, contrary to reasons for inaction as both, the participants in the questionnaire and interviewees already showed a high degree of climate change action.

Despite the suggestions for further research mentioned previously, it is also important to further study how climate change action related messages travel through social media to specify the recommendations. Generally, the effectiveness of recommendations should be tested, preferably in

experiments as they bring advantages to the study of behaviour and extend the findings of research based on participants' self-reporting.

The findings of literature presented in chapter two and three are also limited to fit the scope of this research. Especially related decision-making processes are believed to be more complex and drivers to be more various than the ones presented. Additionally, a driver analysis for certain behaviours or particular actions is suggested for further research to be able to detect differences in the drivers of various climate change actions.

7 Conclusion

This research aimed to identify recommendations for strategies for communication that effectively induces an increase in climate change action, based on the prior identification of reasons for individuals' climate change inaction. Findings in literature of factors influencing climate change action were therefore compared to respective findings in a quantitative and qualitative analysis and various recommendations for communication strategies to exacerbate the extent of climate change action taken by individuals were concluded.

The results indicate that the degree of system- and action-related knowledge, as well as the related certainty an individual holds about climate change and effectiveness of climate change action, greatly influences the degree of respective action. It is therefore recommended to design communication so that it informs and presents concrete ideas for action and emphasizes their effectiveness. Furthermore, communication should be designed to evoke conversations about concrete climate change actions among individuals, including friends, partners, family members and colleagues, as that kind of communication is found to be effective in inspiring greater action. The effectiveness is particularly explained by the belief in effectiveness of action, due to the assurance of others also taking climate change action.

Furthermore, a cautious choice of wording is suggested, as even small changes in commonly interchangeably used words are found to be perceived

differently. Simultaneously climate communicators must avoid evoking a feeling of threat through climate change that leads to paralysation but focus on communicating optimistic and positive images to preserve hope.

To overcome a variety of identified biases, communicated time frames should be chosen cautiously, and short-term losses prioritised. Moreover, the issue of climate change should be localised and personalised to evoke greater climate change action among individuals. Overall, it is suggested to emphasize the positive consequences of change to overcome habits limiting climate change action.

Due to the identified challenge to assess climate change impacts and limited imminent availability of information regarding actions' and products' impacts on climate change, carbon-labels are recommended to be used by businesses. Additionally, the potential in communication inducing the feeling of responsibility and evoking individuals to formulate clear climate change reduction intentions was identified.

While the samples for the questionnaire and interviews limit the generalizability of the results, the findings provide new insight into reasons for limited climate change action and inaction among educated and young individuals, as well as recommendations for communication evoking greater climate change action.

To better understand the implications of these results, future studies should examine the effectiveness of the recommended communication strategies, examine the generalisability of the results with means of greater and more diverse sample size, and aim to identify more detailed drivers of climate change inaction to derive further recommendations for communication. Additionally, research should focus on the improvement of life-cycle assessments in terms of climate change impact, and their availability to lay-people.

List of References

Aarts, H., & Dijksterhuis, A. (2000, February). Habits as Knowledge Structures: Automaticity in Goal-Directed Behavior. *Journal of Personality and Social Psychology 78(1)*, pp. 53-63.

Acevedo, M., & Krueger , J. (2004, February). Two Egocentric Sources of the Decision to Vote: The Voter's Illusion and the Belief in Personal Relevance. *Political Psychology Vol. 25(1)*, pp. 115-134.

Aertsens, J., Verbeke, W., Mondelaers, K., & Van Huylenbroeck, G. (2009). Personal determinants of organic food consumption: A review. *British Food Journal Vol. 111(10)*, pp. 1140-1167.

Aiaanse, M. A., M., G. P., De Ridder, D. T., De Wit, J. B., & Kroese, F. M. (2011). Breaking habits with implementation intentions : A test of underlying processes. *Personality and Social Psychology Bulletin Vol. 37(4)*, pp. 502-513.

Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology Vol. 52(1)*, pp. 27-58.

Akerlof, K., Maibach, E., Fitzgerald, D., Cedeno, A., & Neuman, A. (2013). Do people "personally experience" global warming, and if so how, does it matter? *Global Environmental Change Vol. 23 (1)*, pp. 81-91.

Alcott, B. (2017). Does teacher encouragement influence students' educational progress? A propensity-score matching analysis. *Research in Higher Education Vol. 58(7)*, pp. 773-804.

Alfredsson, E. C. (2004). "Green" consumption—no solution for climate change. *Energy Vol. 29(4)*, pp. 513-524.

Anderson, A. (2011). Sources, media, and modes of climate change communication: The role of celebrities. *Wiley Interdisciplinary Reviews: Climate Change Vol. 2 (4)*, pp. 535-546.

Antala, M., & Hukkinenb, J. (2010, March 15th). The art of the cognitive war to save the planet. *Ecological Economics Vol. 69(5)*, pp. 937-943.

Antonetti, P., & Maklan, S. (2014). Feelings That Make a Difference: How Guilt and Pride Convince Consumers of the Effectiveness of Sustainable Consumption Choices. *Journal of Business Ethics Vol. 124 (1)*, pp. 117–134.

Arens, E. (2020, March 10th). *The best times to post on social media in 2020.* Retrieved from Sprout Social: https://sproutsocial.com/insights/best-times-to-post-on-social-media/#fb-times

Arnold, A. (2018). *Climate Change and Storytelling: Narratives and Cultural Meaning in Environmental Communication.* Cham: Springer International Publishing.

Atkinson, L., & Rosenthal, S. (2014). Signaling the green sell: The influence of eco-label source, argument specificity, and product involvement on consumer trust. *Journal of Advertising Vol. 43(1)*, pp. 33-45.

Attari, S. Z., Krantz, D. H., & Weber, E. U. (2019). Climate change communicators' carbon footprints affect their audience's policy support. *Climatic Change Vol. 154*, pp. 529-545.

Austin, J. (2019, November 18th). *Trump's withdrawal from the Paris climate deal is bad for US business. Here's why.* Retrieved from https://www.weforum.org/agenda/2019/11/trump-paris-climate-change-us-business/

Azeiteiro, U. M., Leal Filho, W., & Aires, L. (2018). *Climate Literacy and Innovations in Climate Change Education.* Cham, CH: Springer International Publishing.

Babutsidze, Z., & Chai, A. (2018). Look at me saving the planet! the imitation of visible green behavior and its impact on the climate value-action gap. *Ecological Economics Vol. 146, ,* pp. 290-303.

Bamberg, S., & Moser, G. (2007). Twenty years after Hines, Hungerford and Tomera: A new meta-analysis of psychosocial determinants of pro-environmental behavior. *Journal of Environmental Psychology Vol. 27*, pp. 14–25.

Bamberg, S., & Schmidt, P. (2003, March). Incentives, Morality, Or Habit? Predicting Students' Car Use for University Routes With the Models of Ajzen, Schwartz, and Triandis. *Environment and Behavior 35(2)* , pp. 264-286.

Banerjee, S. B. (2002). Reinventing colonialism: Biotechnology, intellectual property rights and the new economics of sustainable development. *Ninth Biennial Conference of the International Association for the Study of Common Property, Victoria Falls.*

Bang, H., Ellinger, A., Hadjimarcou, J., & Traichal, P. (2000). Consumer concern, knowledge, belief, and attitude toward renewable energy: an application of the reasoned action theory. *Psychology and Marketing Vol. 17(6)*, pp. 449–468.

Bearden, W. O., & Etzel, M. J. (1982). Reference group influence on product and brand purchase decisions. *Journal of Consumer Research Vol. 9(2)*, pp. 183-194.

Beattie, G., & McGuire, L. (2016). Consumption and climate change: Why we say one thing but do another in the face of our greatest threat. *Semiotica Vol. 213*, pp. 493-538.

Beattie, G., Marselle, M., McGuire, L., & Litchfield, D. (2017). Staying over-optimistic about the future: Uncovering attentional biases to climate change messages. *Semiotica Vol. 218*, pp. 21-64.

Beckman, L. (2009). *The frontiers of democracy: The right to vote and its limits.* London, UK: Palgrave Macmillan UK.

Behr, R. (2010). Anti-consumerism. *Public Policy Research Vol. 17(3)*, pp. 123-129.

Bekin, C., Carrigan, M., & Szmigin, I. (2005). Defying marketing sovereignty: Voluntary simplicity at new consumption communities. *Qualitative Market Research: An International Journal Vol. 8(4),* , pp. 413-429 .

Berg, J. (2017). Political Participation in the Form of Online Petitions: A Comparison of Formal and Informal Petitioning. *International Journal of E-Politics Vol. 8(1)*, pp. 14-29.

Berkley Library. (2020, April 26th). *Non Governmental Organizations (NGOs): Environment.* Retrieved from Berkeley Library: University of California: https://guides.lib.berkeley.edu/c.php?g=496970&p=3427176

Bertolotti, M., & Catellani, P. (2014). Effects of message framing in policy communication on climate change. *European Journal of Social Psychology Vol. 44(5)*, pp. 474-486.

Bieniek-Tobasco, A., McCormick, S., Rimal, R. N., Harrington, C. B., Shafer, M., & Shaikh, H. (2019). Communicating climate change through documentary film: Imagery, emotion, and efficacy. *Climatic Change Vol. 154(1)*, pp. 1-18.

Blake, J. (1999). Overcoming the "value-action gap" in environmental policy: Tensions between national policy and local experience. *Local Environment Vol. 4*, pp. 257-278.

Bord, R., O'Connor, R., & Fisher, A. (2000). In what sense does the public need to understand climate change? *Public Understanding of Science Vol. 9(3)*, pp. 205-218.

Borick, C. P., & Rabe, B. G. (2010). A reason to believe: Examining the factors that determine individual views on global warming. *Social Science Quarterly Vol. 91(3)*, pp. 777-800.

Borin, N., Cerf, D. C., & Krishnan, R. (2011). Consumer Effects of Environmental Impact in Product Labeling. *Journal of Consumer Marketing Vol. 28 (1)*, pp. 76–86.

Bosetti, V., Lubowski, R., & Elgar (Eds.), E. (2010). *Deforestation and climate change: Reducing carbon emissions from deforestation and forest degradation.* Cheltenham, UK: Edward Elgar Publishing.

Bostrom, A., Morgan, M. G., Fischhoff, B., & Read, D. (1994). What do people know about global climate change? *Risk Analysis Vol. 14*, pp. 959–970.

Boykoff, M. T., & Goodman, M. K. (2009). Conspicuous redemption? reflections on the promises and perils of the 'Celebritization' of climate change. *Geoforum Vol. 40(3)*, pp. 395-406.

Bradley, G., L., B. Z., Chai, A., & Reser, J. P. (2020). The role of climate change risk perception, response efficacy, and psychological adaptation in pro-environmental behavior: A two nation study. *Journal of Environmental Psychology Vol. 68,(101)*, p. 410.

Breakwell, G. (2010). Models of risk construction: Some applications to climate change. *WIREs: Climate Change Vol. 1(6)*, pp. 857-870.

Brinkmann, S., & Kvale, S. (2014). *Interviews: Learning the craft of qualitative research interviewing (3rd ed.).* Los Angeles, CA: SAGE.

Brinkmann, S., & Kvale, S. (2018). *Doing interviews (2.th ed.).* London: SAGE Publications Ltd.

Brody, S., Zahran, A., Vedlitz, A., & Grover, H. (2008). Examining the relationship between physical vulnerability and public perceptions of global climate change. *Environment and Behavior Vol. 40 (1)*, pp. 72-95.

Brown, K. W., & Kasser, T. (2005). Are psychological and ecological well-being compatible? the role of values, mindfulness, and lifestyle. *Social Indicators Research Vol. 74(2)*, pp. 349-368.

Brügger, A., Dessai, S., Devine-Wright, P., Morton, T. A., & Pidgeon, N. F. (2015). *Psychological responses to the proximity of climate change.* London: Nature Publishing Group.

Bruno, M., Thomsen, M., Pulselli, F. M., Patrizi, N., Marini, M., & Caro, D. (2019). The carbon footprint of danish diets. *Climatic Change Vol. 156(4)*, pp. 489-507.

Bull, J. (2012). Loads of Green Washing—Can Behavioural Economics Increase Willingness-to-Pay for Efficient Washing Machines in the UK? *Energy Policy Vol. 50*, pp. 242–252.

Burkeman, O. (2003, March 4th). *Memo exposes Bush's new green strategy.* Retrieved from The Guardian: https://www.theguardian.com/environment/2003/mar/04/usnews.climatechange

Carlson, L., Grove, S. J., Kangun, N., & Polonsky, M. J. (1996). An international comparison of environmental advertising: Substantive versus associative claims. *Journal of Macromarketing Vol. 16(2)*, pp. 57-68.

Carlton, J. S., Mase, A. S., Knutson, C. L., Lemos, M. C., Haigh, T., Todey, D., & Propkopy, L. (2016). The effects of extreme drought on climate change beliefs, risk perceptions, and adaptation attitudes. *Climatic Change Vol. 135(2)*, pp. 211-226.

Carrington, D. (2019, October 30th). *Climate crisis affects how majority will vote in UK election – poll .* Retrieved from The Guardian: https://www.theguardian.com/environment/2019/oct/30/climate-crisis-affects-how-majority-will-vote-in-uk-election-poll#maincontent

Carvalho, A. (2010). Media(ted) discourses and climate change: a focus on political subjectivity and(dis) engagement. *Wiley Interdisciplinary Reviews Climate Change Vol. 1(2)*, pp. 172–179.

Caverni, J. P., Fabre, J. M., & Gonzalez (eds.), M. (1990). *Cognitive Biases (Volume 68).* Amsterdam: North Holland Publishing Company.

Center for Responsive Politics. (2020, April 19th). *Environment.* Retrieved from The Center for Responsive Politics: https://www.opensecrets.org/industries/indus.php?ind=q11

Choi, B. C., & Pak, A. W. (2005). A catalog of biases in questionnaires. *Preventing Chronic Disease Vol. 2(1), A13*.

Chung, M., Kang, H., Dietz, T., Jaimes, P., & Liu, J. (2019). Activating values for encouraging pro-environmental behavior: the role of religious fundamentalism and willingness to sacrifice. *Journal of Environmental Studies and Sciences Vol. 9(4)*, pp. 371-385.

Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology Vol. 55*, pp. 591–621.

Cialdini, R., Kallgren, C., & Reno, R. (1991). A focus theory of normative conduct. *Advances in Experimental Psychology Vol.24*, pp. 201-234.

Clark, C. F., Kotchen, M. J., & Moore, M. R. (2003). Internal and external influences on pro-environmental behavior: Participation in a green electricity program. *Journal of Environmental Psychology Vol. 23(3)*, pp. 237-246.

Climate Chat. (2020, April 28th). *Climate Change in the news.* Retrieved from The Climate Chate: http://www.theclimatechat.org/climate-change-in-the-news

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.).* Hillsdale, N.J.: L. Erlbaum Associates.

Cohen, S., Higham, J., Gössling, S., Peeters, P., & Eijgelaar, E. (2016). Finding effective pathways to sustainable mobility: Bridging the science-policy gap. *Journal of Sustainable Tourism Vol. 24 (3)*, pp. 317-334.

Common, M., & Stagl, S. (2005). *Ecological economics: An introduction.* New York: Cambridge University Press.

Corner, A., Lewandowsky, S., Phillips, M., & Roberts, O. (2015). *The uncertainty handbook.* Bristol, UK: University of Bristol.

Corner, A., Whitmarsh, L., & Xenias, D. (2012). Uncertainty, scepticism and attitudes towards climate change: Biased assimilation and attitude polarisation. *Climatic Change Vol. 114(3)*, pp. 463-478.

Corraliza, J. A., & Berenguer, J. (2000). Environmental values, beliefs, and actions: A situational approach. *Environment and Behavior Vol. 32(6)*, pp. 832-848.

Cortese, M. (2018). An Analysis of the Filmmaking Strategies Behind Sustainable Energy Narratives. In W. Leal Filho, E. Manolas, A. M. Azul, U. M. Azeiteiro, & H. McGhie, *Handbook of climate change communication: Vol. 1: Theory of climate change communication.* (pp. 123-136). Cham, CH: Springer International Publishing.

Cowie, L. J., Greaves, L. M., & Sibley, C. G. (2015). Identifying distinct subgroups of green voters : A latent profile analysis of crux values relating to green party support. *New Zealand Journal of Psychology Vol. 44(1)*, pp. 45-59.

Craig-Lees, M., & Hill, C. (2002). Understanding voluntary simplifiers. . *Psychology & Marketing Vol. 19(2)*, pp. 187-210.

Crompton, T., & Lennon, S. (2017). Values as a Route to Widening Public Concern About Climate Change. In W. Filho, E. Manolas, A. Azul, U. Azeiteiro, & H. McGhie, *Handbook of Climate Change Communication: Vol. 1* (pp. 385-397). Basel, CH: Springer International Publishing.

Dahl, R. (2010). Green washing: Do you know what you're buying? *Environmental Health Perspectives Vol. 118(6)*.

Dahlstrom, M. F., & Scheufele, D. A. (2018). *Esaping the paradox of scientific storytelling. .* San Francisco, USA: Public Library of Science.

Darley, J. M., & Latane, B. (1968). Bystander intervention in emergencies: Diffusion of responsibility. *Journal of Personality and Social Psychology Vol. 8(4)*, pp. 377-383.

Dasgupta, P. (2008). Discounting Climate Change. *Journal of Risk and Uncertainty Vol. 37(2)*, pp. 141-169.

Davies, S. R., & Horst, M. (2016). *Science communication: Culture, identity and citizenship.* London: Palgrave Macmillan UK.

de Bruin, W. B., Parker, A. M., & Fischhoff, B. (2007). Individual Differences in Adult Decision-Making Competence . *Journal of Personality and Social Psychology Vol.92(5)*, pp. 938–956.

de Marco, S., Antino, M., & Morales, R. M. (2012). Assessing a Measurement Model for DigitalPolitical Participation: A MultidisciplinaryPoint of View. In Y. Charalabidis, & S. Koussouris, *Empowering Open and Collaborative Governance: Technologies and Methods for Online Citizen Engagement in Public Policy Making* (pp. 61-78). Heidelberg: Springer-Verlag Berlin Heidelberg .

Dean, A. J., Fielding, K. S., & Wilson, K. A. (2019). Building community support for coastal management — what types of messages are most effective? *Environmental Science and Policy Vol. 92*, pp. 161-169.

Deisenrieder, V., Kubisch, S., Keller, L., & Stötter, J. (2020). Bridging the action gap by democratizing climate change Education—The case of k.i.d.Z.21 in the context of fridays for future. *Sustainability Vol. 12(5)*, p. 1748.

Dialer, D., & Richter, M. (2019). *Lobbying in the european union: Strategies, dynamics and trends.* Cham: Springer International Publishing.

Diehl, S., Karmasin, M., Mueller, B., Terlutter, R., & Weder, F. (2017). *Handbook of integrated CSR communication.* Cham, CH: Springer International Publishing.

Diekmann, A., & Franzen, A. (1999). The Wealth of Nations and Environmental Concern. *Environment and Behavior Vol. 31(4)*, pp. 540–549.

Dietrich, C. (2010). Decision Making: Factors that Influence DecisionMaking, Heuristics Used, and Decision Outcomes. *Student Pulse, 2(02)*.

Dietz, T., Fitzgerald, A., & Shwom, R. (2005). Environmental Values. *Annual Review of Environment and Resources Vol. 30*, pp. 335–372.

Dionne, G., & Harrington, S. (2014). Insurance and Insurance Markets. In M. Machina, & K. Viscusi, *Handbook of the Economics of Risk and Uncertainty Vol.1* (pp. 203-261). Oxford, UK: Elsevier .

Drews, S., & van den Bergh, J. (2016). What explains public support for climate policies? A review of empirical and experimental studies. *Climate Policy Vol. 16*, pp. 855–876.

Dudo, A. (2015). Scientists, the media, and the public communication of science: Scientists' public communication activities. *Sociology Compass Vol. 9(9)*, pp. 761-775.

Dunlap, R. E., & McCright, A. M. (2010). Climate change denial: Sources, actors and strategies. In C. Lever-Tracy (Ed.), *Routledge Handbook of Climate Change and Society.* London, UK: Routledge.

Eagly, A., & Chaiken, S. (1993). *The psychology of attitudes.* Forth Worth: TX: Harcourt Brace Jovanovich.

Eaternity. (2020, May 24th). *Eaternity Institute*. Retrieved from Eaternity Score: https://eaternity.org/score/

Elgin, D. (2000). Voluntary Simplicity and the new Global Challenge. In J. Schor, & D. Holt (Eds.), *The Consumer Society Reader.* New York: The New Press.

Elster, J. (1979). Risk, uncertainty and nuclear power. *Social Science Information Vol18(3)*, pp. 371-400.

Engler, J., Abson, D., & von Wehrden, H. (2019, June 15). Navigating cognition biases in the search of sustainability. *Ambio 48* , pp. 605–618.

Environmental Voter Project. (2019, December 19th). *Exploration of U.S. Voting Behavior and Attitudes.* Retrieved from Environmental Voter Project: https://www.environmentalvoter.org/sites/default/files/documents/report-exploration-us-voting-behavior-attitudes.pdf

Ereaut, G., & Segnit, N. (2006). *Warm Words: How are we telling the climate story and can we tell it better?* London, UK: UK Institute for Public Policy Research.

Eurobarometer. (2019, April). *Eurobarometer 490: Climate change.* Retrieved from European Commission: https://ec.europa.eu/clima/sites/clima/files/support/docs/report_2019_en.pdf

European Commission. (2020, May 20th). *Origin labelling* . Retrieved from European Commission: https://ec.europa.eu/food/safety/labelling_nutrition/labelling_legislation/origin-labelling_en

European Parliament. (2019, October 23rd). *2019 European election results.* Retrieved from European Parliament: https://www.europarl.europa.eu/election-results-2019/en

Evans, H., Dyll, L., & Teer-Tomaselli, R. (2018). Communicating Climate Change:Theories and Perspectives. In W. Leal Filho, E. Manolas, A.

M. Azul, U. M. Azeiteiro, & H. McGhie (Eds.), *Handbook of Climate Change Communication: Vol. 1: Climate Change Management* (pp. 107-122). Cham, CH: Springer International Publishing.

Ewart, A., Place, G., & Sibthorp, J. (2005). Early-Life Outdoor Experiences and Individual's Environmental Attitudes. *Leisure Sciences Vol. 27 (3)*, pp. 225–239.

Fairbrother, M. (2013). Rich people, poor people, and environmental concern: Evidence across nations and time. *European Sociological Review Vol. 29(5)*, pp. 910-922.

Feldman, L., & Sol Hart, P. (2018). Is There Any Hope? How Climate Change News Imagery and Text Influence Audience Emotions and Support for Climate Mitigation Policies. *Risk Analysis Vol. 38 (3)*, pp. 585–602. .

Ferguson, M. A., Branscombe, N. R., & Reynolds, K. J. (2011). The Effect of Intergroup Comparison on Willingness to Perform Sustainable Behavior. *Journal of Environmental Psychology Vol. 31 (4)*, pp. 275–281.

Field, A. (2018). *Discovering statistics using IBM SPSS statistics (5.th ed.).* London;Thousand Oaks, California;: : SAGE Publications.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research.* Reading: Addison-Wesley. .

Fisher, R. A. (1956). *Statistical methods and scientific inference.* Oxford, England: Hafner Publishing Co.

Fowler, D., Nemitz, E., Misztal, P., Marco, C. D., Skiba, U., Ryder, J., & . . . Hewitt, C. N. (2011). Effects of land use on surface-atmosphere exchanges of trace gases and energy in borneo: Comparing fluxes over oil palm plantations and a rainforest. *Philosophical Transactions: Biological Sciences Vol. 366 (1582)*, pp. 3196-3209.

Franzen, A., & Meyer, R. (2010). Environmental Attitudes in Cross-National Perspective: A Multilevel Analysisof the ISSP 1993 and 2000. *European Sociological Review Vol. 26(2)*, pp. 219–234.

Franzen, A., & Vogl, D. (2013). Two decades of measuring environmental attitudes: A comparative analysis of 33 countries. *Global Environmental Change Vol. 23(5)*, pp. 1001-1008.

Frick, J., Kaiser, F. G., & Wilson, M. (2004). Environmental knowledge and conservation behavior: Exploring prevalence and structure in a representative sample. *Personality and Individual Differences Vol. 37(8)*, pp. 1597-1613.

Fridays for Future. (2020, May 2nd). *Fridays for Future*. Retrieved from Who we are: https://fridaysforfuture.org/what-we-do/who-we-are/

Fujii, S., Gärling, T., Jakobsson, C., & Jou, R. (2004). A cross-country study of fairness and infringement on freedom as determinants of car owners' acceptance of road pricing. *Transportation Vol. 31(3)*, pp. 285-295.

Galletta, A. (2013). *Mastering the semi-structured interview and beyond: From research design to analysis and publication.* New York: NYU Press.

Gambro, J. S., & Switzky, H. N. (1999). Variables associated with american high school students' knowledge of environmental issues related to energy and pollution. *The Journal of Environmental Education Vol. 30(2)*, pp. 15-22.

Gelissen, J. (2007). Explaining Popular Support for Environmental Protection: A Multilevel Analysis of 50 Nations. *Environment and Behavior Vol. 39(3)*, pp. 392–415.

Geng, S. (2016, January). DECISION TIME, CONSIDERATION TIME, AND STATUS QUO BIAS. *Economic Inquiry Vol. 54(1)*, pp. 433-449.

Gibson, C., Farbotko, C., Gill, N. J., Head, L., & Waitt, G. (2013). *Household sustainability: Challenges and dilemmas in everyday life.* Cheltenham, UK: Edward Elgar Publishing.

Gifford, R., Scannell, L., Kormos, C., Smolova, L., Biel, A., Boncu, S., & . . . Uzzell, D. (2009). Temporal pessimism and spatial optimism in environmental assessments: An 18-nation study. *Journal of Environmental Psychology Vol. 29(1)*, pp. 1-12.

Gitlin, T. (2013). *The Whole World Is Watching Mass Media in the Making and Unmaking of the New Left.* Berkeley, CA: University of California Press.

Givens, J. E., & Jorgenson, A. K. (2011). The effects of affluence, economic development, and environmental degradation on environmental concern: A multilevel analysis. *Organization & Environment Vol. 24(1)*, pp. 74-91.

Glenza, J. (2019, March 15th). *Climate strikes held around the world – as it happened.* Retrieved from The Guardian: https://www.theguardian.com/environment/live/2019/mar/15/climate-strikes-2019-live-latest-climate-change-global-warming

Goldstein, N., Cialdini, R., Griskevicius, V., Deighton, D., & Luce, M. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of Consumer Research 35(3)*, pp. 472-482.

Google Trends. (2020, April 28th). *Google Trends.* Retrieved from "Global Warming" vs. "Climate Change": https://trends.google.de/trends/explore?date=all&q=global%20warming,climate%20change

Gosnell, G. K. (2018). Communicating resourcefully: A natural field experiment on environmental framing and cognitive dissonance in going paperless. *Ecological Economics Vol. 154*, pp. 128-144.

Gössling, S. (2019). Celebrities, air travel, and social norms. *Annals of Tourism Research Vol. 79, 102775*.

Gössling, S., & Cohen, S. (2014). Why sustainable transport policies will fail: EU climate policy in the light of transport taboos. *Journal of Transport Geography Vol. 39*, pp. 197-207.

Gountas, J., Gountas, S., Reeves, R., & Moran, L. (2012). Desire for fame: Scale development and association with personal goals and aspirations. *Psychology & Marketing, Vol. 29 (9)*, pp. 680-689.

Greitemeyer, T., Fischer, P., Frey, D., & Schulz-Hardt, S. (2009, January 29th). Biased assimilation: the role of source position. *European Journal of Social Psychology Vol. 39(1)*, pp. 22-39.

Groening, C., Inman, J. J., & Ross, W. T. (2015). The role of carbon emissions in consumer purchase decisions. *International Journal of Environmental Policy and Decision Making Vol. 1(4)*, pp. 261-296.

Grunert, K. G., Hieke, S., & Wills, J. (2014). Sustainability Labels on Food Products: Consumer Motivation, Understanding, and Use. *Food Policy Vol. 44*, pp. 177–189. .

Grüne-Yanoff, T. (2015). Models of Temporal Discounting 1937–2000: An Interdisciplinary Exchange between Economics and Psychology. *Science in Context Vol.28(4)*, pp. 675–713.

Guenther, M., Saunders, C. M., & Tait, P. R. (2012). Carbon labeling and consumer attitudes. *Carbon Management Journal Vol. 3(5)*, pp. 445-455.

Gul, F., & Pesendorfer, W. (2001). Temptation and self-control. *Econometrica Vol. 69(6),* , pp. 1403-1435.

Hadler, M., & Haller, M. (2013). A shift from public to private environmental behavior: Findings from hadler and haller (2011) revisited and extended. *International Sociology Vol. 28(4)*, pp. 484-489.

Hagen, B. (2013). *Public perceptions of climate change: Risk, trust, and policy.* Tempe, AZ: ProQuest Dissertations Publishing.

Hamilton-Webb, A., Naylor, R., Manning, L., & Conway, J. (2017). The relationship between risk experience and risk response: A study of farmers and climate change. *Journal of Risk Research Vol. 20(11)*, pp. 1379-1393.

Hanna, P., Kantenbacher, J., Cohen, S., & Gössling, S. (2018). Role model advocacy for sustainable transport. *Transportation Research Part D: Transport and Environment Vol. 61*, pp. 373-382.

Hansen, A., & Cox, R. (2015). *The Routledge handbook of environmental communication.* Abingdon, UK: Routledge Handbooks.

Hansen, A., & Machin, D. (2013). Researching visual environmental communication. *Environmental Communication Vol. 7(2)*, pp. 151–168.

Hardisty, D. J., Beall, A. T., Lubowski, R., Petsonk, A., & Romero-Canyas, R. (2019). A carbon price by another name may seem sweeter: Consumers prefer upstream offsets to downstream taxes. *Journal of Environmental Psychology Vol. 66*, p. 101342.

Hardisty, D., Johnson, E., & Weber, E. (2010). A dirty word or a dirty world? Attribute framing, political affiliation, and query theory. *Psychological Science Vol. 21 (1)*, pp. 86-92.

Hawke, S. M. (2012). Water literacy: An otherwise, active and cross-cultural approach to pedagogy, sustainability and human rights. *Continuum Vol 26*, pp. 235–247.

Heimlich, J., Mony, P., & Yocco, V. (2013). Belief to behavior. In R. B. Stevenson, J. Dillon, & A. Wals (Eds.), *International handbook of research on environmental education* (pp. 262–274). London: Taylor & Francis.

Helgeson, J., van der Linden, S., & Chabay, I. (2012). The role of knowledge, learning and mental models in public perceptions of climate change

related risks. In A. Wals, & P. Corcoran (Eds.), *Learning for sustainability in times of accelerating change* (pp. 329-346). Wageningen, NL: Wageningen Academic Publishers.

Hepburn, C., Duncan, S., & Papachristodoulou, A. (2010). Behavioural Economics, Hyperbolic Discountingand Environmental Policy. *Environmental Resource Economics Vol.46* , pp. 189–206.

Hewitt, J. K., Simonoff, E., Pickles, A., Loeber, R., Heath, A. C., & .. .. (1997). Genetics and developmental psychopathology: 1. phenotypic assessment in the virginia twin study of adolescent behavioral development. *Journal of Child Psychology and Psychiatry Vol. 38(8)*, pp. 943-963.

Hine, D. W., & Gifford, R. (1996). Individual restraint and group efficiency in commons dilemmas: The effects of two types of environmental uncertainty. *Journal of Applied Social Psychology Vol. 26(11)*, p. 993.

Hines, J. M., Hungerford, H. P., & Tomera, A. N. (1986/87). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *Journal of Environtal Educaction Vol. 18*, pp. 1–8.

Hobson, K. (2003, February). hinking Habits into Action: The role of knowledge and process in questioning household consumption practices. *Local Environment Vol.8(1)*, pp. 95-112.

Holmes, D., & Star, C. (2018). Climate Change Communicationin Australia: The Politics, MainstreamMedia and Fossil Fuel Industry Nexus. In W. Leal Filho, E. Manolas, A. Azul, U. Azeiteiro, & H. McGhie (Eds.), *Handbook of Climate ChangeCommunication: Vol. 1: Theory of Climate Change Communication* (pp. 151-170). Cham, CH: Springer International Publishing.

Hortensius, R., & Gelder, B. (2014, June). The neural basis of the bystander effect — The influence of group size on neural activity when witnessing an emergency. *NeuroImage Vol. 93(1)*, pp. 53-58.

Howell, R. A. (2011). Lights, camera . action? Altered attitudes and behaviour in response to the climate change film The Age of Stupid. *Global Environmental Change Vol. 21*, pp. 177–187.

Howell, R. A. (2014). Investigating the long-term impacts of climate change communications on individuals' attitudes and behavior. *Environment and Behavior Vol. 46(1)*, pp. 70-101.

Huber, J., & Viscusi, W. K. (2006). *Hyperbolic discounting of public goods.* Cambridge, Massachusetts: National Bureau of Economic Research.

Hungerford, H., & Peyton, R. (1976). *Teaching Environmental Education.* Portland, USA: J. Weston Walch.

Hunter, P. (2016). The communications gap between scientists and public: More scientists and their institutions feel a need to communicate the results and nature of research with the public. *EMBO Reports Vol. 17(11)*, pp. 1513-1515.

Hurlstone, M. J., Lewandowsky, S., Newell, B. R., & Sewell, B. (2014). The effect of framing and normative messages in building support for climate policies. *PloS One Vol. 9(12)*.

Ingham, J. (2007). *Strategic human capital management: Creating value through people.* Oxford: Butterworth-Heinemann.

Inkpen, R., & Baily, B. (2020). Environmental beliefs and their role in environmental behaviours of undergraduate students. *Journal of Environmental Studies and Sciences Vol. 10*, pp. 57–67.

ISO. (2018, August 1st). *OBP- Online Browsing Platform.* Retrieved from ISO 14067:2018 Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification: https://www.iso.org/obp/ui/#iso:std:iso:14067:ed-1:v1:en

Isson, D., Gericke, N., & Chang Rundgren, S.-N. (2016). The effect of implementation of education for sustainable development in Swedish compulsory schools – assessing pupils' sustainability

consciousness. *Environmental Education Research Vol. 22(2)*, pp. 176–202.

Ivanova, D., Stadler, K., Steen-Olsen, K., Wood, R. V., Tukker, A., & Hertwich, E. G. (2016). Environmental impact assessment of household consumption. *Journal of Industrial Ecology Vol. 20(3)*, pp. 526-536.

Iyengar, S., & Kinder, D. (1987). *News that Matters.* Chicago, IL: University of Chicago Press.

Jabine, T., U.S. National Reserach Council, & Research Seminar on Cognitive Survey Methodology. (1984). *Cognitive aspects of survey methodology: Building a bridge between disciplines report of the advanced research seminar on cognitive aspects of survey methodology.* Washington, D.C: National Academy Press.

James, W. (1890). *The Principles of Psychology.* New York City, New York, USA: Henry Holt and Company.

Jensen, B. B. (2002). Knowledge, Action and Pro-environmental Behaviour. *Environmental Education Research Vol. 8:3*, pp. 325-334.

Johns-Putra, A. (2019). *Climate change and the contemporary novel. .* Cambridge: Cambridge University Press.

Joireman, J., Truelove, H., & Duell, B. (2010). Effect of outdoor temperature, heat primes and anchoring on belief in global warming. *Journal of Environmental Psychology Vol. 30 (4)*, pp. 358-367.

Jones, M. D. (2014). Communicating climate change: Are stories better than "Just the facts"? . *Policy Studies Journal Vol. 42(4)*, pp. 644-673.

Jordan, J., Sommers, R., Bloom, P., & Rand, D. (2017). Why do we hate hypocrites? Evidence for a theory of false signaling. *Psychological Science Vol. 28 (3)*, pp. 356-368.

Judge, D. (1993). *A green dimension for the european community: Political issues and processes.* London: Frank Cass.

Kaaronen, R. O. (2017, November). Affording Sustainability: Adopting a Theory of Affordances as a Guiding Heuristic for Environmental Policy. *Frontiers in Psychology Vol. 8*.

Kahan, D. M., Jenkins-Smith, H., & Braman, D. (2011). Cultural cognition of scientific consensus. Journal of Risk Research Vol.14(2). pp. 147-174.

Kahneman, D. (2012). *Thinking fast and slow.* London, UK: Penguin Books.

Kahneman, D., & Riepe, M. W. (1998). Aspects of Investor Psychology. *Journal of Portfolio Management Vol. 24(4)* , pp. 52-65.

Kahneman, D., & Tversky, A. (1979, March). Prospect Theory: An Analysis of Decision under Risk. *Econometrica Vol. 47(2)*, pp. 263-291.

Kahneman, D., & Tversky, A. (2000). *Choices, values and frames. .* Cambridge: Cambridge University Press.

Kahneman, D., Gilovich, T., & Griffin, D. (2002). *Heuristics and biases: The psychology of intuitive judgment.* Cambridge: Cambridge University Press.

Kahneman, D., Knetsch, J., & Thaler, R. (1990, February). Experimental Tests of the Endowment Effect and the Coase Theorem. *Journal of Political Economy Vol. 98*, pp. 1325-1348.

Kaiser, F. G., & Keller, C. (2001). Disclosing situational constraints to ecological behavior: a confirmatory application of the mixed Rasch model. *European Journal of Psychological Assessment Vol. 17*, pp. 212–221.

Kaiser, F. G., Wölfing, S., & Fuhrer, U. (1999). Environmental attitude and ecological behaviour. *Journal of Environmental Psychology Vol. 19*, pp. 1–19 .

Kalantzakos, S. (2017). *The EU, US and China Tackling Climate Change : Policies and Alliances for the Anthropocene.* Milton Park, Abingdon, Oxon: Routledge.

Kallbekken, S., & Sælen, H. (2011, May). Public acceptance for environmental taxes: Self-interest, environmental and distributional concerns. *Energy Policy Vol. 39(5)*, pp. 2966-2973.

Kallgren, C. A., Reno, R. R., & Cialdini, R. B. (2000). A focus theory of normative conduct: When norms do and do not affect behavior. *Personality and Social Psychology Bulletin Vol. 26(8)*, pp. 1002-1012.

Karlsson, N., Juliusson, Á., Grankvist, G., & Gärling, T. (2002, November). Impact of decision goal on escalation. *Acta Psychologica Vol.111(3)*, pp. 309-322.

Karp, D. (1996). Values and their effect on pro-environmental behavior. *Environmental Behaviour Vol. 28*, pp. 111-133.

Karpa, L., & Tsur, Y. (2011, July). Time perspective and climate change policy. *Journal of Environmental Economics and Management Vol.62(1)*, pp. 1-14.

Kelbessa, W. (2005). The rehabilitation of indigenous environmental ethics in Africa. *Diogenes Vol. 52*, pp. 17–34.

Kellstedt, P. M., Zahran, S., & Vedlitz, A. (2008). Personal efficacy, the information environment, and attitudes toward global warming and climate change in the United States. *Risk Analysis Vol. 28*, pp. 113-126.

Kempton, W., Boster, J. S., & Hartley, J. A. (1995). *Environmental values in american culture. .* Cambridge, Massachusetts: MIT Press.

Kidwell, B., Farmer, A., & Hardesty, D. M. (2013). Getting Liberals and Conservatives to Go Green: Political Ideology and Congruent Appeals. *Journal of Consumer Research Vol. 40 (2)*, pp. 350–367.

Kilbourne, W., McDonagh, P., & Prothero, A. (1997). Sustainable consumption and the quality of life: A macromarketing challenge to the dominant social paradigm. *Journal of Macromarketing Vol. 17(1)*, pp. 4-24.

Kim, S., & Wolinsky-Nahmias, Y. (2014). Cross-national public opinion on climate change: The effects of affluence and vulnerability. *Global Environmental Politics Vol. 14 (1)*, pp. 79-106.

Kim, Y., Dykema, J., Stevenson, J., Black, P., & Moberg, D. P. (2019). Straightlining: Overview of measurement, comparison of indicators, and effects in Mail–Web mixed-mode surveys. *Social Science Computer Review Vol. 37(2)*, pp. 214-233.

King, M. W. (2019, March 8th). *BBC Future.* Retrieved from How brain biases prevent climate action: https://www.bbc.com/future/article/20190304-human-evolution-means-we-can-tackle-climate-change

Klöckner, C. A. (2011). Towards a psychology of climate change. In W. L. Filho (Ed.), *The economic, social and political elements of climate change* (pp. 153-173). Berlin, Germany: Springer-Verlag.

Klöckner, C., Ellen, M., & Hunecke, M. (2003). Problems of operationalizing habits and integrating habits in normative decision-making models. *Journal of Applied Social Psychology Vol. 33(2)*, pp. 396–417.

Knoblauch, D., & Woolfolk Hoy, A. (2008). "Maybe I can teach those kids." the influence of contextual factors on student teachers' efficacy beliefs. *Teaching and Teacher Education Vol. 24(1)*, pp. 166-179.

Kobbeltved, T., Brun, W., Johnsen, B., & Eid, J. (2005). Risk as feelings or risk and feelings? A cross-lagged panel analysis. *Journal of Risk Research Vol. 8(5)*, pp. 417-437.

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? . *Environmental Education Research Vol. 8(3)*, pp. 239-260.

Kousser, T., & Tranter, B. (2018). The influence of political leaders on climate change attitudes. *Global Environmental Change Vol. 50*, pp. 100-109.

Kraus, S. J. (1995). Attitudes and the prediction of behavior: A meta-analysis of the empirical literature. . *Personality and Social Psychology Bulletin Vol. 21(1)*, pp. 58-75.

Krosnick, J. A. (1999). Survey research. *Annual Review of Psychology Vol. 50*, pp. 537-567.

Krosnick, J., Holbrook, A., Lowe, L., & Visser, P. (2006). The origins and consequences of democratic citizens' policy agendas: A study of popular concern about global warming. *Climatic Change Vol. 77 (1–2)*, pp. 7-43.

Krozer, Y. (2016). *Theory and practices on innovating for sustainable development.* Cham: Springer International Publishing.

Kvale, S. (1995). The social construction of validity. *Qualitative Inquiry Vol. 1(1)*, pp. 19-40.

Lakoff, G. (2004). *Don't think of an elephant: Know your values and frame the debate the essential guide for progressives.* White River Junction, Vt: Chelsea Green.

Lavine, J. (2006). *Not buying it: My year without shopping.* London: Simon & Schuster.

Lee, T. M., Markowitz, E. M., Howe, P. D., Ko, C., & Leiserowitz, A. A. (2015). Predictors of public climate change awareness and risk perception around the world. *Nature and Climate Change Vol. 5(11)*, pp. 1014-1020.

Leeming, F. C., Dwyer, W. O., & Bracken, B. A. (1995). Children's environmental attitude and knowledge scale: Construction and validation. *The Journal of Environmental Education Vol. 26(3)*, pp. 22-31.

Leiserowitz, A. (2005). American risk perceptions: Is climate change dangerous? *Risk Analysis Vol. 25 (6)*, pp. 1433-1442.

Leiserowitz, A. (2006). Climate Change Risk Perception and Policy Preferences: The Role of Affect, Imagery, and Values. *Climatic Change Vol. 77 (1)*, pp. 45–72.

Leiserowitz, A. (2007). Communicating the risks of global warming: American risk perceptions, affective images, and interpretive communities. In S. C. Moser, & L. Dilling (Eds.), *Creating a climate for change: Communicating climate change and facilitating social change* (pp. 44–63). Cambridge: Cambridge University Press.

Leiserowitz, A., Maibach, E., Roser-Renouf, C., Feinberg, G., & Rosenthal, S. (2014). *Climate change in the American mind April 2014 Yale Project on Climate Change Communication.* Yale University: New Haven: CT.

Lerner, J. S., & Keltner, D. (2000). Beyond Valence: Toward a Model of Emotion-Specific Influences on Judgement and Choice. *Cognition & Emotion Vol. 14 (4)*, pp. 473–493.

Lester, L., & Cottle, S. (2009). Visualizing Climate Change: Television News and Ecological Citizenship . *International Journal of Communication Vol. 3*, pp. 920-936 .

Lewandowsky, S., Cook, J., Fay, N., & Gignac, G. E. (2019). Science by social media: Attitudes towards climate change are mediated by perceived social consensus. *Memory & Cognition Vol. 47(8)*, pp. 1445-1456.

Li, C., & Stacks, D. (2015). *Measuring the impact of social media on business profit and success: A fortune 500 perspective.* New York: Peter Lang.

Li, S.-C. S. (2014). Fear Appeals and College Students' Attitudes and Behavioral Intentions Toward Global Warming. *The Journal of Environmental Education Vol. 45 (4)*, pp. 243–257.

Linnenluecke, M. K., Griffiths, A., & Mumby, P. J. (2015). Executives' engagement with climate science and perceived need for business adaptation to climate change. *Climatic Change Vol. 131(2)*, pp. 321-333.

Lord, C. G., Ross, L., & Lepper, M. (1979, November). Biased Assimilation and Attitude Polarization: The Effects of Prior Theories on Subsequently Considered Evidence. *Journal of Personality and Social Psychology Vol. 37(11)* , pp. 2098-2109.

Lorenzoni, I., & Nicholson-Cole, S. W. (2007). Barriers perceived to engaging with climate change among the UK public and their policy implications. *Global Environtal Change Vol. 17*, pp. 445–459.

Loukopoulos, P., Jakobsson, C., Gärling, T., Meland, S., & Fujii, S. (2006, March). Understanding the process of adaptation to car-use reduction goals. *Transportation Research Part F: Traffic Psychology and Behaviour Vol. 9(2), March 2006, Pages 115-127*, pp. 115-127.

Lowe, T., Brown, K., Dessai, S., De Franca, M., Haynes, K., & Vincent, K. (2006). Does tomorrow even come? Disaster narrative and public perception of climate change. *Public Understanding of Science Vol 15 (4)*, pp. 435–457.

Lynn, J. (2018). Communicating the IPCC: Challenges and Opportunities. In W. Leal Filho, E. Manolas, A. Azul, A. U., & H. McGhie (eds), *Handbook of Climate Change Communication: Vol. 3* (pp. 131-143). Chem, CH: Springer.

Mackay, C., & Schmitt, M. T. (2019). Do people who feel connected to nature do more to protect it? A meta-analysis. *Journal of Environmental Psychology Vol. 65 101323.* .

Maggini, N. (2017). *Young People's voting behaviour in europe: A comparative perspective.* London: Palgrave Macmillan UK.

Mainieri, T., Barnett, E. G., Valdero, T. R., Unipan, J. B., & Oskamp, S. (1997). Green buying: The influence of environmental concern on consumer behavior. *Journal of Social Psychology Vol. 137(2)*, pp. 189–204.

Maio, G., Haddock, G., & Jarman, H. (2007). Social psychological factors in tackling obesity. *Obesity reviews Vol.8(1)*, pp. 123-125.

Malandrakis, G., Boyes, E., & Stanisstreet, M. (2011). Global warming: Greek students' belief in the usefulness of pro-environmental actions and their intention to take action. *International Journal of Environmental Studies Vol. 68(6)*, pp. 947-963.

Malka, A., Krosnick, J., & Langer, G. (2009). The association of knowledge with concern about global warming: Trusted information sources shape public thinking. *Risk Analysis Vol. 9 (5)*, pp. 633-647.

Malkani, V. (2017, May 31st). *Stanford Politics.* Retrieved from Sustainable Optimism: Communicating Climate Change Effectively: https://medium.com/stanfordpolitics/sustainable-optimism-communicating-climate-change-effectively-11106631a68d

Mallett, R. K., Melchiori, K. J., & Strickroth, T. (2013). Self-Confrontation via a Carbon Footprint Calculator Increases Guilt and Support for a Pro-environmental Group. *Ecopsychology Vol. 5 (1)*, pp. 9–16.

Manget, J., Roche, C., & Münnich, F. (2009). *Capturing the Green Advantage for Consumer Companies," research report.* Boston, USA: The Boston Consulting Group.

Marquart-Pyatt, S. (2008). Are There Similar Influences on Environmental Concern? Comparing Industrialized Countries. *Social Science Quarterly Vol. 89(5)*, pp. 1–24.

Marquart-Pyatt, S. (2015). Public opinion about the environment: testing measurement equivalence across countries. *International Journal of Sociology Vol. 45*, pp. 309–326.

Marquart-Pyatt, S. T. (2007). Concern for the Environment among General Publics: A Cross-National Study. *Society and Natural Resources Vol. 20(10)*, pp. 883–898.

Marshall, G. (2014). *Don't even think about it: Why our brains are wired to ignore climate change.* New York, USA: Bloomsbury.

Marshall, P. (1997). *Celebrity and Power: Fame in Contemporary Culture.* Minneapolis, USA: University of Minnesota Press.

Mastrandrea, M. D. (2010). *Guidance note for lead authors of the IPCC fifth assessment report on consistent treatment of uncertainties.* Geneva: IPCC.

Matthies, E., Klöckner, C., & Preißner, C. (2006, January 12th). Applying a Modified Moral Decision Making Model to Change Habitual Car Use: How Can Commitment be Effective? *Applied Psychology Vol. 55(1)*, pp. 91-106.

McCracken, G. (1989). Who is the celebrity endorser? Cultural foundations of the endorsement process. *Journal of Consumer Research Vol. 16 (3)*, pp. 310-321.

McGrath, M. (2019, December 6th). *Greta Thunberg: 'They try so desperately to silence us'.* Retrieved from BBC News: https://www.bbc.com/news/science-environment-50680781

McKibben, B. (2007). Thinking past ourselves. . *Bulletin of the Atomic Scientists Vol. 63(6)*, pp. 28-31.

Meadows, D., Randers, J., & Meadows, D. (2004). *Limitis to Growth: The 30-Year Update.* White River Junction, Vermont: Chelsea Green Publishing Company .

Meehan, C., Levy, B., & Collet-Gillard, L. (2018). Global climate change in U.S. high school curricula: portrayals of the causes, consequences, and potential responses. *Science Education Vol. 102(3)*, pp. 498–528.

Meffert, H., Burmann, C., Kirchgeorg, M., & Eisenbeiss, M. (2019). *Marketing: Grundlagen marktorientierter unternehmensführung konzepte - instrumente - praxisbeispiele (13. Aufl. 2019 ed.).* Wiesbaden, DE: Springer Fachmedien Wiesbaden.

Meng, M. D., & Trudel, R. (2017). Using Emoticons to Encourage Students to Recycle. *The Journal of Environmental Education Vol. 48 (3)*, pp. 196–204.

Mercer, D., Christesen, L., & Buxton, M. (2005). Squandering the future-climate change, policy failure and the water crisis in Australia. *Futures Vol. 39*, pp. 272–287.

Merchant, C. (1992). *Radical ecology: The search for a livable world.* New York: Routledge.

Michell, H. (2005). Nehithewak of Reindeer Lake, Canada: Worldview, epistemology and relationships with the natural world. *Australian Journal of Indigenous Education Vol. 34*, pp. 33–43.

Milfont, T. (2012). The interplay between knowledge, perceived efficacy, and concern about global warming and climate change: A one-year longitudinal study. *Risk Analysis Vol. 32*, pp. 1003-1020.

Min, J., Azevedo, I. L., Michalek, J., & de Bruin, W. B. (2014). Labeling Energy Cost on Light Bulbs Lowers Implicit Discount Rates. *Ecological Economics Vol. 97 (C)* , pp. 42–50.

Moolna, A., Knott, C., Wallis, D., Crawshaw, D., Brierley-Moore, J., Simons, J., & Selby, A. (2018). Engaging People with Carbon and ClimateChange Using Landscape ScaleConservation and Biodiversity Monitoring. In W. Leal Filho, E. Manolas, A. M. Azul, U. M. Azeiteiro, & H. McGhie, *Handbook of climate change*

communication: Vol. 1: Theory of climate change communication (pp. 293-308). Cham, CH: Springer International Publishing.

Moore, S., Murphy, M., & Watson, R. (1994). A longitudinal study of domestic water conservation behavior. *Population and Environment Vol. 16*, pp. 175-189.

Moosbrugger, H., & Kelava, A. (2008). *Testtheorie und fragebogenkonstruktion.* Berlin, Heidelberg: Springer Berlin Heidelberg.

Moser, S. (2010). Communicating climate change: history, challenges, process and future directions. *Wiley Interdisciplinary Revue on Climate Change Vol. 1*, pp. 31–53.

Moser, S. C. (2007). More bad news: The risk of neglecting emotional response to climate change information. In S. C. Moser, & L. Dilling (Eds.), *Creating a climate for change: Communicating climate change and facilitating social change* (pp. 64-80). New York, USA: Cambridge University Press.

Nawrotzki, R. (2012). The Politics of Environmental Concern: A Cross-National Analysis. *Organization and Environment Vol. 25*, pp. 286–307.

Nerlich, B., & Jaspal, R. (2013). Images of extreme weather: symbolising human responses to climatechange. *Science as culture*, pp. 1–24.

Nerlich, B., Koteyko, N., & Brown, B. (2010). Theory and language of climate change communication. *Wiley Interdisciplinary Reviews: Climate Change Vol. 1(1)*, pp. 97-110.

Neuman, K. (2004). Trends in Public Opinion on Acid Rain: A Comprehensive Review of Existing Data. *Water, Air and Soil Pollution Vol.31 (3–4)*, pp. 1047–1059.

Nicholls, J. (2017). Queensland teachers and climate change education. . *Curriculum Perspectives Vol. 37*, pp. 79–82.

Norgaard, K. M. (2011). *Living in denial: Climate change, emotions, and everyday life.* Cambridge, Massachusetts: MIT Press.

O'Neill, S. (2013). Image matters: climate change imagery in US, UK and Australian newspapers. *Geoforum Vol. 49*, pp. 10–19.

O'Neill, S., & Nicholson-Cole, S. (2009). "Fear Won't Do It": promoting positive engagement with climate change through visual and iconic representations. *Science Communication Vol. 30(3)*, pp. 355–379.

O'Neill, S., & Smith, N. (2014). Climate change and visual imagery. *WIREs Climate Change 2014 (5)*, pp. 73–87.

Ockwell, D., Whitmarsh, L., & O'Neill, S. (2009). Reorienting climate change communication for effective mitigation: Forcing people to be green or fostering grass-roots engagement? *Science Communication Vol. 30*, pp. 305-327.

O'Connnor, R., Bord, R., & Fisher, A. (1999). Risk perceptions, general environmental beliefs, and willingness to address climate change. *Risk Analysis Vol. 19(3)*, pp. 461-471.

Öhlmér, B., Olson, K., & Brehmer, B. (1998). Understanding farmers' decision making processes and improving managerial assistance. *Agricultural Economics Vol. 18*, pp. 273-290.

Ojala, M. (2012). Hope and climate change: the importance of hope for environmental engagement among young people. *Environmental Education Research Vol. 18(5)*, pp. 625-642.

Ojala, M. (2015). Hope in the face of climate change: associations with environmental engagement and student perceptions of teachers' emotion communication style and future. *Journal of Environmental Education Vol. 46(3)*, pp. 133–148.

Ojala, M., & Bengtsson, H. (2019). Young People's coping strategies concerning climate change: Relations to perceived communication

with parents and friends and proenvironmental behavior. *Environment and Behavior Vol. 51(8)*, pp. 907-935.

Opotow, S., & Brook, A. (2003). Identity and Exclusion in Rangeland Conflict. In S. Clayton, & S. Opotow (Eds.), *Identity and the natural environment: The psychological significance of nature* (pp. 249–272). Cambridge, Massachusetts, USA: MIT Press.

Ortega-Egea, J. M., García-de-Frutos, N., & Antolín-López, R. (2014). Why do some people do "more" to mitigate climate change than others? Exploring heterogeneity in psycho-social associations. *PloS One Vol. 9(9) e106645*.

Osbaldiston, R., & Sheldon, K. (2002). Social Dilemmas and Sustainability: Promoting Peoples' Motivation to 'Cooperate with the Future'. In P. Schmuck, & W. Schultz (eds.), *Psychology of Sustainable Development* (pp. 37–58). New York: Springer Science & Business Media.

Pandey, C. (2015). Managing Climate Change: Shifting Roles for NGOs in the Climate Negotiations. *Environmental Values Vol. 24*, pp. 799-824.

Pandey, D. A., & Pandey, J. S. (2011). Carbon footprint: Current methods of estimation. *Environmental Monitoring and Assessment Vol. 178(1)*, pp. 135-160.

Parguel, B., Benoît-Moreau, F., & Larceneux, F. (2011). How Sustainability Ratings Might Deter 'Greenwashing:' A Closer Look at Ethical Corporate Communication. *Journal of Business Ethics Vol. 102 (1)*, p. 15.

Partha, D. (2008, December). Discounting climate change. *Journal of Risk and Uncertainty Journal of Risk and Uncertainty Vol.37(2-3)*, pp. 141-169.

Peattie, K. (2010). Green consumption: Behavior and norms. . *Annual Review of Environment and Resources Vol. 35(1)*, pp. 195-228.

Peattie, K., & Peattie, S. (2009). Social marketing: A pathway to consumption reduction? *Journal of Business Research Vol. 62(2)*, pp. 260-268.

Peloza, J., White, K., & Shang, J. (2013). Good and Guilt-Free: The Role of Self-Accountability in Influencing Preferences for Products with Ethical Attributes. *Journal of Marketing Vol. 77 (1),* , pp. 104–119.

Pew. (2019, July 23rd). *Digital News Fact Sheet.* Retrieved from Pew Research Center: Journalism and Media: https://www.journalism.org/fact-sheet/digital-news/

Pidgeon, N. (2012). Public understanding of, and attitudes to, climate change: UK and international perspectives. *Climate Policy Vol. 12 (1)*, pp. 85-106.

Pomeroy, R. (2020, January 21st). *This is what Greta Thunberg just told Davos.* Retrieved from World Economic Forum: https://www.weforum.org/agenda/2020/01/greta-thunberg-davos-message-climate-change/

Pooley, J. A., & O'Connor, M. (2000). Environmental education and attitudes: Emotions and beliefs are what is needed. *Environment & Behavior Vol. 32*, pp. 711-723.

Poulsen, T., Strand, T., & Thomsen, S. (2010). Voting power and shareholder activism: A study of swedish shareholder meetings. *Corporate Governance: An International Review Vol. 18(4)*, pp. 329-343.

Priest, S. (2016). *Communicating Climate Change: The Path Forward.* London: Palgrave Macmillan UK.

Pruneau, D., Doyon, A., Langis, J., Vasseur, L., Ouellet, E., McLaughlin, E., & . . . Martin, G. (2006). When teachers adopt environmental behaviors in the aim of protecting the climate. *The Journal of Environmental Education Vol. 37(3)*, pp. 3-12.

Public Citizen. (2018). *Carbon Omission: How the U.S. Media Failed to Connect Extreme Weather to Climate Change in 2018.* Retrieved from Public Citizen's Climate Program: https://www.citizen.org/wp-

content/uploads/public-citizen-carbon-omission-extreme-weather-2018.pdf

Rattray, J., & Jones, M. C. (2007). Essential elements of questionnaire design and development. *Journal of Clinical Nursing Vol. 16(2)*, pp. 234-243.

Rebolini, A. (2019, April 25th). *Buzzfeed news*. Retrieved from 17 Books That Will Change The Way You Think About The World: https://www.buzzfeednews.com/article/ariannarebolini/powerful-books-climate-change-cli-fi

Reczek, R., Trudel, R., & White, K. (2018). Focusing on the Forest or the Trees: How Abstract Versus Concrete Construal Level Predicts Responses to Eco-Friendly Products. *Journal of Environmental Psychology Vol. 57*, pp. 87–98.

Reeder, G. D., & Brewer, M. B. (1979). A schematic model of dispositional attribution in interpersonal perception. *Psychological Review Vol. 86(1)*, pp. 61-79.

Reich, B. J., & Soule, C. A. (2016). Green demarketing in advertisements: Comparing "buy green" and "buy less" appeals in product and institutional advertising contexts. *Journal of Advertising Vol. 45(4)*, pp. 441-458.

Reser, J., Bradley, G., Glendon, A., Ellul, M., & Callaghan, R. (2012). *Public risk perceptions, understandings, and responses to climate change and natural disasters in Australia, 2010 and 2011.* Queensland: AU: Griffith University, National Climate Change Adaptation Research Facility.

Reynolds, T. W., Bostrom, A., Read, D., & Morgan, M. G. (2010). Now what do people know about global climate change? survey studies of educated laypeople. *Risk Analysis Vol. 30(10)*, pp. 1520-1538.

Richerson, P., & Boyd, R. (2005). *Not by Genes Alone: How Culture Transformed Human Evolution. .* Chicago, Illinois, USA: University of Chicago Press.

Rieder, T. N. (2016). *Toward a Small Family Ethic: How Overpopulation and Climate Change Are Affecting the Morality of Procreation.* Cham: Springer International Publishing.

Rokeach, M. (1968). *Beliefs, attitudes and values.* San Francisco, CA:: Jossey-Bass Publications.

Rokeach, M. (1973). *The Nature of Human Values.* New York City, New York, USA: The Free Press.

Rokeach, M. (2000). *Understanding human values: Individual and societal.* New York: NY: The Free Press.

Röös, E., & Tjärnemo, H. (2011). Challenges of carbon labelling of food products: A consumer research perspective. *British Food Journal Vol. 113(8)*, pp. 982-996.

Rootes, C. (1999, March). Environmental movements: From the local to the global. *Environmental Politics Vol. 8(1)*, pp. 1-12.

Royal, C. (2012). Towards a Manifesto for indigenous development. *Fifth Biennial International Indigenous Development Research Conference. .* Auckland: Ngā Pae o te Māramatanga, New Zealand's Māori Centre of Research Excellence, University of Auckland.

Rubinstein, A. (2003, November). "Economics and Psychology"? The Case of Hyperbolic Discounting*. *International Economic Review Vol.44(4)*, pp. 1207-1216.

Ruddock, A. (2000). *Understanding audiences: Theory and method.* London : SAGE Publications.

Sadiq, A. A., Ollier, M., & Tyler, J. (2016). Employees' perceptions of workplace preparedness for climate Change-Related natural hazards. *Risk, Hazards & Crisis in Public Policy Vol. 7(2)*, pp. 62-78.

Salama, S., & Aboukoura, K. (2018). Role of Emotions in Climate Change Communication. In W. Leal Filho, M. E., A. A., A. U., & H. McGhie

(eds), *Handbook of Climate Change Communication: Vol. 1 Climate Change Management.* (pp. 137-150). Cham: Springer.

Samuelson, W., & Zeckhauser, R. (1988, March). Status Quo Bias in Decision Making. *Journal of Risk and Uncertainty Vol. 1(1)*, pp. 7-59.

Scannell, L., & Gifford, R. (2013). Personally Relevant Climate Change: The Role of Place Attachment and Local Versus Global Message Framing in Engagement. *Environment and Behavior Vol. 45 (1)*, pp. 60–85.

Schahn, J., & Holzer, E. (1990). Studies of individual environmental concern. The role of knowledge, gender, and background variables. *Environment & Behavior Vol. 22*, pp. 767-786.

Schickel, R. (2000). *Intimate strangers: The culture of celebrity in America.* Chicago, USA: Ivan R. Dee Publishing.

Schneider-Mayerson, M. (2018). The Influence of Climate Fiction: An Empirical Survey of Readers. *Environmental Humanities Vol. 10 (2)*, pp. 473–500. .

Schultz, P. (2002). Knowledge, information, and household recycling: Examining the knowledge-deficit model of behavior change. In T. Dietz, & P. Stern (Eds.), *New tools for environmental protection: Education, information, and voluntary measures* (pp. 67-82). Washington, DC: National Academy Press.

Schultz, P. W. (1998). Values and proenvironmental behavior: A five-country survey. *Journal of Cross-Cultural Psychology Vol. 29(4)*, pp. 540-558.

Schultz, P., & Zelezny, L. (1998, July). and proenvironmental behavior: a five-country survey. *Journal of Cross-Cultural Psychology Vol. 29(4)*, pp. 540–558.

Schwartz, S. (1992, December). Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries. *Advances in Experimental Social Psychology Vol. 25*, pp. 1-65.

Seifert, C., Krannich, T., & Guenther, E. (2019, February 1st). Gearing up sustainability thinking and reducing the bystander effect – A case study of wastewater treatment plants. *Journal of Environmental Management Vol. 231*, pp. 155-165.

Semenza, J., Hall, D., Wilson, D., Bontempo, B., Sailor, D., & George, L. (2008). Public perception of climate change: Voluntary mitigation and barriers to behaviour change. *American Journal of Preventive Medicine Vol. 35(5)*, pp. 479-487.

Serrao-Neumann, S., & Low Choy, D. (2018). Uncertainty and Future Planning: The Use of Scenario Planning for Climate Change Adaptation Planning and Decision. In S. Serrao-Neumann, A. Coudrain, & L. Coulter, *Communicating Climate Change Information for Decision-Making* (pp. 79-90). Cham, CH: Springer Verlag.

Serrao-Neumann, S., Coudrain, A., & Coulter, L. (2018). *Communicating climate change information for decision-making.* Cham: Springer International Publishing.

Seyfang, G. (2009). *The new economics of sustainable consumption: Seeds of change. .* London: Palgrave Macmillan UK.

Sheehan, K., & Atkinson, L. (2012). Revisiting green advertising and the reluctant consumer. *Journal of Advertising Vol. 41(4)*, p. 5.

Shehata, A., & Hopmann, D. N. (2012, April). Framing climate change: A study of US and swedish press coverage of global warming. *Journalism Studies: Environmental Journalism Vol. 13 (2)*, pp. 175-192.

Shurpali, N., Agarwal, A. K., & Srivastava, V. (2019). *Greenhouse gas emissions: Challenges, technologies and solutions.* Singapore: Springer Singapore.

Sjöberg, L. (1998). Worry and risk perception. *Risk Analysis Vol. 18 (1)*, pp. 85-93.

Sjöberg, L. (2006). Will the real meaning of affect please stand up? *Journal of Risk Research Vol. 9 (2)*, pp. 101-108.

Skamp, K., Boyes, E., Stanisstreet, M., Rodriguez, M., Malandrakis, G., Fortner, R., & . . . Yoon, H. (2019). Voting for change: An international study of students' willingness to support measures to ameliorate climate change. *Research in Science Education*.

Smith, N., & Joffe, H. (2009). Climate change news in the British press: the role of the visual. *Journal of Risk Research Vol. 12*, pp. 647–663.

Smith, N., & Leiserowitz, A. (2012). The rise of global warming skepticism: Exploring affective image associations in the United States over time. *Risk Analysis Vol. 32 (6)*, pp. 1021-1032.

Smith, N., & Leiserowitz, A. (2014). The Role of Emotion in Global Warming Policy Support and Opposition. *Risk Analysis Vol. 34 (5)*, pp. 937–948. .

Smith, S. M., & Haugtvedt, C. P. (1994). Attitudes and recycling: Does the measurement of affect enhance behavioral prediction? *Psychological Market Vol. 11*, pp. 359–374.

Snodgrass, J. G., Sharma, S. K., Jhala, Y. S., Lacy, M. G., Advani, M., Bhargava, N. K., & Upadhyay, C. (n.d.). Beyond self-interest and altruism: Herbalist and leopard brothers in an Indian wildlife sanctuary. *Human Dimensions of Wildlife Vol. 12*, pp. 375–387.

Spence, A., Poortinga, W., & Pidgeon, N. (2012). The psychological distance of climate change. *Risk Analysis Vol. 32(6)*, pp. 957-972.

Spence, A., Poortinga, W., Butler, C., & Pidgeon, N. (2011). Perceptions of climate change and willingness to save energy related to flood experience. *Nature Climate Change Vol. 1 (1)*, pp. 46-49.

Stern, P. (1997). Toward a working definition of consumption for environmental research and policy. In P. C. Stern, T. Dietz, V. R. Ruttan, & R. H. Socolow (Eds.), *Environmentally significant*

consumption: Research directions (pp. 12-35). Washington, DC, USA: National Academies Press.

Stern, P. C., & Dietz, T. (1994). The Value Basis of Environmental Concern. *Journal of Social Issues Vol. 50(3)*, pp. 65-84.

Stern, P. C., Dietz, T., & Kalof, L. (1993, September 1st). Value Orientations, Gender, and Environmental Concern. *Environment and Behavior Vol. 25(5)*, pp. 322-348.

Stern, P. C., Dietz, T., Kalof, L., & Guagnano, G. (1995). Values, beliefs, and proenvironmental action: attitude, formation towardemergent attitude objects. *Journal of Applied Social Psychology Vol 25*, pp. 1611–1636.

Stevenson, K. P., & Bondell, H. (2016). The influence of personal beliefs, friends, and family in building climate change concern among adolescents. *Environmental Education Research Vol. 4622*, pp. 1–15.

Stokes, B., Wike, R., & Carle, J. (2015, November 5th). *Pew Research Center.* Retrieved from Global Concern about Climate Change: https://www.pewresearch.org/wp-content/uploads/sites/2/2015/11/Pew-Research-Center-Climate-Change-Report-FINAL-November-5-2015.pdf

Strahilevitz, M. A., & Loewenstein, G. (1998). The effect of ownership history on the valuation of objects. *Journal of Consumer Research Vol. 25(3)*, pp. 276-289.

Su, L. Y., Akin, H., Brossard, D., Scheufele, D. A., & Xenos, M. A. (2015). Science news consumption patterns and their implications for public understanding of science. *Journalism & Mass Communication Quarterly Vol. 92*, pp. 597–616.

Sundblad, E., Biel, A., & Gärling, T. (2007). Cognitive and affective risk judgments related to climate change. *Journal of Environmental Psychology Vol. 27(2)*, pp. 97-106.

Swain, K. A. (2012). Mass Media Roles in Climate Change Mitigation. In W. Chen, J. Seiner, T. Suzuki, & M. Lackner (eds), *Handbook of Climate Change Mitigation* (pp. 161-195). New York, NY: Springer.

Swerling, G. (2019, August 1st). *Birth rate lowest since records began, as families opt for 'environmentally friendly' two children* . Retrieved from The Telegraph: https://www.telegraph.co.uk/news/2019/08/01/birth-rate-lowest-since-records-began-families-opt-environmentally/

Swim, J., Clayton, S., Doherty, T., Gifford, R., Howard, G., Reser, J., . . . Weber, E. (2011). *Psychology and Global Climate Change: Addressing a Multi-faceted Phenomenon and Set of Challenges.* Washington D.C., USA: American Psychological Association.

Swim, J., Markowitz, E., & Bloodhart, B. (2012). Psychology and Climate Change: Beliefs, Impacts, and Human Contributions. In S. D. Clayton, *The Oxford Handbook of Environmental and Conservation Psychology* . Oxford, UK: Oxford University Press.

Tasquier, G., & Pongiglione, F. (2017). The influence of causal knowledge on the willingness to change attitude towards climate change: results from an empirical study. *International Journal of Science Education Vol. 39(13)*, pp. 1846–1868.

Taufique, K. M., Vocino, A., & Polonsky, M. J. (2017). The Influence of Eco-Label Knowledge and Trust on Pro-environmental Consumer Behaviour in an Emerging Market. *Journal of Strategic Marketing Vol. 25 (7)*, pp. 511–529.

TerraChoice, E. (2007). *The "Six Sins of Greenwashing™": A Study of Environmental Claims in North American Consumer Markets.* Retrieved from London: TerraChoice Environmental Marketin: Available: http://sinsofgreenwashing.org

Thaler, R. (1980). Toward a positive theory of consumer choice. *Journal of Economic Behavior and Organization Vol.1(1)*, pp. 39-60.

Thøgersen, J. (2000). Psychological Determinants of Paying Attention to Eco-Labels in Purchase Decisions: Model Development and Multinational Validation. *Journal of Consumer Policy Vol. 23 (3)*, pp. 285–313.

Thompson, C., Coskuner-Balli, G., Deighton, J., & Belk (Eds.), R. (2007). Thompson, C., Coskuner-Balli, G., & John Deighton served as editor and Russell Belk served as associate editor for this article.Countervailing market responses to corporate Co-optation and the ideological recruitment of consumption communities. *Journal of Consumer Research Vol. 34(2)*, pp. 135-152.

Thurstone, L. L. (1931). The measurement of social attitudes. *The Journal of Abnormal and Social Psychology Vol. 26(3)*, pp. 249-269.

Tobler, C., Visschers, V., & Siegrist, M. (2012). Addressing climate change: Determinants of consumers' willingness to act and to support policy measures. *Journal of Environmental Psychology Vol. 32(3)*, pp. 197-207.

Trampuš, M., Sen, S., Stojanović, N., & Grobelnik, M. (2012). Visualisation of Online Discussion Forums. In Y. Charalabidis, & S. Koussouris, *Empowering Open and Collaborative Governance: Technologies and Methods for Online Citizen Engagement in Public Policy Making.* Heidelberg : Springer-Verlag Berlin Heidelberg .

Turner, J., & Oakes, P. (1986). The significance of the social identity concept for social psychology with reference to individualism, interactionism and social influence. *British Journal of Social Psychology Vol. 25 (3)*, pp. 237–252.

Tyler, T., & Cook, F. (1984). The mass media and judgments of risk: Distinguishing impact on personal and societal level judgments. *Journal of Personality and Social Psychology Vol. 47(4)*, pp. 693-798.

UN, U. (2019, August 28th). *Teen activist Greta Thunberg arrives in New York by boat, putting 'climate crisis' in spotlight.* Retrieved from UN News: https://news.un.org/en/story/2019/08/1045161

Vainio, A., & Paloniemi, R. (2013). Does belief matter in climate change action? . *Public Understanding of Science Vol. 22(4)*, pp. 382-395.

Valdez, R., Peterson, M., & Stevenson, K. (2018). How communication with teachers, family and friends contributes to predicting climate change behaviour among adolescents. *Environmental Conservation Vol. 45(2)*, pp. 183-191.

van der Linden, S. (2015). The social-psychological determinants of climate change risk perceptions: Towards a comprehensive model. *Journal of Environmental Psychology Vol. 41*, pp. 112-124.

van Egmond, N. D., & de Vries, H. J. (2011). Sustainability: The search for the integral worldview. . *Futures Vol. 43(8)*, pp. 853-867.

van Valkengoed, A. M., & Steg, L. (2019). Meta-analyses of factors motivating climate change adaptation behaviour. *Nature and Climate Change Vol. 9(2)*, pp. 158-163.

Veganz. (2020, May 26th). *Veganz Group AG*. Retrieved from Alle Fakten auf den Tisch – Die Ökobilanz unserer Produkte: https://veganz.de/blog/alle-fakten-auf-den-tisch-die-oekobilanz-unserer-produkte/

Veganz, G. (2019, November 1st). *Veganz Group AG.* Retrieved from VEGANZ ERNÄHRUNGSUMFRAGE 2019: https://veganz.de/wp-content/uploads/2020/01/2019-11-29-laxxnderreport-weltvegantagsumfrage-interaktiv-deutsch.pdf

Vidal, J. (2015, June 19th). *Pope's climate change encyclical glosses over role of population growth; In ignoring family planning - and overlooking women's development role - the pope may have weakened his case on links between poverty and ecological crisis.* Retrieved from The Guardian: https://advance-lexis-com.proxy1-bib.sdu.dk/api/document?collection=news&id=urn:contentItem:5G7Y-H7B1-JCJY-G31K-00000-00&context=1516831

Voeller, E. (2011). Renewing a Naxi environmental ethic in Lijiang, China: An approach for water management. *Lakes and Reservoirs: Research and Management Vol. 16*, pp. 223–229.

Vogler, J. (2011). Environmental issues. In J. Baylis, & S. O. Smith, *The Globalization of World Politics: An Introduction to International Relations* (pp. 346–362). New York, NY: Oxford University Press.

Wade-Benzoni, K. A., Tenbrunsel, A., & Bazerman, M. (1997). Egocentric Interpretations of Fairness as an Obstacle to the Resolution of Environmental Conflict. In R. J. Lewicki, & B. H. Sheppard (eds.), *Research on Negotiation in Organizations: A Biannual Research Series, Vol. 6* (pp. 189–208). Bingley, UK: Emerald Group Publishing.

Wake, B. (2012). Voting for climate. *Nature Climate Change Vol. 2(6)*, pp. 395-395.

Walker, B. J., Kurz, T., & Russel, D. (2018). Towards an understanding of when non-climate frames can generate public support for climate change policy. *Environment and Behavior V ol. 50(7)*, pp. 781-806.

Wang, T., Mukhopadhyay, A., & Patrick, V. M. (2017). Getting Consumers to Recycle NOW! When and Why Cuteness Appeals Influence Prosocial and Sustainable Behavior. *Journal of Public Policy & Marketing Vol. 36 (2)*, pp. 269–283.

Watts, J. (2018, December 13th). *The Guardian.* Retrieved from Global warming should be called global heating, says key scientist : https://www.theguardian.com/environment/2018/dec/13/global-heating-more-accurate-to-describe-risks-to-planet-says-key-scientist

Weber, E. (2010). What shapes perceptions of climate change? *Wiley Interdisciplinary Reviews: Climate Change Vol. 1(3)*, pp. 332-342.

Weber, E. (2015). Climate change demands behavioral change: What are the challenges? *Social Research: An International Quarterly Vol. 82(3)*, pp. 561-580.

White, K., Habib, R., & Hardisty, D. J. (2019). How to SHIFT consumer behaviors to be more sustainable: A literature review and guiding framework. *Journal of Marketing Vol. 83(3)*, pp. 22-49.

White, K., MacDonnell, R., & Dahl, D. W. (2011). It's the Mind-Set that Matters: The Role of Construal Level and Message Framing in Influencing Consumer Efficacy and Conservation Behaviors. *Journal of Marketing Research Vol. 48 (3)*, pp. 472–485.

Whitmarsh, L. (2011). Scepticism and uncertainty about climate change: Dimensions, determinants and change over time. *Global Environmental Change Vol. 21(2)*, pp. 690-700.

Whitmarsh, L., Seyfang, G., & O'Neill, S. (2011). Public engagement with carbon and climate change: to what extent is the public 'carbon capable'? . *Global Environ Change Vol. 21*, pp. 56–65.

Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: implications for effective public health campaigns. *Health Education & Behaviour Vol. 27(5)*, pp. 591–615.

Writer, P. C. (2018). *The undeniable link between consumerism and climate change. .* Shimla: Athena Information Solutions Pvt. Ltd.

York, R., Rosa, E., & Dietz, T. (2003). STIRPAT, IPAT and ImPACT: Analytic Tools for Unpacking the Driving Forces of Environmental Impact. *Ecological Economics Vol. 46*, pp. 351-365.

Youngblood, S. (2016). *Peace journalism principles and practices: Responsibly reporting conflicts, reconciliation, and solutions.* London; New York: Routledge.

Zanocco, C., Boudet, H., Nilson, R., Satein, H., Whitley, H., & Flora, J. (2018). *Place, proximity, and perceived harm: Extreme weather events and views about climate change.* Dordrecht: Springer.

Zaval, L., Keenan, E., Johnson, E., & Weber, E. (2014). How warm days increase belief in global warming. *Nature Climate Change Vol. 4*, pp. 143-147.

Zaval, L., Markowitz, E. M., & Weber, E. U. (2015). How Will I Be Remembered? Conserving the Environment for the Sake of One's Legacy. *Psychological Science Vol. 26 (2)*, pp. 231–236.

Zetter, L. (2011). *Lobbying: The art of political persuasion (Revis, updat and expand second ed.).* Petersfield, Hampshire: Harriman House.

Zhao, X., & Belk, R. W. (2008). Politicizing consumer culture: Advertising's appropriation of political ideology in china's social transition. *Journal of Consumer Research Vol. 35(2)*, pp. 231-244.

Zinkhan, G. M., & Carlson, L. (1995). Green advertising and the reluctant consumer. *Journal of Advertising Vol. 24(2)*, pp. 1-6.

List of Tables

Descriptive Statistics

	Mean	Std. Deviation	N
Mean Question 13	2,1603	,26438	121
11a) Impacts	3,60	1,018	122
11b) Causes	3,79	1,014	122
11c) GHG	3,61	1,153	122
11d) Sustainability by emissions	2,81	1,063	122
11e) Being able to judge a procuct's sustainability in other terms of sustainability	3,02	1,157	122

Correlations

		Mean Question 13	11a) Impacts	11b) Causes	11c) GHG	11d) Sustainability by emissions	11e) Being able to judge a procuct's sustainability in other terms of sustainability
Mean Question 13	Pearson Correlation	1	,306**	,181*	,198*	,231*	,250**
	Sig. (2-tailed)		,001	,047	,029	,011	,006
	N	121	121	121	121	121	121
11a) Impacts	Pearson Correlation	,306**	1	,653**	,628**	,396**	,300**
	Sig. (2-tailed)	,001		,000	,000	,000	,001
	N	121	122	122	122	122	122
11b) Causes	Pearson Correlation	,181*	,653**	1	,728**	,338**	,306**
	Sig. (2-tailed)	,047	,000		,000	,000	,001
	N	121	122	122	122	122	122
11c) GHG	Pearson Correlation	,198*	,628**	,728**	1	,379**	,240**
	Sig. (2-tailed)	,029	,000	,000		,000	,008
	N	121	122	122	122	122	122
11d) Sustainability by emissions	Pearson Correlation	,231*	,396**	,338**	,379**	1	,621**
	Sig. (2-tailed)	,011	,000	,000	,000		,000
	N	121	122	122	122	122	122
11e) Being able to judge a procuct's sustainability in other terms of sustainability	Pearson Correlation	,250**	,300**	,306**	,240**	,621**	1
	Sig. (2-tailed)	,006	,001	,001	,008	,000	
	N	121	122	122	122	122	122

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

*. Correlation is significant at the 0.05 level (2-tailed).

Table 1: Pearson Correlation - Relation knowledge (question 11 a-e) and climate change action (question 13a-o), created in SPSS with own data.

Descriptive Statistics

	Mean	Std. Deviation	N
Mean Question 11	3,3656	,81218	122
Mean Question 13	2,1603	,26438	121

Correlations

		Mean Question 11	Mean Question 13
Mean Question 11	Pearson Correlation	1	,310**
	Sig. (2-tailed)		,001
	N	122	121
Mean Question 13	Pearson Correlation	,310**	1
	Sig. (2-tailed)	,001	
	N	121	121

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

Table 2: Pearson Correlation - Mean knowledge (question 11) and mean climate change action (question 13), created in SPSS with own data.

Descriptive Statistics

	Mean	Std. Deviation	N
9) Score on gap effort and knowledge	6,05	1,615	122
11a) Impacts	3,60	1,018	122
11b) Causes	3,79	1,014	122
11c) GHG	3,61	1,153	122
11d) Sustainability by emissions	2,81	1,063	122

Correlations

		9) Score on gap effort and knowledge	11a) Impacts	11b) Causes	11c) GHG	11d) Sustainability by emissions
9) Score on gap effort and knowledge	Pearson Correlation	1	,374**	,233**	,259**	,256**
	Sig. (2-tailed)		,000	,010	,004	,004
	N	122	122	122	122	122
11a) Impacts	Pearson Correlation	,374**	1	,653**	,628**	,396**
	Sig. (2-tailed)	,000		,000	,000	,000
	N	122	122	122	122	122
11b) Causes	Pearson Correlation	,233**	,653**	1	,728**	,338**
	Sig. (2-tailed)	,010	,000		,000	,000
	N	122	122	122	122	122
11c) GHG	Pearson Correlation	,259**	,628**	,728**	1	,379**
	Sig. (2-tailed)	,004	,000	,000		,000
	N	122	122	122	122	122
11d) Sustainability by emissions	Pearson Correlation	,256**	,396**	,338**	,379**	1
	Sig. (2-tailed)	,004	,000	,000	,000	
	N	122	122	122	122	122

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

Table 3: Pearson Correlation- Overall climate change system and action-related knowledge (question 11a-d) and effort score (question 9), created in SPSS with own data.

Descriptive Statistics

	Mean	Std. Deviation	N
9) Score on gap effort and knowledge	6,05	1,615	122
Mean Question 11 a-d	3,4529	,84997	122

Correlations

		9) Score on gap effort and knowledge	Mean Question 11 a-d
9) Score on gap effort and knowledge	Pearson Correlation	1	,349**
	Sig. (2-tailed)		,000
	N	122	122
Mean Question 11 a-d	Pearson Correlation	,349**	1
	Sig. (2-tailed)	,000	
	N	122	122

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

Table 4: Pearson Correlation - Overall climate change system and action-related knowledge (question 11a-d) and effect on self-reported climate change action scores (question 9), created in SPSS with own data.

Correlations

		4) Please indicate how sure you are that global warming is happening:	11a) Explaining the impacts of global average warming	11c) Explaining the greenhouse gas effect
4) Please indicate how sure you are that global warming is happening:	Pearson Correlation	1	,319**	,301**
	Sig. (2-tailed)		,000	,001
	N	122	122	122
11a) Explaining the impacts of global average warming	Pearson Correlation	,319**	1	,628**
	Sig. (2-tailed)	,000		,000
	N	122	122	122
11c) Explaining the greenhouse gas effect	Pearson Correlation	,301**	,628**	1
	Sig. (2-tailed)	,001	,000	
	N	122	122	122

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

Table 5: Pearson Correlation - Influence of climate change system knowledge (question 11a &c) on someone's certainty about it (question 4), created in SPSS with own data.

Descriptive Statistics

	Mean	Std. Deviation	N
6) Ability to limit global warming	2,70	,462	122
Mean Question 13	2,1603	,26438	121

Correlations

		6) Ability to limit global warming	Mean Question 13
6) Ability to limit global warming	Pearson Correlation	1	,218*
	Sig. (2-tailed)		,016
	N	122	121
Mean Question 13	Pearson Correlation	,218*	1
	Sig. (2-tailed)	,016	
	N	121	121

*. Correlation is significant at the 0.05 level (2-tailed).

Table 6: Pearson Correlation - Someone's belief in humans ability to limit global average warming to a 2°C increase (question 6) and their mean climate change action (question 13), created in SPSS with own data.

Group Statistics

	6) Please indicate which of the following statements you personally agree with the most:	N	Mean	Std. Deviation	Std. Error Mean
Mean Question 13	3	84	2,1984	,25954	,02832
	2	37	2,0739	,25810	,04243

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Mean Question 13	Equal variances assumed	,010	,922	2,436	119	,016	,12454	,05112	,02331	,22577
	Equal variances not assumed			2,441	69,253	,017	,12454	,05101	,02278	,22630

Table 7: T-test - Comparison between those who belief and disbelief in humans' ability to limit global average warming to a 2°C increase (question 6) and their mean extent of climate change action (question 13), created in SPSS with own data.

Descriptive Statistics

	Mean	Std. Deviation	N
Mean Question 13	2,1603	,26438	121
3) Importance	4,09	,803	122

Correlations

		Mean Question 13	3) Importance
Mean Question 13	Pearson Correlation	1	,434**
	Sig. (2-tailed)		,000
	N	121	121
3) Importance	Pearson Correlation	,434**	1
	Sig. (2-tailed)	,000	
	N	121	122

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

Table 8: Pearson Correlation - Level of personal importance of climate change (question 3) and extent of mean climate change action (question 13), created in SPSS with own data.

		3) Importan
3) Importance	Pearson Correlation	1
	Sig. (2-tailed)	
	N	122
13 a) Eat vegan or vegetarian	Pearson Correlation	,345**
	Sig. (2-tailed)	,000
	N	121
13b) Buy locally-sourced food	Pearson Correlation	,002
	Sig. (2-tailed)	,982
	N	121
13c) Second-hand shop for furniture	Pearson Correlation	,196*
	Sig. (2-tailed)	,031
	N	121
13d) Second-hand shop for clothes	Pearson Correlation	,160
	Sig. (2-tailed)	,080
	N	121
13e) Second-hand shop for technological devices	Pearson Correlation	,088
	Sig. (2-tailed)	,339
	N	121
13f) Choose the option of transportation with the lowest CO imprint	Pearson Correlation	-,031
	Sig. (2-tailed)	,739
	N	121
13 g) Pay CO offsets for medium of transportation (flights, bus and train rides)	Pearson Correlation	,278**
	Sig. (2-tailed)	,002
	N	121
13h) Alter travel destinations	Pearson Correlation	,316**
	Sig. (2-tailed)	,000
	N	121
13i) Pay extra for CO neutral shipping	Pearson Correlation	,240**
	Sig. (2-tailed)	,008
	N	121
13j) Shop with a shopping list	Pearson Correlation	,366**
	Sig. (2-tailed)	,000
	N	121
13k) Repair broken items if they can be repaired still	Pearson Correlation	,111
	Sig. (2-tailed)	,227
	N	121

		3) Importance
13l) Prioritise the longevity of a product in my consumption choices	Pearson Correlation	,128
	Sig. (2-tailed)	,163
	N	121
13m) Prioritise products from companies with CO-neutral operations	Pearson Correlation	,234**
	Sig. (2-tailed)	,010
	N	121
13n) Compare products by emissions	Pearson Correlation	,284**
	Sig. (2-tailed)	,002
	N	121
13o) Use green electricity	Pearson Correlation	,172
	Sig. (2-tailed)	,060
	N	121

Correlations

Table 9: Pearson Correlation- level of importance (question 3) on extent of different climate change actions (question 13), created in SPSS with own data.

Descriptive Statistics

	Mean	Std. Deviation	N
3) Importance	4,09	,803	122
11a) Impacts	3,60	1,018	122
11b) Causes	3,79	1,014	122
11c) GHG	3,61	1,153	122

Correlations

		3) Importance	11a) Impacts	11b) Causes	11c) GHG
3) Importance	Pearson Correlation	1	,318**	,217*	,279**
	Sig. (2-tailed)		,000	,017	,002
	N	122	122	122	122
11a) Impacts	Pearson Correlation	,318**	1	,653**	,628**
	Sig. (2-tailed)	,000		,000	,000
	N	122	122	122	122
11b) Causes	Pearson Correlation	,217*	,653**	1	,728**
	Sig. (2-tailed)	,017	,000		,000
	N	122	122	122	122
11c) GHG	Pearson Correlation	,279**	,628**	,728**	1
	Sig. (2-tailed)	,002	,000	,000	
	N	122	122	122	122

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

*. Correlation is significant at the 0.05 level (2-tailed).

Table 10: Pearson Correlation - Confidence about knowledge (question 11a-c) and the level of importance of climate change (question 3), created in SPSS with own data.

Correlations

		mean question 11 a&c	3) Please indicate how important the issue of global warming is to you personally:
mean question 11 a&c	Pearson Correlation	1	,329**
	Sig. (2-tailed)		,000
	N	122	122
3) Please indicate how important the issue of global warming is to you personally:	Pearson Correlation	,329**	1
	Sig. (2-tailed)	,000	
	N	122	122

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

Table 11: Pearson correlation – Level of confidence about system knowledge (mean question 11 a&c) and the level of importance of climate change (question 3), created in SPSS with own data.

Correlations

		4) Certainty	Mean Question 13
4) Certainty	Pearson Correlation	1	,403**
	Sig. (2-tailed)		,000
	N	122	121
Mean Question 13	Pearson Correlation	,403**	1
	Sig. (2-tailed)	,000	
	N	121	121

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

Table 12: Pearson Correlation - level of certainty over climate change happening (question 4) and the mean extent of climate change action taken (question 13), created in SPSS with own data.

		4) Certainty
4) Certainty	Pearson Correlation	1
	Sig. (2-tailed)	
	N	122
13 a) Eat vegan or vegetarian	Pearson Correlation	,327**
	Sig. (2-tailed)	,000
	N	121
13b) Buy locally-sourced food	Pearson Correlation	,069
	Sig. (2-tailed)	,454
	N	121
13c) Second-hand shop for furniture	Pearson Correlation	,220*
	Sig. (2-tailed)	,016
	N	121
13d) Second-hand shop for clothes	Pearson Correlation	,205*
	Sig. (2-tailed)	,024
	N	121
13e) Second-hand shop for technological devices	Pearson Correlation	,218*
	Sig. (2-tailed)	,016
	N	121
13f) Choose the option of transportation with the lowest CO imprint	Pearson Correlation	,195*
	Sig. (2-tailed)	,032
	N	121
13 g) Pay CO offsets for medium of transportation (flights, bus and train rides)	Pearson Correlation	,282**
	Sig. (2-tailed)	,002
	N	121
13h) Alter travel destinations	Pearson Correlation	,242**
	Sig. (2-tailed)	,007
	N	121
13i) Pay extra for CO neutral shipping	Pearson Correlation	,094
	Sig. (2-tailed)	,304
	N	121
13j) Shop with a shopping list	Pearson Correlation	,276**
	Sig. (2-tailed)	,002
	N	121
13k) Repair broken items if they can be repaired still	Pearson Correlation	-,075
	Sig. (2-tailed)	,413
	N	121

		4) Certainty
13l) Prioritise the longevity of a product in my consumption choices	Pearson Correlation	,056
	Sig. (2-tailed)	,540
	N	121
13m) Prioritise products from companies with CO-neutral operations	Pearson Correlation	,317**
	Sig. (2-tailed)	,000
	N	121
13n) Compare products by emissions	Pearson Correlation	,166
	Sig. (2-tailed)	,069
	N	121
13o) Use green electricity	Pearson Correlation	,067
	Sig. (2-tailed)	,466
	N	121

Correlations

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

*. Correlation is significant at the 0.05 level (2-tailed).

Table 13: Pearson Correlation - level of certainty over climate change happening (question 3) and the extent of certain climate change actions undertaken (question 13), created in SPSS with own data.

Group Statistics

	5) Are you aware how much CO_2 you're 'allowed' to emit annually?	N	Mean	Std. Deviation	Std. Error Mean
Mean Question 13	-1	90	2,1059	,25516	,02690
	1	31	2,3183	,22752	,04086

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Mean Question 13	Equal variances assumed	,773	,381	-4,104	119	,000	-,21235	,05175	-,31482	-,10989
	Equal variances not assumed			-4,341	57,957	,000	-,21235	,04892	-,31028	-,11443

Table 14: T-test: Effect of knowledge on how much CO_2 one is allowed to emit (question 5) on mean extent of climate change action (question 13), created in SPSS with own data.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
13 a) Eat vegan or vegetarian	Equal variances assumed	,755	,387	-3,524	119	,001	-,482	,137	-,752	-,211
	Equal variances not assumed			-3,641	55,381	,001	-,482	,132	-,747	-,217
13b) Buy locally-sourced food	Equal variances assumed	13,041	,000	-1,730	119	,086	-,165	,095	-,354	,024
	Equal variances not assumed			-1,505	42,172	,140	-,165	,110	-,386	,056
13c) Second-hand shop for furniture	Equal variances assumed	2,098	,150	-2,121	119	,036	-,267	,126	-,516	-,018
	Equal variances not assumed			-2,133	52,680	,038	-,267	,125	-,518	-,016
13d) Second-hand shop for clothes	Equal variances assumed	,284	,595	-1,345	119	,181	-,176	,131	-,434	,083
	Equal variances not assumed			-1,273	47,576	,209	-,176	,138	-,453	,102
13e) Second-hand shop for technological devices	Equal variances assumed	8,258	,005	-2,420	119	,017	-,302	,125	-,549	-,055
	Equal variances not assumed			-2,490	54,938	,016	-,302	,121	-,545	-,059
13f) Choose the option of transportation with the lowest CO_2 imprint	Equal variances assumed	,123	,726	-1,804	119	,074	-,206	,114	-,432	,020
	Equal variances not assumed			-1,895	57,146	,063	-,206	,109	-,424	,012
13 g) Pay CO_2 offsets for medium of transportation (flights, bus and train rides)	Equal variances assumed	,009	,923	-,657	119	,512	-,087	,132	-,348	,175
	Equal variances not assumed			-,660	52,617	,512	-,087	,131	-,350	,177
13h) Alter travel destinations	Equal variances assumed	,574	,450	-2,915	119	,004	-,395	,135	-,663	-,127
	Equal variances not assumed			-2,952	53,349	,005	-,395	,134	-,663	-,127
13i) Pay extra for CO_2 neutral shipping	Equal variances assumed	1,473	,227	-,754	119	,452	-,082	,109	-,297	,133
	Equal variances not assumed			-,777	54,984	,441	-,082	,106	-,294	,130
13j) Shop with a shopping list	Equal variances assumed	1,737	,190	-,890	119	,375	-,109	,122	-,350	,133
	Equal variances not assumed			-,901	53,237	,372	-,109	,121	-,350	,133
13k) Repair broken items if they can be repaired still	Equal variances assumed	1,857	,176	-,633	119	,528	-,067	,106	-,278	,143
	Equal variances not assumed			-,654	55,262	,516	-,067	,103	-,274	,139
13l) Prioritise the longevity of a product in my consumption choices	Equal variances assumed	5,676	,019	-1,273	119	,206	-,144	,113	-,368	,080
	Equal variances not assumed			-1,385	61,409	,171	-,144	,104	-,352	,064
13m) Prioritise products from companies with CO_2-neutral operations	Equal variances assumed	4,634	,033	-2,317	119	,022	-,255	,110	-,473	-,037
	Equal variances not assumed			-2,253	49,709	,029	-,255	,113	-,482	-,028
13n) Compare products by emissions	Equal variances assumed	3,149	,079	-2,234	119	,027	-,230	,103	-,434	-,026
	Equal variances not assumed			-2,555	68,581	,013	-,230	,090	-,410	-,050
13o) Use green electricity	Equal variances assumed	,149	,700	-1,733	119	,086	-,219	,127	-,470	,031
	Equal variances not assumed			-1,818	56,986	,074	-,219	,121	-,461	,022

Table 15: T-test: Effect of awareness on how much CO_2 equivalent one is allowed to emit annually (question 5) on extent of climate change action (question 13), created in SPSS with own data.

Group Statistics

	8d) I have made it a goal of mine to reduce my CO_2 emissions.	N	Mean	Std. Deviation	Std. Error Mean
11a) Explaining the impacts of global average warming	-1	43	3,14	1,167	,178
	1	79	3,85	,833	,094
11b) Explaining the causes of global average warming	-1	43	3,35	1,044	,159
	1	79	4,03	,920	,103
11c) Explaining the greenhouse gas effect	-1	43	3,07	1,203	,183
	1	79	3,91	1,015	,114
11d) Being able to judge a product's sustainability in terms of greenhouse gas emissions	-1	43	2,33	1,085	,165
	1	79	3,08	,958	,108

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
11a) Explaining the impacts of global average warming	Equal variances assumed	10,187	,002	-3,882	120	,000	-,709	,183	-1,070	-,347
	Equal variances not assumed			-3,523	65,839	,001	-,709	,201	-1,110	-,307
11b) Explaining the causes of global average warming	Equal variances assumed	3,017	,085	-3,700	120	,000	-,676	,183	-1,039	-,314
	Equal variances not assumed			-3,563	77,522	,001	-,676	,190	-1,054	-,298
11c) Explaining the greenhouse gas effect	Equal variances assumed	1,795	,183	-4,095	120	,000	-,842	,206	-1,249	-,435
	Equal variances not assumed			-3,894	74,810	,000	-,842	,216	-1,272	-,411
11d) Being able to judge a product's sustainability in terms of greenhouse gas emissions	Equal variances assumed	2,255	,136	-3,943	120	,000	-,750	,190	-1,127	-,374
	Equal variances not assumed			-3,800	77,658	,000	-,750	,197	-1,143	-,357

Table 16: T-test - Effect of level of confidence in explaining climate change related system and action-related knowledge (question 11 a-d) on the goal to limit CO_2 emissions (question 8d), created in SPSS with own data.

Group Statistics

	8d) I have made it a goal of mine to reduce my CO_2 emissions.	N	Mean	Std. Deviation	Std. Error Mean
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	-1	43	5,14	1,712	,261
	1	79	6,54	1,328	,149

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	Equal variances assumed	2,674	,105	-5,029	120	,000	-1,405	,279	-1,958	-,852
	Equal variances not assumed			-4,669	69,968	,000	-1,405	,301	-2,005	-,805

Table 17: T-test - Effect having made it a goal to limit CO_2 emissions (question 8d) on self-reported climate change action score (question 9), created in SPSS with own data.

Group Statistics

	8d) I have made it a goal of mine to reduce my CO_2 emissions.	N	Mean	Std. Deviation	Std. Error Mean
Mean Question 13	-1	42	2,0302	,26634	,04110
	1	79	2,2295	,23721	,02669

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Mean Question 13	Equal variances assumed	1,065	,304	-4,216	119	,000	-,19938	,04729	-,29301	-,10574
	Equal variances not assumed			-4,069	75,786	,000	-,19938	,04900	-,29698	-,10178

Table 18: T-test - Effect of having made the reduction of CO_2 emissions a personal goal (question 8d) on mean extent of climate change action (question 13), created in SPSS with own data.

Group Statistics

	6) Ability to limit global warming	N	Mean	Std. Deviation	Std. Error Mean
Mean Question 13	3	84	2,1984	,25954	,02832
	2	37	2,0739	,25810	,04243

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Mean Question 13	Equal variances assumed	,010	,922	2,436	119	,016	,12454	,05112	,02331	,22577
	Equal variances not assumed			2,441	69,253	,017	,12454	,05101	,02278	,22630

Table 19: T-test - Effect of belief in humans' ability to limit global average warming to a 2°C increase (question 6) on mean extent of climate change action (question 13), created in SPSS with own data.

Group Statistics

	17t) I feel a personal responsiblity to alter my behaviour in order to achieve the current climate change targets.	N	Mean	Std. Deviation	Std. Error Mean
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	-1	24	5,25	1,939	,396
	1	98	6,24	1,472	,149

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	Equal variances assumed	2,119	,148	-2,778	120	,006	-,995	,358	-1,704	-,286
	Equal variances not assumed			-2,353	29,806	,025	-,995	,423	-1,859	-,131

Table 20: T-test - Effect of personal responsibility (question 17f) on self-reported climate change action score (question 9), created in SPSS with own data.

Group Statistics

	17t) I feel a personal responsiblity to alter my behaviour in order to achieve the current climate change targets.	N	Mean	Std. Deviation	Std. Error Mean
zusammen	-1	23	1,9826	,28442	,05931
	1	98	2,2020	,24264	,02451

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
zusammen	Equal variances assumed	,562	,455	-3,775	119	,000	-,21943	,05813	-,33453	-,10433
	Equal variances not assumed			-3,419	29,959	,002	-,21943	,06417	-,35050	-,08837

Table 21: T-test - Effect of personal responsibility (question 17f) on extent of mean average climate change action (question 13), created in SPSS with own data.

Group Statistics

	8 i) I can clearly see a personal benefit in reducing my greenhouse gas emissions.	N	Mean	Std. Deviation	Std. Error Mean
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	-1	46	5,46	1,870	,276
	1	76	6,41	1,328	,152

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	Equal variances assumed	8,222	,005	-3,277	120	,001	-,951	,290	-1,526	-,377
	Equal variances not assumed			-3,020	72,615	,003	-,951	,315	-1,579	-,323

Table 22: T-test - Effect of seeing a personal benefit in lowering emissions (question 8i) on self-reported climate change action score (question 9), created in SPSS with own data.

Group Statistics

	8 i) I can clearly see a personal benefit in reducing my greenhouse gas emissions.	N	Mean	Std. Deviation	Std. Error Mean
zusammen	-1	45	2,0563	,26013	,03878
	1	76	2,2219	,24858	,02851

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
zusammen	Equal variances assumed	,220	,640	-3,482	119	,001	-,16563	,04757	-,25983	-,07144
	Equal variances not assumed			-3,441	89,155	,001	-,16563	,04813	-,26127	-,07000

Table 23: T-test - Effect of seeing a personal benefit in lowering emissions (question 8i) on extent of mean climate change action (question 13), created in SPSS with own data.

Group Statistics

	8k) Climate change and its impacts is something I often discuss with friends and/or family.	N	Mean	Std. Deviation	Std. Error Mean
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	-1	27	5,37	1,597	,307
	1	95	6,24	1,576	,162

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	Equal variances assumed	,331	,566	-2,529	120	,013	-,872	,345	-1,554	-,189
	Equal variances not assumed			-2,510	41,506	,016	-,872	,347	-1,573	-,171

Table 24: T-test - Effect of often discussing climate change with friends and family (question 8k) on self-reported climate change action score (question 9), created in SPSS with own data.

Group Statistics

	8j) Climate change and its impacts is something I often discuss with strangers/ people I meet for the first time.	N	Mean	Std. Deviation	Std. Error Mean
zusammen	-1	89	2,1228	,25384	,02691
	1	32	2,2646	,26907	,04756

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
zusammen	Equal variances assumed	,164	,686	-2,666	119	,009	-,14174	,05316	-,24699	-,03648
	Equal variances not assumed			-2,594	52,134	,012	-,14174	,05465	-,25139	-,03208

Table 25: T-test - Effect of often discussing climate change with strangers (question 8j) on extent of mean climate change action (question 13), created in SPSS with own data.

Group Statistics

	8 e) I like watching climate change related documentaries and have seen most of them.	N	Mean	Std. Deviation	Std. Error Mean
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	-1	76	5,75	1,690	,194
	1	46	6,54	1,361	,201

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	Equal variances assumed	2,257	,136	-2,697	120	,008	-,793	,294	-1,376	-,211
	Equal variances not assumed			-2,843	110,446	,005	-,793	,279	-1,347	-,240

Table 26: T-test - Effect of watching climate change documentaries, having watched all of them (question 8e) on score of extent of climate change action (question 9), created in SPSS with own data.

Group Statistics

	17p) I know of a story/ movie/ book/ play that portrays a realisitic image of the impact average global warming will have within the next 40 years.	N	Mean	Std. Deviation	Std. Error Mean
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	-1	77	5,86	1,554	,177
	1	45	6,38	1,683	,251

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	Equal variances assumed	,149	,700	-1,732	120	,086	-,521	,301	-1,116	,075
	Equal variances not assumed			-1,696	86,352	,094	-,521	,307	-1,131	,090

Table 27: T-test - Effect knowing a story, movie, or book portraying a realistic image of the impact average global warming will have within the next 40 years (question 17p) on self-reported climate change action score (question 9), created in SPSS with own data.

Group Statistics

	14c) You, personally	N	Mean	Std. Deviation	Std. Error Mean
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	>= 3	83	6,17	1,637	,180
	< 3	39	5,79	1,559	,250

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	Equal variances assumed	,058	,810	1,194	120	,235	,374	,313	-,246	,994
	Equal variances not assumed			1,215	77,868	,228	,374	,308	-,239	,986

Table 28: T-test - Effect on belief to be personally severely or moderately harmed by climate change (question 14c) on self-reported climate change action score (question 9), created in SPSS with own data.

Group Statistics

	8f) I am certain the effects of climate change can be experienced globally already.	N	Mean	Std. Deviation	Std. Error Mean
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	-1	6	6,33	1,211	,494
	1	116	6,03	1,636	,152

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	Equal variances assumed	,383	,537	,440	120	,660	,299	,679	-1,045	1,642
	Equal variances not assumed			,578	5,986	,584	,299	,517	-,967	1,565

Table 29: T-test - Effect of certainty that the effects of climate change can be experienced globally already (question 8f) on self-reported climate change action score (question 9), created in SPSS with own data.

Group Statistics

	8B) I am certain I have personally experienced the effects of climate change already.	N	Mean	Std. Deviation	Std. Error Mean
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	-1	23	5,74	1,602	,334
	1	99	6,12	1,618	,163

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	Equal variances assumed	,155	,695	-1,022	120	,309	-,382	,374	-1,122	,358
	Equal variances not assumed			-1,029	33,249	,311	-,382	,371	-1,138	,373

Table 30: T-test - Effect of certainty to have already personally felt the impacts of climate change already (question 8b) on self-reported climate change action score (question 9), created in SPSS with own data.

Group Statistics

	17 o) The threat of an increase in global average temperature by 2C°is something I cannot relate to anything I have ever experienced before.	N	Mean	Std. Deviation	Std. Error Mean
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	-1	37	5,89	1,430	,235
	1	85	6,12	1,693	,184

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	Equal variances assumed	1,134	,289	-,708	120	,480	-,226	,319	-,857	,405
	Equal variances not assumed			-,757	80,525	,451	-,226	,298	-,819	,368

Table 31: T-test - Effect of the ability to relate the threat of climate change to anything ever experienced before (question 17 o) on self-reported climate change action score (question 9), created in SPSS with own data.

Group Statistics

	17q) I feel social pressure to reduce my greenhouse gas emissions.	N	Mean	Std. Deviation	Std. Error Mean
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	-1	74	5,88	1,728	,201
	1	48	6,31	1,401	,202

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	Equal variances assumed	2,018	,158	-1,457	120	,148	-,434	,298	-1,024	,156
	Equal variances not assumed			-1,523	114,008	,131	-,434	,285	-,999	,131

Table 32: T-test - Effect of social pressure to reduce personal greenhouse gas emissions (question 17q) on self-reported climate change action score (question 9), created in SPSS with own data.

Group Statistics

	17r) I often take things directly from nature (whether it be by growing your own food, harvesting flax or berries in the woods, going fishing or hunting yourself, ...)	N	Mean	Std. Deviation	Std. Error Mean
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	-1	90	6,09	1,713	,181
	1	32	5,94	1,318	,233

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
9) Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10.	Equal variances assumed	1,382	,242	,454	120	,651	,151	,334	-,509	,812
	Equal variances not assumed			,513	70,557	,609	,151	,295	-,437	,739

Table 33: T-test - Effect of often taking directly from nature (question 17r) on self-reported climate change action score (question 9), created in SPSS with own data.

Group Statistics

	7) Do you have a sustainable role model? (Someone who lives as sustainble as you would like to live)	N	Mean	Std. Deviation	Std. Error Mean
Mean Question 13	-1	82	2,1317	,25272	,02791
	1	39	2,2205	,28125	,04504

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Mean Question 13	Equal variances assumed	,638	,426	-1,741	119	,084	-,08881	,05100	-,18978	,01217
	Equal variances not assumed			-1,676	68,078	,098	-,08881	,05298	-,19453	,01692

Table 34: T-test - Effect of having a role model (question 7) on extent of mean climate change action (question 13), created in SPSS with own data.

Group Statistics

	7) Do you have a sustainable role model? (Someone who lives as sustainble as you would like to live)	N	Mean	Std. Deviation	Std. Error Mean
9) Score on gap effort and knowledge	-1	83	5,92	1,654	,182
	1	39	6,33	1,510	,242

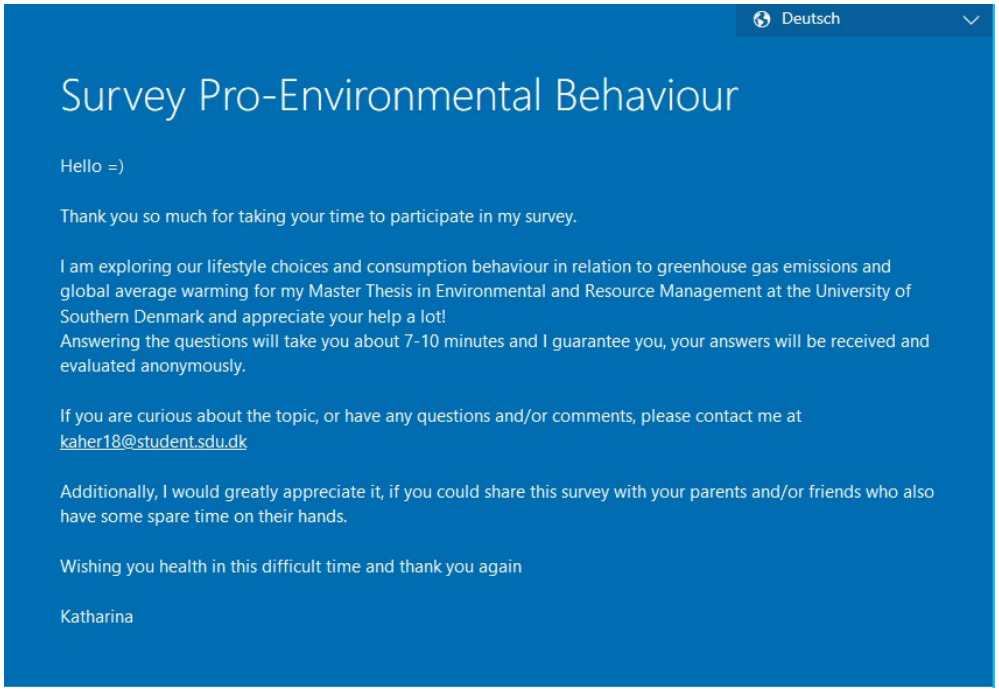
Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
9) Score on gap effort and knowledge	Equal variances assumed	,622	,432	-1,336	120	,184	-,418	,313	-1,037	,201
	Equal variances not assumed			-1,381	80,998	,171	-,418	,302	-1,019	,184

Table 35: T-test - Effect of having a role model (question 7) on self-reported climate change action score (question 9), created in SPSS with own data.

Appendix

Appendix A: Design of Questionnaire, own work.



1. Please write down your first association with "heat":

Ihre Antwort eingeben

2. Please write down your first association with "warmth":

Ihre Antwort eingeben

3. Please indicate how important the issue of global warming is to you personally: *

5 ○ extremely important

4 ○ very important

3 ○ somewhat important

2 ○ not too important

1 ○ not at all important

4. Please indicate how sure you are that global warming is happening: *

4 ○ Extremely sure

3 ○ Very sure

2 ○ Somewhat sure

1 ○ Not at all sure

5. Are you aware how much CO_2 you're 'allowed' to emit annually? *

1 ○ Yes

-1 ○ No

6. Please indicate which of the following statements you personally agree with the most: *

2 C° = 3.6 °F

3 ○ Humans can limit global warming to a 2 C°increase.

2 ○ Humans cannot limit global warming to a 2 C°increase.

1 ○ Global warming is not happening.

7. Please choose how you would finish the previous statement: *

- ○ We are going to do so successfully.
- ○ It is unclear at this point whether we will do what's needed.

7. Please choose how you would finish the previous statement *

- ○ Mainly because people aren't willing to change their behaviour.
- ○ Mainly due to lack in political action.
- ○ Because it is not caused by humans.
- ○ Sonstiges

7. Do you have a sustainable role model? (Someone who lives as sustainble as you would like to live) *

Sustainable = low emission lifestyle / zero emission life style

1 ○ Yes

-1 ○ No

8. Who is it? *

- ☐ friend
- ☐ family member
- ☐ public figure
- ☐ Sonstiges

8. Please indicate whether you agree or disagree with the following statements: *

"Sustainable" or "Sustainablilty" is reffered to as low and/ or neutral in greenhouse gas emissions.

	-1 Disagree	**1** Agree
I wish for more incentives to live more sustainable. e.g. free public transportation, recognition for wearing sustainable brands, cheaper local products compared to imported products, ...	○	○
I am certain I have personally experienced the effects of climate change already.	○	○
I often find myself buying things I don't really need.	○	○
I have made it a goal of mine to reduce my CO_2 emissions.	○	○
I like watching climate change related documentaries and have seen most of them.	○	○
I am certain the effects of climate change can be experienced globally already.	○	○

I have signed (a) petition(s) aimed at the reduction of greenhouse gases.	○	○
The last time I voted, the party's or person's climate change action agenda was one of my key decision factors.	○	○
I can clearly see a personal benefit in reducing my greenhouse gas emissions.	○	○
Climate change and its impacts is something I often discuss with strangers/ people I meet for the first time.	○	○
Climate change and its impacts is something I often discuss with friends and/or family.	○	○
I am confident I can feel a change between 1 to 3 C˚ in temperature (1.8 to 5.4 F˚).	○	○

9. Please indicate the relation of your effort in reducing your greenhouse gas emissions in comparison to how much you know you could do to recude them on a scale from 1 to 10. *

1 = I don't do anything of what I know I could do to reduce my emissions.
10 = I do everything I know I can do to reduce my emissions.

1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

10. Please write down the emotion most fitting to describe how you feel about global average warming: *

Ihre Antwort eingeben

11. Please indicate your level of confidence in the following options *

	1 not confident at all	2 slightly unconfident	3 slightly confident	4 medium confident	5 absolutly confident
Explaining the impacts of global average warming	○	○	○	○	○
Explaining the causes of global average warming	○	○	○	○	○
Explaining the greenhouse gas effect	○	○	○	○	○
Being able to judge a procuct's sustainability in terms of greenhouse gas emissions	○	○	○	○	○
Being able to judge a procuct's sustainability in other terms of sustainability, such as the potential for plastic pollution, chemical toxins, organic content, fair trade, fair production, etc.	○	○	○	○	○

12. Please pick the term that describes the phenoma explored best, out of the options given: *

- ○ Global Heating
- ○ Global Climate Disruption
- ○ Climate Shift
- ○ Climate Chaos
- ○ Climate Crisis
- ○ Global Weirding
- ○ Carbon Pollution

13. Please indicate how willing you are to change the following emission-related consumption choices or behaviours:

Note that you may choose "Neither" if you cannot imagine doing the option more often and aren't already always doing what is described.

	2 Can imagine doing (more often)	3 I am already always doing this	1 Neither
Eat vegan or vegetarian	○	○	○
Buy locally-sourced food	○	○	○
Second-hand shop for furniture	○	○	○
Second-hand shop for clothes	○	○	○
Second-hand shop for technological devices	○	○	○
Choose the option of transportation with the lowest CO_2 imprint	○	○	○
Pay CO_2 offsets for medium of transportation (flights, bus and train rides)	○	○	○
Alter travel destinations	○	○	○
Pay extra for CO_2 neutral shipping	○	○	○
Shop with a shopping list	○	○	○
Repair broken items if they can be repaired still	○	○	○
Prioritise the longevity of a product in my consumption choices	○	○	○
Prioritise products from companies with CO_2-neutral operations	○	○	○
Compare products by emissions	○	○	○
Use green electricity	○	○	○

14. How much do you think global warming will harm the following: *

	4 Severly	3 Moderatley	2 Slightly	1 Not at all
People in 'developing' countries	○	○	○	○
Future generations of people	○	○	○	○
You, personally	○	○	○	○
People in the country you live in	○	○	○	○
People in 'developed' countries	○	○	○	○

15. Please indicate the institutions you remember being educated in about climate change. *

If the types of schools presented don't refer to the institutions you have visited, please go by the proximation of the age.

- ☐ Kindergarten (<7 years)
- ☐ Primary or Elementary School (Age ~6 to 10)
- ☐ Middle School / Junior High School (Age ~11-14)
- ☐ High School (Age ~14 -18)
- ☐ College, Polytech, University, vocational school or comparable institution

16. Please rank the following options about where you learned the most about climate change from (on top) and the least about climate change (last, on the bottom). *

- Educational institutions / teachers
- Social Media (Facebook, Instagram, Twitter, Youtube, ...)
- Family or friends
- TV shows, movies, leisure magazines or books
- Climate change documentaries
- News (newspaper, TV airings, radio)

17. For the last question before the usual demographical ones, please indicate again whether you agree or disagree with the following statements: *

"Sustainable" / "Sustainablilty" is agaim reffered to as low or neutral in greenhouse gas emissions.

	1 Agree	**-1** Disagree
I wish the corporations I like to buy from were putting more effort into a low-emission business.	○	○
I regard my consumption choices as a vote to the practices of the company that produces the products I consume.	○	○
The threat of an increase in global average temperature by 2C˚ is something I cannot relate to anything I have ever experienced before.	○	○
I know of a story/ movie/ book/ play that portrays a realisitic image of the impact average global warming will have within the next 40 years.	○	○
I feel social pressure to reduce my greenhouse gas emissions.	○	○
I often take things directly from nature (whether it be by growing your own food, harvesting flax or berries in the woods, going fishing or hunting yourself, ...)	○	○
It is challenging for me to distinguish between other environmental pollution and greenhouse gases when assessing a product's sustainability.	○	○
I feel a personal responsiblity to alter my behaviour in order to achieve the current climate change targets.	○	○

X

18. Please indicate your age *

- ○ Under 12 years old
- ○ 12-17 years old
- ○ 18-24 years old
- ○ 25-34 years old
- ○ 35-44 years old
- ○ 45-54 years old
- ○ 55-64 years old
- ○ 65-74 years old
- ○ 75 years or older

19. Please specify your ethnicity, if you feel comfortable.

Ihre Antwort eingeben

20. Which country do you live in? *

Ihre Antwort eingeben

21. Please indicate all degrees and schools you have completed, or are currently enrolled in. *

- ☐ High school
- ☐ Associate degree
- ☐ Bachelor's degree
- ☐ Master's degree
- ☐ Professional degree
- ☐ Doctorate degree

22. Please, lastly, indicate your gender: *

- Female
- Non-binary
- Male
- Prefer not to say
- Sonstiges

Appendix B: Text asking for participants in questionnaire on Facebook, own photo.

Appendix C: Guideline Interviews, own list.

Guideline for Interview questions

a) Do you believe that the global average temperature is currently increasing due to human activity and do you think enough is done to limit global average warming to a 2°C increase?
b) Are you hopeful that climate change can be limited to an increase of 2° Celsius?
c) What do you know about global warming and where do you know it from?
d) What are generally the most effective ways individuals can generally minimise their emissions and which of them do you do?
e) Do you personally believe you do everything you can to limit your emissions?
→ Why not? What are the limits? How do you select what you do?
f) Those changes that you have made, do you remember what inspired them or where that motivation came from? How did they come about?
g) What are things you know you could do (more) to minimise your personal emissions, but do not do, and why is that? What do you need? What is missing for you to take more action?
h) How often do you talk to friends or family about more climate change friendly alternative lifestyles or purchase opportunities and/ or brands?
i) How influential would you say are your friends' or family's climate change concerns and consumption choices on your own behaviour and actions?
j) How influential is the knowledge and information you have on climate change, its causes, and effects on your climate change action? Can you describe the influence? Can you describe your learning curve, or knowledge curve? Do you still learn new things, if so, what are they?
k) How influential is the knowledge and information you have on climate change action on your own action? How do you tell the environmental impact of a product? Or an activity?
l) How would you describe the risk imposed by global average warming on you personally and others?
m) Where does that perception come from? What is it influenced by?
n) Do you really think your climate change effort makes a difference? If so, what kind of difference?

Appendix D: Transcript Interview Ludwig Helmer, 11th of May 2020, own work.

Do you believe that the global average temperature is currently increasing due to human activity and do you think enough is done to slow it down or limit the increase of global average warming to two degrees Celsius?
I strongly believe there is a certain correlation between human activity when it comes to emitting greenhouse gases and the global average warming, so definitely. And I do not believe that enough is being done enough to stop it and I think there would be numbers and facts to support the theory that there's not enough done, since the average global temperature is increasing faster and faster every year.

Are you hopeful the climate change can be limited to an increase of two degrees Celsius?
Well, I certainly do. The question is in what matter of time. Are we talking about 50 years, or are we talk about 10 years, are we talking about five years? So, at the rate we are increasing the emission of greenhouse gases at the moment, I do not believe that we will be able to limit the increase in global average temperature. However, if you would change, rapidly, how we produce things, how we consume things, we might be able to slow down the global average warming.

What is your definition of rapidly? What time frame do you think is needed?
Well, when it comes to the effects of global warming we can already see at the moment, which are, for example, droughts in Africa, ice melting at the polar caps and increasing unnatural natural disasters or other natural disasters of an unnatural scale. Rapidly, I mean within the next 10 years, we should change the global average warming.

And with unnatural you mean what exactly?
Unusual when it comes to comparing the effects at the moment, to effects we had 150 years ago.

What do you know about global warming, and where you know that from?
Most of the knowledge comes probably for my family when it comes to the early stages and the details I probably learned at school. Around year seven or eight we started talking about global warming and details behind that.

Did you learn first about the impacts, effects, or causes?
We firstly talked about the impacts of global warming. As far as I remember we actually started watching a very famous youth TV show that always highlights some sort of aspect, some project, some global movement, sort of going on and explained it to children. So that's what we probably first watched at school and talked about and they explained what global warming is in terms of that the ice is melting, that we have this Bering Strait between Russia and the American continent and it's been getting easier and easier over the last 10 years to get through that ice because it's getting thinner. And we have lower water levels on the continents when it comes to rain ,we have higher water levels when it comes to the oceans, and then they explained that most of the global warming is caused by the emission of the greenhouse gas CO_2, mostly emitted by, where they usually use pictures of, let's say, industrial compile compounds and that sort of stuff.

Do you ever remember being taught that you are part of the cause, or do you remember the point in your life at which you realised that you are a part of it? Do you think you're a part of it?
Well, absolutely. And I got told very early. Even at the earliest stages. When it comes to those movies, for example, they taught us that if we switch off the light, for example, we not only safe power, but we reduce our green footprint. Similarly, if we do not shower very hot for 30 minutes, and rather at a moderate temperature for only 5 minutes, so we clean up, and we do not leave the water running, and we turn down the heaters, the radiators in the room once we leave it, and we don't leave the windows open all day but rather open them quickly and all of them for just a short period of time. So yes, we were taught that we can have actual an actual and rather large impact just by doing small deeds.

What do you say, are generally the most effective ways by which individuals can minimise their emissions?
Well, first of all, it is our responsibility to look at our everyday choices and make those who have the least impact, when it comes to the footprint (for example the CO_2 footprint). At the same time, without losing too much comfort, so that we might get the idea of resisting the idea of lowering a great footprint, if you know what I mean? We should make choices that are good for the environment, but at the same time aren't too bad for ourselves, so we sort of resist the idea of helping the environment. And then, fortunately in most democratic countries, you have a voice and you should use that.

For example, you don't necessarily need to protest. By, for example, voting for party that strongly supports lowering global warming impacts, you make a difference. So that is what I think should be done or could be done.

So, you think voting is one of the most effective ways?
It absolutely is on a long-term basis. On a short-term basis, I believe we need to look at our consumer choices, for example. But on the long-term basis, voting makes a huge difference, yes.

Those consumer choices, is there anything, in terms of general switches, that you think can minimise the emissions or a general shift in consumption?
Well, I'd say, probably the biggest parts, bits and pieces that should be changed, are probably how much and what kind of meat we eat, when it comes to our nutrition. And how we travel when it comes to our daily sort of travelling basis. I know people, me included, that take the bike whenever they can, rather than public transportation, or even worse, the car. However, I also do know people that need to travel larger distances for work and have to fly 200 to 300 kilometres, three times a week, which is actually not that much of a distance. However, they travel by plane because that's just a lot faster. So this is what we need to look at when it comes to traveling and how we eat.

How about the amount of consumption?
What exactly do you mean by that?

So, one way to decrease emissions is to generally consume less and then to consume differently.
Well, I say you cannot generally say that only consuming less of something is going to be helpful, because there's more than the environment that needs to be supported by consuming less. You can actually make a difference by consuming more of things that indirectly, or on a long-term basis, help the environment. For example, if you, and this is probably more economics, but if you buy a lot of a certain product that is produced by a certain ecological standard, let's just say organic fruits and veggies, if you eat a lot of them, you support a certain group of people who make organic produce. If you buy, I don't know, a nice bag from a company that uses recycled plastic, and you also buy a laptop sleeve from them, although you might as well just be fine with a bag, but you will also buy the sleeve, which you do not necessarily need, you support a company that recycles plastic that they fish out of the ocean, in, for example, India. So, sometimes, by consuming more you supported a good cause.

You mentioned biking as one of the things you do to lower your emissions, but despite that what are some of the things that you personally do to lower your emissions?
I present myself as a vegetarian. What I mean by that is that I do eat meat about 10 times a year maximum and only organic, so I try to heavily reduce my CO_2 impact by eating a lot less meat and if I can, less dairy products. But, bedsides that, it sometimes comes down to what I considered first, supporting a certain company that, when I feel I need a new product, for example a laptop sleeve, which was just the case a few weeks ago, I look at what kind of sleeves are out there and then I see well this is a little smart start-up and they seem pretty smart, they have a good concept , they use recycled plastics so I go for the bag, even though it was a bit more to pay for it than the product which was not from recycled plastic. So, those are the choices I make on a daily basis.

How would you describe your concept of sustainability when you assess those products? And how do you assess?
Well, the problem with evaluating how, let's just call it "green" for a moment, how green, how ecological friendly a product is, or how ecologically friendly the choices I make are, sometimes can be really hard. Because sometimes there's the lack of like an indicator how much I do for the environment how much CO_2 is saved when I take the bike rather than the bus, obviously, all of the CO_2 the bus would have emitted with me in it, it is safe to know when I take the bike that there's literally no emission from bike. When it comes to consumer choices in my nutrition, I sometimes stay in front of the fridge at the supermarket and think, whether to buy this organic cheese from southern Germany or this non-organic cheese from a little farmer sort of just 20 kilometres away. Which cheese do I take? to know which has the lowest CO_2 impact, and which is, at the same time more environmentally friendly is hard to know.

Would you say it is then situational, or do you have a specific guideline for yourself?
It is definitely situational. Sometimes, I obviously just go for what I like and then, yeah, it's really situational.

Are there other things you don't consume at all because of their greenhouse gas emissions overall?
Yes, I say that, but I can't be very, very strict, because sometimes I eat something at different places, at friends', or I just do not have a choice, but I strongly try to avoid eating fruits and veggies from seasons far away, from the other half of the year season. I mean, I would not go to the supermarket in January and buy raspberries or strawberries, because they are from Spain. At the same time, I would not buy leak in summer, which only grows in winter. So, I try to sort of look at products, especially produce, where they come from, and then decide if I can eat them. I am always sort of excited when spring comes round so that I can eat tomatoes again, because they start coming from Germany, rather than from Spain.

Do you remember what motivated you to change in that sense? Do you remember a specific event in your life, knowledge you gained? Did you meet someone who lived in a way that you aspire to live? Or someone who inspired you to change in that sense?
There was definitely no, sort of "turning point", at which I said, well, this is where I need to change. It sort of grew more steadier in school, talking to friends, and learning about the effects and the impacts of global warming and the causes, at the same time. Because I thought, well, if only me, just me, if only I changed the way I live, how I consume, it might not have an impact at that very moment, however on long term basis, if more and more people change, and try to look more sustainable ways to live, we can create a massive difference. So, that was probably back in the 9th grade, where I said, well, I can make a difference just by changing the way I live and the way I look at things. This is how I can make a change, so that's when I decided to act on it.

And do you rely on others to gain that same knowledge and make those changes through inspiration from others, or do you also try to inspire others, or educate others on those consumption choices, for example? Do you share that knowledge?
Well, it is hard to say that I share the knowledge. However, me and my friends, we often discuss for example, being a vegetarian, or eating meat. How much meat to eat, or how to travel, how much to travel and where to travel and by what means. So, this is the way I talk to people about global warming and its causes and effects. So, I'd say there was nothing special, no person that was inspiration for me, I do not look up to certain people and say "hey I wanna be like him. I need to be like him, or her.", but at the same time, I also wouldn't say I try to bring other people on my side. I just try to express my point and see if I can convince someone who is really unconvinced.

Do you personally think you do everything you can to limit your greenhouse gas emissions?
No, absolutely not. But as I mentioned before, there has to be a mix between not losing too much comfort, going back that far resist doing something for the environment. For example, I still like cheese and I'm going to eat cheese, because if I say to myself, well if you really want to live zero CO_2, or even just a bit more than that, just really trying to bring that emission down, I couldn't eat cheese, I couldn't, well I probably couldn't, even drink soy milk and that sort of stuff. I would have to limit myself to a very, very specific, limited things, and so no, I am not doing everything I can, but I'm doing everything I can while still staying in the sort of comfort zone, where I think I make a difference without resisting the idea of wanting to make a difference.

So, you think you select by your comfort zone? By things you can give up, or you can make changes in? How do you select?
It's often situational. When it comes to speaking generally, I'd say it is, again, a mix between comfort and wanting to make a difference. I often evaluate when consuming something, when buying something, when looking at something, how "good" or "bad", let's put it that simple, a product is for the environment and then I can still say, well, this is really bad and I would only gain the taste of a mildly sweet strawberry, so I'm just not going to buy it. So, it is always a mix of evaluating how good or bad is this product for the environment, how would I feel eating/ buying/ consuming/ and ordering it on the internet and how urgently do I need it? Do I really feel the need to buy those strawberries from Spain or Morocco just to have those strawberries on my cake, for example?

Is there anything you can imagine happening, or any anything that could change you, for example, for you, personally, not eating that cheese anymore, due to those emissions that are related to it?
The only way I could imagine is, being, you find a lot of information on the Internet on how much CO_2 is needed in kg , or even tonnes, or litres of water, for example, for producing a kilogram of a certain thing. If it is for meat, if it is for cheese, and cheese isn't exactly environmentally friendly. However, I still don't exactly know how bad it is, due to only having that certain number and the other factors coming into the game. For example, supporting local farmers, when I buy certain cheese that comes from around the corner, I support certain farmers that may have struggle with producing organic cheese. So, the only way that I might change the amount of cheese I eat (just as an example), the changes would just be sort of suddenly, due to a change in perspective. So, for example, if there is, hypothetically, a bar on each product, indicating how much of my daily CO_2 I may emit, to limit global warming to 2 degrees Celsius. If there is something that would put those 10,000 litres of water per kilogram of cheese and those 10,000 kilogram of CO_2 for a kilogram of cheese if that would put it in perspective and I'd find out that this is really, really terrible eating, I definitely would consider reducing the amount of cheese I will eat.

That is something you could look up and calculate yourself. So, you say that if it was more prominent, more obvious it would encourage you more?
Well yes, easy to see. You see, I could look up on the internet how much CO_2 I am supposed to produce a year, then I can look how much that is per day, and then I can see how much is a kilogram of cheese from there and there. So theoretically, if I say 10% of my calorie's intake comes from cheese, I can probably calculate it somehow. However, that would be stupendously, just hard to find out, so that the maths and calculations all around it. And this is, for example, the way I could not live. This would be a way I would say well, I resist. I am not going to eat less cheese if I have to do these calculations everyday if I have to see can I eat this apple from Germany, or might this apple from New Zealand be better for the environment because it was shipped.

You mentioned before that you talk to your friends often about climate change and global warming. How influential, would you say, are your friends' climate change concerns and consumption choices on your own behaviours and your own actions?
Well, I have to say that most of my friends and me, we do consume almost in an identical way. We also evaluate how much this product is good or bad for the environment and it really comes to play when we are together and have a barbeque, for example, and we go shopping together and the one says well let's take this meat, I say "no let's go for organic, it's better", so this is when, how my friends consume, really affects how I consume. But other than that, I always listen to what people have to say. For example, a friend just recently told me that avocados need a lot of water and they need to be shipped and all that sort of stuff, so the next week I was at a restaurant, we ordered, and I thought, well, I could take the avocado salad, which would be nice, but didn't because I knew then that it's almost on the same level as red meat when it comes to water consumption per kilogram. So, just because a friend told me a fact and enlightened me in that way, I changed how I thought about avocados.

Do you feel social pressure from your friends? Do your friends, for example, acknowledge that you bike more often than you take other means of transportation, or, let's say travel choices, do they comment on them? Do you feel pressured to display low-emission consumption choices?
No, absolutely not. I am not on any social media and I'm on a level with all my friends, when it comes to consumer choices, travel choices, where we do speak about it, but I do not feel any pressure at all to say something else, eventually even make something up. All I do is just for myself, my own conscious and in that sort of sense, for the environment as well. But I do not feel any pressure at all.

You mentioned before that you don't go on the Internet and calculate how much emissions are related to a piece of cheese for example and that you wish for a more prominent display. There are apps available that support you in those calculations. Why is that something you don't use or don't include? Do you know?
To be frankly honest, I didn't know about those apps. That would be actually a sort of thing I need to try out and see how hard that is. As someone who looks at his nutrition very, very strictly with phases where, for example, I go to the gym very regularly and need to eat a certain amount of calories and a certain amount of macro nutrients, when I check everything I eat.

I find that to be very exhausting after a while so even after two and a half months, already, I thought, well, I do not feel very comfortable to always check how many calories this is, how much protein it has, how much fat is in it, before eating something, so I actually have to say I have to try this apps, but if every time I buy something, every time I'm in the supermarket, I'd have to scan that first and see it and look it up and compare it, I'd say this wouldn't something I could do on a long-term basis. Simply for the soul fact that it would be too exhausting every time.

How would you describe the risk imposed by global average warming on you personally and others? And where does that perception come from? What is it influenced by?
There are two key factors about global warming that make it such a worrying and dangerous process. First is the fact that global warming is literally affecting everyone, hence the word "global". The prospect that this is not a local phenomenon, but a crisis of sheer massive scale makes it so dangerous and imposes a risk of an equal massive scale. The second factor is that many of the processes involved and responsible for global warming are exponential. For example, global average warming causes polar ice to melt which than decreases the factor by which the water is cooled and therefore speeds up the warming of the ocean water and the melting of the ice even further. This prospect of setting loose these exponential chain reactions that are self-propelling is highly risky.

Lastly, do you really think your climate change effort makes a difference? If so, which?
Although a single individual might not make a huge difference, just as "no snowflake ever felt responsible in an avalanche", the mass of individuals makes a difference. Being part of a movement that is engaging in lowering it's ecological footprint increases the mass itself and therefore the impact it has. So, the personal impact my choices might have is small, however what my choices contribute to a mass of choices aimed at lowering e.g. CO_2 emissions makes a larger change.

Thank you for taking the time.

Date and duration of interview	11th of May, 27 minutes
Place and type of conduction	Hamburg, DE in person
Name of interviewee (pseudonym)	Ludwig Helmer
Age of interviewee	20
Education of interviewee	High School Diploma
Place of residence of interviewee	Hamburg, Germany
Interviewed by	Katharina Herwig

Appendix E: Transcript Interview Jacob Bremming, 12th of May 2020, own work.

Do you believe that the global average temperature is currently increasing due to human activity and do you think enough is done to slow down/ limit global warming?
I do believe the global average temperature is increasing, and that not enough is being done. Even with meeting the Paris climate agreement it wouldn't be enough. I believe we should get emissions capped at the source. I think it's about ten companies that emit most of our CO_2. I think 80% of our CO_2 in the world, which are all oil companies So if we actively capped it at source, that would be way you would have meaningful change.

Are you hopeful that climate change can be limited to an increase of 2° Celsius?
I'm hopeful that it is possible but realistically, I don't have faith in world governments to do what needs to be done.

What do you know about global warming and where do you know it from?
I feel like I have considerable knowledge although there is always more to learn. My thesis was sustainably focused, and I have gained this knowledge from university and research and I often read articles with climate change related topics.

What are generally the most effective ways individuals can generally minimise their emissions and which of them do you do?
Limiting flying is the easiest way to reduce your CO_2 emissions although it only makes up 2% of global emissions it can be a significant portion of an individual's emissions. Also, I take public transport and walk to work. Also, when purchasing, I try to keep in mind the longevity of a product versus it's embodied carbon as well as the scarcity of materials that are not renewable, for example, reduce, reuse, recycle, and respect.

What motivated you to change in that sense?
The more I learned the more important it became to me or the more dire the situation seemed to me, so I believe it was more intrinsic.

Do you personally believe you do everything you can to limit your emissions? If not, why not? What are the limits? How do you select what you do?
I mostly try to be mindful keeping the amount of planets needed to support my lifestyle less than 1 (I think the average New Zealander takes 2.5). And we did a calculator in university where we put in our general lifestyle and it showed us how much it took. I will occasionally have some meat (although it is NZ meat) and most of the emissions will be Methane and in the transportation. I will buy new clothes but try to make them last a long time. Often, I try to manage the embodied carbon of a high emission item such as a phone and make it last for a long time. Cause I want them to last longer. I have had my phone for about five years now, but I paid more for it, so it would last longer. New Zealand is in a privileged situation for emissions and I think we will have a much easier time reducing our personal emissions than other countries necessarily would.

How influential is the knowledge and information you have on climate change action on your own action? How do you tell the climate change impact of a product? Or an activity?
Often, I find it is difficult to ascertain the exact embodied carbon of a product. I will try to buy local and in season if possible or buy long lasting / hard wearing products when I cannot. Often, I will do some research to try to figure things out. but means of transport is often something difficult to factor into a product. Sometimes environmental impact can be conflicting for products with negative ecological impacts but low emissions so it is often difficult to find the correct balance.

What are things you know you could do (more) to minimise your personal emissions, but do not do, and why is that? What do you need? What is missing for you to take more action?
One thing I know I could do is less driving when we go away for a weekend, but New Zealand intercity transport is limited / slow and expensive. However, we selected a second hand car with low emissions to lessen this, so we picked something that would be generally better than most and we try to limit how much we do drive when we do things. Something I know I could do is go fully vegan, but I am weak willed, so I try to just reduce the amount I consume. Dairy farming is very central to New Zealand, though, and often times the emissions are in the transportation.

So, once they will start to use electric vehicles that will be less. And while dairy farming is bad for the environment, not in the way of emissions.

Those changes that you have made, do you remember what inspired them? How did they come about?
As mentioned, a lot has been educational influence. Also, I will only occasionally have meat maybe once or twice a month. Although I would like to say this is wholly climate crisis inspired, but my partner is vegetarian, so it made the reduction easier.

How often do you talk to friends or family about more climate change friendly alternative lifestyles or purchase opportunities/ brands?
When I see my family, I will often mention alternatives to things if I am aware of better options. But I have also had long conversations with people I have been working with or are am working with, especially at my current job, where we talk about how we can improve things in terms of sustainability. And I have annoyed people by advising them how they can be a little bit more sustainable.

How influential would you say are your friend's climate change concerns and consumption choices on your own behaviour and actions?
I work a sustainably minded company, who encourage me to be sustainable and try to influence our clients to choose more sustainable options. This can add an element of social pressure to be more sustainable so I will find myself drinking water from the tap in the office rather than going to buy a soft drink for example.

How influential is the knowledge and information you have on climate change action? How do you tell the climate change impact of a product or an activity?
It has been very influential to me. It is often one of the factors I consider when making a decision. Having a sustainable focus was one of the values I looked for in companies I applied to after university. I have also voted in government elections based on their climate policies. It is often quite difficult, though when it comes to purchases as it is very difficult to figure out what the embodied carbon of a product is. As I've mentioned, I try to buy local and things that last a long time, that are durable as well. Often, I will do some research, if it is something big. Trying to figure things out. But the transportation to New Zealand makes most things automatically have a large CO_2 impact. Though, when I order from overseas, which I don't often, I will select the slowest form of transportation, to reduce the emissions. But then sometimes the environmental impact can be conflicting to the emissions' impact, so I often also try to find what the balance is. Yeah, but it is difficult and I would like to have some sort of product logo on stuff, saying what it's emissions is. That would definitely influence me buying things. I went to a conference about the little eco-friendly check-marks that you may find on products. Turns out, a lot of them are fake here in New Zealand. Companies make their own one and when you research into them, there is nothing behind them to back them up. So I think we need something like the FCC trademark, which is easier to understand global than just for the product.

How would you describe the risk imposed by global average warming on you personally and others? And where does that perception come from? What is it influenced by?
I believe the risk could be dire although it will affect the world's poor disproportionately and wealthy countries will cope better. New Zealand is one of the better countries to be in according to climate estimates our changing local climate will need to be adjusted to and our cities may need to be moved. However, we are a water and arable land rich country with a small population. We could be isolated from the rest of the world and survive. However certain parts of the country may become heavily drought afflicted as Auckland is getting a taste for right now. Also, some industries will be rather affected, especially the dairy industry. Personally, I believe it will affect me in ways that will make my life feel smaller. Less opportunities to do things globally like travel. Economies may be ruined which may mean less security for us and our family. I worry we will be part of a transition generation where we go from having so much to so little. And, it makes me worried for future generations. I have gotten this information by looking into it and reading scientific studies, within the scope of my thesis. As often, when something gives me anxiety, learning more about it tends to help.

I have also read some science fiction based in post-climate change worlds, which have both the possible dystopias and the worlds where we have adapted to the altered climate and life goes on.

Do you really think your climate change effort makes a difference? If so, which?
I believe it does in small way, that just speaking about it with others and informing them can cause over time a shift in thinking which can put pressure on leaders to change. I think one of the most powerful things we can do is vote. In my work I can advocate for sustainable construction, but that can often be difficult if a client only cares about cost, this is where pressuring our leaders to make change is most important as they can change laws and regulations where sustainability isn't a 'nice to have' but a requirement. Changing my lifestyle may also cause social pressure on others to be more climate conscious, however I don't think this will be enough.

Thank you so much for taking your time.

Date and duration of interview	12th of May, 19 minutes
Place and type of conduction	Hamburg, DE and Auckland, NZ via Zoom
Name of interviewee (pseudonym)	Jacob Bremming
Age of interviewee	26
Education of interviewee	M. Sc. Architecture, B. Sc. Architecture
Place of residence of interviewee	Auckland, New Zealand
Interviewed by	Katharina Herwig

Appendix F: Transcript Interview Nadia Bulker, 12th of May 2020, own work.

Do you believe that the global average temperature is currently increasing due to human activity and do you think enough is done to slow down/ limit global warming?
Yes, I do believe that global temperature is increasing due to human activity and no, I don't think enough is done to slow down, but I couldn't tell you what needs to be done. I don't know enough.

Are you hopeful that climate change can be limited to an increase of 2° Celsius?
I'm hopeful that climate change can be limited, but realistically I don't think it will happen. so hopeful, but realistically no.

What do you know about global warming and where do you know it from?
I don't know enough, and the things I know, I mostly know from my partner.

What are generally the most effective ways individuals can generally minimise their emissions and which of them do you do?
I believe to limit air travel, be more informed and overall conscious about what decisions could make an impact.

Those changes that you have made, do you remember what inspired them or where that motivation came from? How did they come about?
I don't really know what influences me, you know. You're just aware of something. I just want to do my part to help, so I believe it comes from within and articles or fear of the worst.

Do you personally believe you do everything you can to limit your emissions? If you don't, why not? What are the limits? How do you select what you do?
I can't really say if I do enough or not. I don't feel like I'm informed enough and, you know, the things that I do see, sometimes they are conflicting, so it's hard to know. I do try to limit travel. I mean, I do drive to work, but that's because it's just overall much easier for me. We like to buy things locally in New Zealand. That's also for practical reasons as it's easier to track and trace NZ and more likely to arrive quicker. And I don't eat meat, so I know that's something. Though, that is more for the taste, not moral or environmental reasons. I just see there are a lot of people all part of something and I'm just trying to be aware of certain decisions. And you know, if it was a weekend in Australia versus a weekend in New Zealand sort, I'd much prefer the weekend in New Zealand. Not that it is necessarily an eco-conscious decision, I just prefer New Zealand, but it does have environmental impacts.

What are things you know you could do (more) to minimise your personal emissions, but do not do, and why is that? What do you need? What is missing for you to take more action?
When we do actually book flights, I do click the thing to offset the carbon emission. I am not sure if that actually does much or anything, but it makes me feel a bit better about booking the flights, at least if we had to. But also, I know I drive a decent amount, though it's a second-hand car. I prefer to drive to work it is for practical reasons I'd have to take a bus and a train to get to work otherwise, or take a train and walk for half an hour, which some days it's just tiring. And getting public transport around Auckland isn't the greatest, mostly cause it's just such a big city. So, I know that up here we do use the car, but we got a car to begin with and use a car, as opposed to walking or public transport. That's probably something that I could look at. But I do leave earlier to avoid gridlock traffic, so the emissions are less in that sense. I guess I could also go vegan, but it does become a health challenge at some point, so I try to limit the amount I consume.

Those changes that you have made, do you remember what inspired them or where that motivation came from? How did they come about?
My partner is my main point of contact, he reads a lot of things and tells me a lot of things. We do discuss it. We make comments about companies and how they could be better, but you know I've got ideas on things that we want to do for our future home to make it eco- friendly and all these grand schemes and stuff, so it just comes up when we talk about what we want in our home. So, my partner is my main source of information and my influence.

How often do you talk to friends or family about more climate change friendly alternative lifestyles or purchase opportunities and, or brands?
I don't really talk with family and friends.

Like, we know people who like to think that they are eco-friendly and what not, but mostly, I just talked with my partner about it. My family is very weird minded about things, political things, so I don't think conversation with them will change much. I don't really talk to family about it.

How influential would you say are your friend's or family's climate change concerns and consumption choices on your own behaviour and actions?
I don't enjoy this question too much, because I know somebody who is very environmentally conscious, who likes to buy a lot of ecofriendly products, they like to tell you, they want to support local businesses and their Facebook and Instagram says, you know, look at this amazing stuff, and they advertise for other to buy they stuff, but then they also go on overseas holidays every single year, they fly all over New Zealand to go on weekends away, they do a lot of driving, they do a lot of things that are very like the big stuff that makes them non ecofriendly. So, they advertise doing the small things like "no I don't take a straw with my drink", but they're fine to fly to Hamilton for a weekend. It really just seems hypocritical and annoying. I'd rather just not fly, but use a straw. When they are doing it for the right reasons that's fine, but just sometimes it just seems so fake. It just puts me off and feel like I don't want to do this. I doesn't quite make me not do stuff, but it just makes me feel like I don't want to.

How influential is the knowledge and information you have on climate change action on your own action? How do you tell the climate change impact of a product, or an activity?
I simply don't know! I feel like, a lot of my eco-conscious buying is more: I just don't want to buy from overseas, I'd much rather buy second-hand clothes, because they are way cheaper and you can get some really good stuff, or you know, half of my furniture is second-hand, from relatives, or built from random things that we already had for years. I just prefer to buy stuff that lasts, when I do buy things. Even just being conscious how I spend my money, not necessarily on the environmental side, but just buying better quality, which should mean that it lasts longer, hopefully and also that companies who produce high-quality products, hopefully also go more eco-friendly. But yeah, my partner and I also like to fix things, instead of throwing them out, because we believe that is also more environmentally friendly than just buying a new one. That is just another way in which we are eco-friendly. So, we do prefer to fix, rather than replace and that also comes down to the way we choose how we spend our money. So, somehow by choosing how to spend our money, we are also on the more environmentally friendly side.

How would you describe the risk imposed by global average warming on you personally and others? Where does that perception come from? What is it influenced by?
I think here in New Zealand, we are reasonably okay. We sort of are out of the scope with a lot of things. It obviously affects us all in different ways and shapes and forms. We have had seasons that feel kind of out of sync with what we usually have. You know, when they are like "oh, it's December, we should have bright blue skies", but we have rain and storms. So, it is a little bit of that, but I mean, it is really hard to judge. I feel like overseas, definitely has more. Like Venice sinking, or the water levels rising. Also, the North pole and ice caps melting is also a pretty big deal. Some of this is from watching David Attenborough documentaries on BBC Earth. I've watched a few of those in the last year and I guess that explains were most of my information comes from, which focuses more so on the impact on the animal kingdom, rather than humans. So, it doesn't really show what will affect us humans in detail. Yeah, so that is where my knowledge mostly comes from and what is influenced by.

Lastly, do you really think your climate change effort makes a difference? If so, what kind of difference?
Well, I like to think that all of my decisions about climate change and those that include sustainable aspects, or for which I try to be more sustainable, have some sort of impact. I mean, we can't change the corporation, but if enough people do it. Surely, they will have to listen eventually and change their business practices. So, I like to think it does and obviously, on a global scale, it is next to nothing, but at a more local scale it might have a bit more weight. I guess, you know, the only thing you could say would be to lead by example and hope that other people will take on similar attributes and you create a snowball effect. But saying that, I don't know if I have all that much influence. I don't exactly talk too much about it with other people. I mean, I'm not shy from saying I buy second-hand clothing, because I don't care. But yeah, if it does come up in conversations, I will definitely say something, but it is a little bit hard to answer this one.

Thank you so much for taking your time.

Date and duration of interview	12th of May, 12 minutes
Place and type of conduction	Hamburg, DE and Auckland, NZ via Zoom
Name of interviewee (pseudonym)	Nadia Bulker
Age of interviewee	25
Education of interviewee	New Zealand Diploma of Business
Place of residence of interviewee	Auckland, New Zealand
Interviewed by	Katharina Herwig

Appendix G: Transcript Interview Isla Grim, 15th of May 2020, own work.

Do you believe that the global average temperature is currently increasing due to human activity and do you think enough is being done to limit it to a 2°C increase?
Yes, I think human activities are the cause. And I don't think enough is done to limit global average warming to a 2°C increase.

What do you think is missing to slow it down?
I think in general the awareness of the people. They are not aware what is harmful for the environment and they are also not aware what is there to help them.

Would you say you are hopeful that climate change can be limited to a 2°C increase in global average temperature?
Yes, because I know a lot of people, who have the right mindset and they are working into the right direction and if I would not be hopeful, who else would be. So, I think I have to stay positive in order to make other people aware. Though aware that it's not the right trend, but that we have to change something. But I have to stay positive because it would not change if I would be negative and say "we are wrong and we will die, so I don't do anything". So, I think it's important that my attitude is positive even though that my realistic point of view is that currently it's not enough, what we're doing.

So, what are you hoping to aspire with your attitude?
To create change in others and inspire others to be more aware.

What would you say, what do you know about global warming, generally and where do you know it from?
I'm studying environmental and resource management, so due to that I am a little bit in this whole topic, especially sustainability and I'm just interested in every information I can get. Especially from social media, because between all the overload of senseless information, there is also quite good information, really nicely packed, so you can see the sources for instance. I really believe in reliable sources, such as the UN or the IPCC or something comparable. So, I'm also motivated in reading parts of the IPCC for instance. I also think it's all about what source I can trust and what sources are just kind of an inspiration. But yeah, I try to surround myself with reliable information from all kinds of sources.

What would you say are generally the most effective ways individuals can overall minimize their emissions? And which of them do you do?
I think overall it starts with the mindset. So, that is not an action itself. It's just to be aware what is harmful and what is not harmful and then afterwards, it's about being aware of, for instance, how much CO_2 a flight will emit from Stuttgart to Frankfurt and how much an ICE will admit when it comes to travel. I think if people would see this difference directly, the choice would be easier, but on the other hand that's also where I'm doing it. I try to avoid flying as much as possible, but still I'm not avoiding all flights. The thing is that it's sometimes pretty hard to choose not to fly, because they are so cheap, and if you have like a more environmental friendly option, for instance the train, then it's more that often the price is a problem. Especially in Germany.

When you talk about awareness, how do you think that awareness is created? What do you think it takes for someone to become aware, or be more aware, or integrate that awareness?
I think it comes down to education. People in general should know what, for instance, a T shirt emits until it is in your closet, or how much CO_2 gets emitted by creating 1 litre of water in a bottle. Just to get an idea of that everywhere is the CO_2 footprint, for instance. But we're just talking about CO_2 right now, but it could be anything, could be the water footprint, or something comparable. And yeah, I think it is important to just connect those dots. So, we are surrounded from the information that the CO_2 emissions are too high and they are increasing the greenhouse gas greenhouse effect of the earth and that's why the earth temperature is getting higher. So, that's the overall headline, but we are not aware why. What we think is that it may be emitted by the big factories in China or India or something and too many cars on the street. I think that's like the stereotype opinion, but we are not aware that also small pieces are part of the problem and that we can change something.

I remember like I started by realising that I'm part of the problem and then it took a long time to realise that even small steps are better than doing nothing an then yeah, I actually started with going

vegan. After that I started to be in general more aware of what I am consuming. And then step by step, the information just found its way to me. So, I thought about "okay, I want to avoid buying not too many vegetables out of Europe", for instance, if it's possible. I tried to buy always local and yeah I started with that step by step and it's also caused due to information I got for instance in University, where I had like a really nice lecture about water scarcity in Spain, for instance. That lecture just made me realise that it cannot happen that I am having whole year strawberries in the supermarket and we are creating a desert in the middle of Europe. Like that cannot happen. So yeah that was the beginning kind of.

So, you said you are vegan, you try to fly less, and you try to buy locally. Is there anything else you specifically do to lower your emissions?
Yes, I think, in general, minimising consumption. So, it's all about "I don't need new clothes every month, or year.". I'm just replacing stuff, which is kind of broken, or looks just too over-used. Also, using the car, I try to minimise it a lot, I try to walk everywhere, and I also try to kind of create my everyday life in avoiding as much waste as possible. It also happens that I'm drinking a coffee to go every now and then, but I really try to avoid buying single-use items. Also, for instance, buying a plastic bag in the supermarket, I avoid because I always have my reusable ones.

You mentioned social media is very important for you? Is that your main source of information? How would you describe the construct of your decision making?
I think I just decided to create an environment for myself, where I only get the information I want to hear, so I'm not consuming any stupid content and only what I want to consume. I think it's yeah valuable for me, and that is most of the time also connected with self-awareness and green living in general. So, minimalism and so on. So, all the time when I hear something and I hear it, for instance, through social media that there is some new documentary on Netflix, for example, then I'm aware.

You said prior that you could fly less to lower your emissions as something you could do, simply because it is cheaper. Is there something besides that and the pricing, is there anything that keeps you from doing literally everything you know you can do to lower your emissions any further? If so, what are those things, what are the limits, and how do you select?
First, I think time is an important component, because I think time is the most valuable thing people have, and it is just the fact that flying is faster most of the time. So, if it's not like a really, really short flight, then flying always wins timewise. But then in that sense, it is also comfort. I think those two things: time and comfort are the things that make me stop sometimes, from not using the train, for instance. Compared to others, though, I am aware of that fact. Others might see a cheap flight from somewhere in Denmark to Spain and don't even think about the option of a train ride. So yeah, I think comfort and time.

What about its accessibility? When we talk, for example, about consumption products, like textiles, towels those kinds of things. How do you know the emissions related to them?
Especially textiles are really interesting because most of them have a really big transportation way to them. On the other hand, they are super harmful in their production because they just don't have the restrictions we have in Europe. So, they can use the chemicals, and destroy humans, withdraw from the environment and harm a lot of things. So, yeah just realising the way it's come and distance it had to travel is one way. On the other hand, the cotton production is intense for the environment. A lot of water is needed, and the harvesting is sometimes difficult, it's a really low salary job and so yeah. Especially in textiles, there are so many things you have to consider and yeah it would be nice to have a climate effectiveness index, or something like that, or global warming impact, in general, on a textile. So one can see the label, scan it with the phone, something like that.

How often do you talk to friends and family about climate change, their lifestyle, purchases, or brands?
When it comes to those things, I actually start to talk immediately when I see that a person is obviously taking a not so good choice for the environment. I'm talking directly to that person, which are in most of the cases family and friends. But I would never be educational or preach. I just wanted to raise the awareness that something may be not a good choice. I try to always give an example of what a better choice would look like. So often, and also in normal conversations.

You mentioned before that you think your awareness is created from knowledge and information that you have. So how influential do you think especially is the knowledge on causes and effects on your climate change action? What is the main goal that drives you to lower your emissions? The image that's behind it?
I think I know that I'm acting as an inspiration, so I want to be an inspiration for others. That's the first thing and just to show the way I'm living, and I have a good life, and I'm not restricting myself in anything. I'm living way cleaner than a lot of other people. On the other hand, also to be gentle to yourself, because you cannot be green from one day to another. So that's a step by step thing and I think nowadays it's pretty hard to avoid 100% plastic, for instance. So, you have to be aware that you will produce waste and it's just, you know, about balance. So, I think that's also a key to be aware that you have to change something but keep the balance and don't be too strict to yourself.

So, what is the thing that drives you to have made that change?
I would like to sustain the world as it is and I would like not to have worse futures kind of extreme weather events, like sea level rise and stuff like that. So, I don't want to see that in the future. My dream scenario would be that when I'm in the in the age of creating or starting a family, I can say "OK, my children have had the same future." and right now I'm in the position, as I mentioned in the beginning, where we are not doing enough. So yeah, that's my driver. My future kids they should have a nice world too.

So, you said you still learn new things from social media, right? Where else do you get your information on the climate change impact of products?
I think it's pretty hard to get the information, so you have to create it by yourself. That is why it may be a little bit easier for me, because we have the simulation software, so we can use it and in worst case we have at least that calculation. So, I could do it by myself, but it's hard. So, I think there's definitely a need for labels, for reliable labels. They would be based on assumptions and proximations because we are currently on a stage where it's quite impossible to make everything quite detailed, but I think estimates are enough to guide.

Then my last question: how would you describe the risk that is imposed by global average warming on you personally and on others, and where do you think that perception comes from? Where did you get that idea from?
OK, I think in a lot of areas, and the risk of global warming depends on where you are living, the perceived risk is much higher. Personally, I am not so scared of the risk that would fit me, personally, because I'm in one of the richest countries of the world. So, I don't have to be scared about that, because I know everything will work out for me. I believe in my government, and I believe in Europe in general, I believe in the European Union. So, my main driver for everything I am doing are the people who are not as privileged as I am. So, I am scared for the people who already don't have much and they will suffer the most. I think that is yeah motivating myself because I don't want to make people who are already suffering, suffer even more.

Thank you so much for taking your time.

Date and duration of interview	15th of May, 21 minutes
Place and type of conduction	Esbjerg, DK in person
Name of interviewee (pseudonym)	Isla Grim
Age of interviewee	24
Education of interviewee	M.Sc. Environmental and Resource Mgmt. B. Eng. Environmental Science
Place of residence of interviewee	Esbjerg, Denmark
Interviewed by	Katharina Herwig

Appendix H: Transcript Interview Marlene Riemer, 17th of May 2020, own work.

Do you believe that the global average temperature is currently increasing due to human activity and do you think enough is done to slow down/ limit global warming?
I certainly believe that the global average temperature is rising due to human impact and I'm just as certain that humanity is not doing enough against it.

Are you hopeful that climate change can be limited to an increase of 2° Celsius?
I think this hope was given up when Trump exited the Paris Climate Agreement. Overall, politicians in Europe and the US are just way too focussed on economic growth to not upset the conservative voters. If the way of politics won't take a 180 degrees turn, which I highly doubt, within the next one to two years, and by applying stricter rules, I believe no climate targets can be met.

What rules do you mean exactly? And do you have any influence on them?
I am talking about laws and regulations, maybe even taxations on certain things, to drive production and business operations into a direction that is sustainable, with fewer emissions. I have an influence on them in the sense that I can vote, which I do. And I encourage everyone around me to vote.

What do you know about global warming and where do you know it from? (relation to personal contributions?)
I'd say know I quite a bit about global warming, the causes and also ways to 'stop' global warming or slowing it down at least. I won't go into detail, but I am very cautious with not only transport and food but also every daily supply good, from beauty stuff to clothes. Many people in my surrounding are very passionate about the topic, which gives me a lot of opportunity to discuss and exchange my thoughts with pretty clever people. Additionally, obviously Fridays for Future became a huge thing in Hamburg as well and I joined their biggest marches twice, where a lot of informational material was handed out (on paper.... just saying....).

Despite the Fridays for Future demonstrations and your family and friends, where else do you get information about climate change or learn about it?
I guess from school, but also from social media. Once I express interest for one climate change related page on Instagram, for example, more and more pop up in my feed, which I am then suggested to follow, and also inspired by. Though, the information shared is not very detailed and needs to be fact-checked, it certainly introduces me to issues I otherwise would only hear from friends about.

What are generally the most effective ways individuals can generally minimise their emissions and which of them do you do?
Food! Go vegan or go home. Veganism is the best way to stop global warming as not only the animals suffer and create big amounts of greenhouse gases, including transport, etc., but also the huge amounts of rainforest being grubbed for feeding fields. It is disgusting when you think about it. All this rainforest gone, just to feed the animals we are then eating. The second biggest impact certainly is one's way of transport. No matter how 'green' you are, one flight to the Bahamas and it's all bananas. Besides not to fly, obviously using the bike, public transportation instead of one's own cars benefits as well. Other ways would be stop using single use plastic, stop fast fashion, recycling and not ordering online.

When it comes to the things I do, I'm vegetarian. I like parmesan. I don't fly much. However, this is more due to my brokeness. I use my bike and public transport quite a lot, however I believe in Germany the public transportation is just way too expensive, so for me, often it is just more affordable to take the car. I rarely use any single use plastic items, I carry a bottle or can with me all the time, for example. Fast Fashion is still a huge problem, but I managed to exchange shopping at H&M etc, whereby the way the quality just sucks, to thrifting. However, I understand why a lot of people struggle with thrifting here, as many shops are really bad, and the clothes is not as nice. Recycling and not ordering online are my two biggest 'issues', I simply forget how to recycle all the time, and Amazon is just too easy.

What do you mean when you say, "too easy"?
It is just convenient and at hand. I can do it from everywhere, it gets there fast, and I can find almost anything on there.

Those changes that you have made, do you remember what inspired them or where that motivation came from? How did they come about?
I would say my mum, my little sister, and a close friend of mine are definitely the biggest inspirations in this field. All three of them act in a quite responsible way, without judging you for not following them, which made it really achievable for me to 'become like them' here. I also think 2019 was kind of a wake-up year for not only me but a lot of people, as climate change became a huge topic in the media. But we also saw a lot more people saying climate change isn't real, which definitely motivated me personally to educate myself more on the topic, to not get confused by the conspiracy theories which flooded the internet, and then in the end, take a stance against them. It reminded me that not everyone understands the severity of the issue and is taking into their lifestyle consideration.

You said veganism is one of the best things one can do to limit their emissions and you have a vegetarian diet, you also said you often drive your car instead of taking public transportation, why is that, despite the price? How do you select what you do? What do you need? What is missing for you to take more action?
I also mentioned I really need to stop ordering stuff online. I just think it is situational. When it comes to transportation, it's a question of convenience. I enjoy the privilege of having my own car and I get places faster when I drive, can listen to my own music, it is just convenient. For the food, it is also about compromise. I enjoy parmesan, I don't want to give that up. So, the way I select really is more about the compromises I am willing to take and the switches most at hand, or available to me. It also helps to be reminded, though. *So yeah,* convenience. It's all about how convenient it is for me to be 'green'. Sure, I use my bike a lot, But I still order my gifts online, as I hate walking through five shops to get what I can buy with one click online. However, I see myself changing to the better constantly. My boyfriend and I both smoke, but we decided to just not throw our cig buts everywhere but in a bin. This surely results us walking two kilometres with a nasty cigarette in our hands, but better than having in in the North Sea. And I know that does not regard my personal emissions, but for me that kind of goes hand-in-hand, as a whole concept. So, I believe becoming conscious about those things is really the deal breaker. I became much more aware about pollution and actively call out people, including my friends, colleagues, and my boss, who pollute our city and environment. And I believe they also became more conscious through that. Another aspect definitely is no knowledge! So many people, including me, are often not aware about the effects of their actions, and I believe we need more, better material on the topic from credible sources. Besides that, we need more rules. This is something the people can't do without the politics. It doesn't matter how many kilometres I drive with my bike, if VW, Audi, BMW, Porsche and so on, can still do whatever they want. Plus, this is extremely demotivating, my efforts are being expected, but are not being valued at all while the big companies can still do whatever.

So, do you wish for more recognition for doing climate change friendly changes and actions?
Not necessarily in that sense, but it is frustrating to feel like it is up to the individual. Systematic restrictions must come in place, holding everyone accountable. So, I do wish for recognition in the sense that I try, and I am conscious, and I want the politicians and companies to see that and do the same.

How often do you talk to friends or family about more climate change friendly alternative lifestyles or purchase opportunities/ brands?
A lot. With my mum and my sister, I talk a lot about a lot of everyday changes. Especially to swaps for usual products we use and single-use items, including bee wax towels and sustainable fireplace lighter. With my girlfriends, I talk a lot about organic cosmetics, reusable cotton pads, menstruation cups and things like that, so we can prevent those single-use items. We give each other recommendations a lot, as it is indeed really hard to find a lot of natural and sustainable things which are actually good. For example, I am still looking for a good deodorant, just saying. So, I would say my surrounding has a big impact on my thinking and acting.

How influential is the knowledge and information you have on climate change, its causes, and effects on your climate change action? Can you describe the influence? Can you describe your learning curve, or knowledge curve? Do you still learn new things, if so, what are they?
I believe to some people I did indeed have a big impact. Especially in my office. All my colleagues are pretty intelligent but when I started to work there, they didn't give a **** about being sustainable.

XXX

In one and a half years I managed for them not to use those coffee capsules, implemented two recycling bins, implemented the usage of reusable coffee cups, we tend to get coffee twice a day so a lot of plastic, and stopped them from printing literally everything. I am quite an opinionated person and for them it probably was easier just to listen to me than arguing with me. But I also believe they acted the way they did because they never thought of it. So, I think the key really is to make people more conscious about the topic, then the change will come. The knowledge definitely is a huge influence. But then also, as always, the more you learn, the more you understand the cause of the issues, the more you can actively steer against it. There are so many small things, I didn't, and still don't know, about, which really change my actions. For example, I learned that organic eggs in Germany doesn't mean the chickens had a good life, and it needs more than the common organic label for that. Since knowing I only buy eggs from specific ranches, where, for example, the male chickens aren't shredded. However, my learning curve definitely flattened over the last year. I think nowadays I go a lot more into detail, which I really like, since I need to understand the relations between things to be mor interested. I now also try and actively research on topics where I'm not as educated, also because I argue a lot with people who don't believe in climate change or taking action and I like to win my arguments.

How influential is the knowledge and information you have on climate change action on your own action? How do you tell the climate change impact of a product? Or an activity?
That one is really hard. I often look at the country of origin, which is an indicator of the way the product has travelled. The closer, the better. Especially when it comes to food. I also try to buy longer-lasting things and make those switches to longer-lasting products. And then, when directly comparing, for example in a compartment store, I will take a product with less packaging, just because more packaging means more production. Though, sometimes I wonder whether to take the chickpeas in the aluminium can, the paper carton or the glass, I just don't know, so I will switch it up, or go by price.

How would you describe the risk imposed by global average warming on you personally, or/and others? And where does that perception come from? What is it influenced by?
I would say that I honestly don't think I am at such a high risk, because I feel safe in my position right now. Even though, that is really, really stupid, because I live pretty close to the sea and I can imagine flooding to become a serious issue. And for others, honestly, my concerns a way higher, like way higher. Especially for many third world countries. Because in the end, global warming will not only, but will obviously affect the poorest people the most. And I think that is mostly influenced by media and my own research since I really like to discuss with people and therefore be informed. So yeah, I do research for that. So yeah, it is influenced by updated data on the sea level and average warming per year. But what I also think is interesting is looking at single countries and seeing the effect there. So, no. I don't feel at imminent threat, or high risk, though the truth is, and I know this, we are at risk. I just don't feel like it.

Do you really think your climate change effort makes a difference? If so, what kind of difference?
Yeah, I do believe that my climate change efforts make a difference. For me, I think, I believe that the biggest impact I have is changing the opinion of others. As, for example, my colleagues become more aware through me. So, I think that is my biggest impact, personally. Because, honestly, I really try a lot to like focus on sustainable things all the time, but I am not the person who will never fly again. I would, quite frankly, fly right now if I could.

Thank you very much for taking your time.

Date and duration of interview	17th of May, 20 minutes
Place and type of conduction	Esbjerg, DK and Hamburg, DE via Zoom
Name of interviewee (pseudonym)	Marlene Riemer
Age of interviewee	24
Education of interviewee	B. Sc. International Logistics Management
Place of residence of interviewee	Hamburg, Germany
Interviewed by	Katharina Herwig

Appendix I: Transcript Interview Karsten Hellwig, 18th of May 2020, own work.

Do you believe that the global average temperature is currently increasing due to human activity and do you think enough is done to limit global warming?
Oh yes, I believe that the increase in temperature is human made and that people can do more against the raising of the temperature.

Are you hopeful that climate change can be limited to an increase of 2° Celsius?
Well, I don't believe that we are able to still limit the increase to two degrees, because it is already so late and not too much action has been taken, but either way we should limit the increase by whatever we can and the lower the increase is, the better.

What do you know about global warming and where do you know it from?
Most of it from news and people around me, family and friends. Some of scientific magazines, yeah that's it.

Do you remember being educated about it in school or University?
No, that is too long ago. No one was really aware of climate change or global warming, but that is almost 30 years, even though I studied physics.

What are generally the most effective ways individuals can generally minimise their emissions and which of them do you do?
Actually, I don't know and that's something which makes me worry, because I think many people do not know what they personally can do to limit the global warming and carbon dioxide emissions very good. So, there is a lot of talk that flying is producing carbon dioxide and obviously burning fossil fuels, and if you reduce that, that would help. But there may be also other possibilities to lower the carbon dioxide production. That is not so clear, what exactly I can do.

So, are there any steps you have personally taken to lower your emissions? What are the ways you contribute to a limitation of global average warming?
Well in general it's mainly that if I have any chance to choose between means of transportation, for example. I'm going to select the one I believe to have the lowest emissions.

What about when you purchase things? Do you include the climate change impact of your purchases in your consumption choices?
Well, I would, but currently it's hard to know which product is made with a lot of carbon dioxide and which is not.

So, you said you get your information from the news and that you like to take the means of transportation that you think has the lowest emissions, for the distance you want to travel. Do you remember what that is influenced by?
So, for example, the riding by train instead of using the car for long distances and instead of taking the plane, taking the train for even longer distances, I think comes also from an advertisement of the railroad company. They advertise that they have a low carbon-dioxide footprint and that they use renewable energy to fuel their trains. So, in this case, yes, it is the railroad company's advertisement.

So, when you buy products, do you consider anything emission-related? Any proximation to assess the emissions of the product?
Yes, I do that. With food especially. Something you can know when you go shopping is the distance the product has travelled. I can look whether it is labeled that it's local food or if this comes from Spain or other countries. So, when I have the chance to make a choice then I would prefer the local food, but it's really hard to know.

Though you say it is hard for you to assess, is there anything you know you could do more to lower your emissions? What keeps you from doing those things?
Yes, obviously, there would be ways to lower the emission, but that would have a major impact on my overall behavior. It is very easy I think, still, to make choices for example if you take product A or product B, but if you say well I I'm going to avoid traveling long distances overall and I'm just staying within 50 kilometers, everything I can reach by bicycle yeah, this would have a major impact on my whole lifestyle. So that's something, obviously, not very easy to change. So, if I want to make long distance traveling, for some reason, then I have no other chance than taking airplanes, for example.

So how would you describe what exactly is holding you back?
Well, it is just that I don't want to change my lifestyle that drastically. I could imagine that there are many other ways of changing my behavior, which are not as drastic, not as changing to my lifestyle. For example, if I would just know that product A is more sustainable than product B and they are comparable in their function, it would be quite easy. I'd imagine it to be a little bit more expensive, but that is okay. As long as I don't have to change too much. I mean, even if there are slight differences in the product, if the transparency was given, I would still pick the one with the lower carbon-dioxide footprint, or more sustainable one. Just because for that reason and I would then be willing to compromise in the products function itself.

How often do you talk to your friends or family about climate change and climate change action? And how influential would you say are your friend's or family's climate change concerns and consumption choices on your own behaviour and actions?
Oh, a lot. My family talks a lot about climate change. And yes, the family is very active in looking for brands and products which are very sustainable, but that is not a really big portion of life. The conversations definitely help me to behave better in terms of lower carbon dioxide footprint because I get knowledge about possibilities to behave better and make better choices.

How influential is the knowledge and information you personally have? Can you describe the influence and the learning curve?
Well, I think, I gain knowledge, that's probably, I don't know, a couple of products per months, but I don't think that is necessarily sufficient to make a real change in my consumption. This is only a couple of products in a month and that doesn't really help me. I think I should gain more knowledge about the principles and there should be more other ways to know where I can behave better in terms of reducing carbon dioxide footprint.

Where do you think that information should come from? Who is able to provide that information?
Well, the producer of the product, obviously, should be forced to give you information about that. I think the information should be provided on the producers' websites, on the product itself, for when you go to the supermarket or other store. I would like to get the knowledge at the point of purchase. Obviously, there are some products you buy on the internet, where you want the information upfront. But I also think the information must be generalized and as far as I know there are already rules being set up, ISO standards, which are used for carbon dioxide trading, because obviously, on a large scale the companies have to identify their carbon dioxide footprint. But the next step would be to break it down to each product and to print it on the product.

How would you describe the risk imposed by global average warming on you personally, and others?
Well, I think I personally probably will not be affected too much. Yes, we are already recognizing climate change, which is mainly recognized, by me at least, as a chaotic climate. So, we have cold days in summer and hot days in winter, but it's not a change for me, which really makes me worry or cause panic regarding my future in my lifetime having changes which really would affect me too much, me personally. But I'm sure, I can see it and I know that in other regions, where the climate already causes big problems, this is obviously more effective there.

Where does that perception come from?
From the news media.

Lastly, do you think your climate change effort makes a difference? If so, in which way?
I think they make a difference, although it's a little difference. I, on my own, would not be able to stop the climate change. But, as with other problems, if everybody plays their role and contributes what they can, then there's a chance to limit the global warming.

Thank you very much.

Date and duration of interview	18th of May, 16 minutes
Place and type of conduction	Esbjerg, DK and Hamburg, DE via Zoom
Name of interviewee (pseudonym)	Karsten Hellwig
Age of interviewee	57
Education of interviewee	Dipl. Ing. Physics and Dipl. Ing. Precision Engineering
Place of residence of interviewee	Hamburg, Germany
Interviewed by	Katharina Herwig

Appendix J: Translated and Original Transcript Expert Interview Moritz Möller, Veganz Group AG 28th of May 2020, own work.

Guten Morgen Moritz, hier ist Katharina Herwig.
Hallo

Vorab kurz die Frage nach deinem Einverständnis das Gespräch aufzuzeichnen?
Ja, das kannst du machen. Kein Problem.

Vielen Dank, dass du dir die Zeit nimmst. Am meisten interessiert es mich, ob ihr Informationen darüber habt, ob eure Kunden sich vegan ernähren, oder zu euren, spezifisch veganen Produkten greifen, aus Gründen des Klimaschutzes?
Ja, also wir haben eine relativ große Ernährungsstudie in Europa gemacht im letzten Jahr und dort haben wir alle Ernährungstypen befragt von Omnivore, zu Flexitarier, Vegetarier, Pescetarier und Veganer, in mehreren Ländern zum Thema Ernährung und Einstellung Umweltschutz, Klimaschutz und auch Labels gefragt, und da war eben die Einstellung, dass ein Großteil der Befragten sehr viel Wert legt auf Nachhaltigkeit beim Lebensmitteleinkauf. Entsprechend haben wir so Informationen darüber, dass Kunden unsere Produkte auch aus Gründen der Nachhaltigkeit kaufen.

Wenn ich das richtig zeitlich einschätze war das aber nach der Veröffentlichung der Kooperation mit Eatenity?
Ne, ne. Das war nachher. Wir haben die Einführung am Markt im Februar 2019 gemacht und dann zum Endkunden im Oktober 2019. Da gab es eine TV-Kampagne und da haben wir die Umfrage gemacht im Vorfeld des Welt-Vegan Tags am 01. 11. Genau, da war halt das Ergebnis, das 86% sagen, sie legen großen Wert auf Nachhaltigkeit beim Lebensmitteleinkauf und 74%, dass sie auch auf Label und Siegel achten und auch darauf vertrauen. Ich schicke dir im Nachhinein einfach mal den Link.

Vielen Dank. Warum spielt der Klimaschutz denn generell in der Unternehmensphilosophie von Veganz eine so große Rolle, aber auch im Marketing des Unternehmens?

Also wir sind ja als erste vegane Supermarktkette gegründet worden und da war natürlich für uns, logischerweise, ein starkes Thema der Tierschutz, damit zusammenhängend, dass wir uns insgesamt einen verantwortungsvollen Umgang mit der Umwelt wünschen und eine nachhaltige Zukunft schaffen möchten auf unserer Erde. Das ist einfach Teil unserer Unternehmensvision inzwischen und es ist einfach so, dass das auch für die Marktpositionierung so ist, dass wir sehen, dass das auch von den Konsumenten nachgefragt wird. Wir haben heutzutage eine Situation in der Leute ganz genau sehen wie die Produktionsbedingungen, Lebensbedingungen und Arbeitsbedingungen in Bangladesch, oder Indien, oder Südamerika, oder Afrika und das ist einfach durch die digitale Vernetzung, durch die digitalen Medien relativ leicht nachvollziehbar, was für Auswirkungen mein eigener Konsum hat und das sorgt jetzt natürlich dafür, dass die Gesellschaft sich verändert und Fridays for Future ist jetzt keine kleine Bewegung, sondern da merkt man einfach, dass das Thema an sich in der Mitte der Gesellschaft angekommen ist. Deswegen ist das für uns auch zentral, das ist Teil unserer DNA und das leben wir halt.

Abgesehen davon, dass es nachgefragt wird, kannst du sagen was für Erfahrungen ihr damit gemacht habt? Welche Rückmeldungen ihr von Kunden bekommt, daraufhin das Label auf euren Produkten zu finden, auf denen es bisher ist?
Ja, es gibt durchweg positives Feedback. Viele Leute sagen sie wünschen sich, dass das auf mehr Produkten ist und da arbeiten wir auch dran. Auch zusammen mit anderen Partnern, die ähnliche Projekte haben, wie zum Beispiel Oatly, die sich auch politisch noch einmal deutlich mehr engagieren. Und wir haben insgesamt also wirklich durchweg positives Feedback dazu. Im Social Media, in Einzelkommentaren, teilweise auch in der Presseberichterstattung natürlich. Ja, immer wo wir das Thema ein bisschen stärker thematisieren wird das bisher positiv besprochen. Wir haben natürlich auch kritische Nutzer, die dann genau nachfragen wie sich das Label genau verhält. Wir sind aber inzwischen soweit, dass wir absolut transparent dazu erzählen können. Genauer, wie sich die Scorings zusammensetzen: was ist gut und was ist schlecht. Wir zeigen ja auch wo wir Schwächen haben. Das hilft eigentlich Vertrauen zu bilden. Das ist eben kein Greenwashing, sondern wir nehmen das ernst. Wir lernen dadurch eben auch die Lebenszyklusanalyse von Eaternity die Schwächen unserer Produkte kennen, aus Umweltsgesichtspunkten und was wir ändern müsse. Zum Beispiel am

Sourcing von Rohstoffen, oder im Sinne von Produktionsverbesserungen vor Ort. Um auch in der Hinsicht bessere Ergebnisse zu erzeugen. Zum Beispiel unsere veganen Pizzen, schneiden nicht immer super ab im Sinne des Wasserfußabdruckes, das hängt damit zusammen, dass das Olivenöl aus einer Region stammt in der Wasser eine eher knappe Ressource ist und Olivenbäume viel Wasser brauchen. Jetzt ist die Überlegung das Olivenöl aus einer anderen Region zu sourcen, wo das eben nicht so schwierig ist, wenn man dort Olivenbäume anbaut. Damit würde sich entsprechend der Score verbessern und wir würden nicht so stark in die Umwelt eingreifen.

Aber wenn ich das richtig verstanden habe, dann ist es nicht unmittelbar geplant, dass alle Produkte den Score auch auf der Verpackung ausweisen?
Doch. Wir haben ein neues Packaging-design entwickeln lassen vom Studio Oeding. Daraufhin haben wir auch das Corporate design in-house angepasst und es werden alle Produkte umgestellt bis zum Jahresende. Wir haben natürlich auch vor Einführung des Labels geguckt, was das für Auswirkungen haben kann. Was passiert, wenn ein Produkt, das einen schlechten Score hat, und neben einem Produkt ohne Score liegt. Welches wird dann gekauft? Oder wenn beide einen Score haben. All das haben wir natürlich vorher auch befragt und wir sind uns der Risiken bewusst, die ein Produkt ohne sehr guten Score trägt. Das kann natürlich auch nachteilig sein. Wir haben den Vorteil, dass wir als veganes Unternehmen in den allermeisten Fällen wirklich gut abschneiden und auch fast immer drei von drei Sternen haben im Score, aber wir merken eben auch, gerade so im Bereich Wasser, das ist schon, vor allen Dingen neben CO_2, was auch super wichtig ist und wir müssen die Emissionen senken, ganz klar, und die Ernährung eines Individuum hat einen großen Einfluss darauf, aber der Wasserverbrauch und das Thema Wasser wird in den nächsten Jahren kommen und da haben wir jetzt schon Learnings für uns. Das ist natürlich schon mal super, weil wir verstehen können wie wir uns in dem Aspekt verbessern können.

Moritz, vielen, vielen Dank, dass du dir die Zeit genommen hast.

Good morning Moritz, this is Katharina Herwig.
Hi

First, the question of your consent to record the conversation?
Yes, you can do that. No problem.

Thank you for taking the time. I am most interested in whether you have information about if your customers are vegan or buy your products because they are vegan, due to climate protection reasons?
Yes, so we did a relatively large nutritional study in Europe last year and there we asked all types of dietary habits from Omnivore, to Flexitarians, Vegetarians, Pescatarians and Vegans, in several countries about nutrition and attitude, environmental protection, climate protection and labels, and there was the attitude that the majority of those questioned attach great importance to sustainability when shopping for food. Accordingly, we have information that customers also buy our products for reasons of sustainability.

If I estimate the timing correctly, was that after the cooperation with Eatenity was published?
No, no. That was after. We made the launch on the market in February 2019 and then the end customer in October 2019. There was a TV campaign and we did the survey in advance of the World Vegan Day on November 11th. Exactly, there we found that 86% say they attach great importance to sustainability when buying groceries and 74% that they also pay attention to, and trust the label and seal. I'll just send you the link afterwards.

Thanks a lot. Why does climate protection generally play such a major role in Veganz' corporate philosophy, but also in the company's marketing?
So we were founded as the first vegan supermarket chain and, of course, there was, the strong issue of animal protection for us, connected with the fact that we all want to be responsible for the environment and want to create a sustainable future on earth. That has simply become part of our corporate vision in the meantime and it is simply the case that this is also the case for the market positioning. We can see that this is also in demand from consumers. Today, we have a situation in which people see exactly how the production conditions, living conditions and working conditions in Bangladesh, or India, or South America, or Africa are, and that is relatively easy to understand, simply by digital networking, by digital media. Individuals can easily know the impact their consumption has and that of course now ensures that society changes and Fridays for Future is now not a small movement. You just notice that the topic itself has reached the centre of society. That's why it's central to us, it's part of our DNA and that's what we live for.

Apart from being asked for, can you say what kind of experience you have had with the score? What feedback do you get from customers to find the label on the products it is on so far?
Yes, there is consistently positive feedback. Many people say they wish that this is on more products and we are working on that. Also, together with other partners who have similar projects, such as Oatly, who are also politically significantly more committed. And overall, we have really consistent positive feedback on this. In social media, in individual comments, and sometimes in press reports, of course. Yes, wherever we address the topic a little more, it has been discussed positively so far. Of course, we also have critical users who then ask exactly how the label behaves. However, we have now reached the point where we can talk about it absolutely transparently. More precisely, how the scorings are composed: what is good and what is bad. We also show where we have weaknesses. This actually helps to build trust. This is not green washing; we take it seriously. Through the lifecycle analysis of Eaternity, we also get to know the weaknesses of our products, from an environmental point of view and what we have to change. For example, in the sourcing of raw materials or in the sense of local production improvements. To produce better results in this regard too. For example, our vegan pizzas do not always perform well in terms of the water footprint, which is due to the fact that olive oil comes from a region where water is a scarce resource and olive trees need a lot of water. Now the consideration is to source the olive oil from another region, where it is not that difficult if you

grow olive trees. The score would therewith improve and we would not interfere as much with the environment as much.

But if I understand that correctly, is it not immediately planned that all products will show the score on the packaging?
It is. We had a new packaging design developed by Studio Oeding. As a result, we also adapted the corporate design in-house and all products will be converted by the end of the year. Of course, we also looked at the effects before the label was introduced. What happens if a product that has a bad score and is next to a product without a score. Then which one is bought? Or if both have a score. Of course, we also asked all of this beforehand and we are aware of the risks that a product without a very good score carries. Of course, this can also be disadvantageous. We have the advantage that as a vegan company we do really well in most cases and almost always have three out of three stars in the score, but we also notice, especially in the water sector, that is, above all (in addition to CO_2 , which is also super important and we have to reduce emissions, of course, and the diet of an individual has a big impact on it) that water consumption and the topic of water will come over the next few years and we already have learnings for ourselves. Of course, that's great because we can understand how we can improve on that aspect.

Moritz, thank you so much for taking the time.

Date and duration of interview	28th of May, 10 minutes
Place and type of conduction	Esbjerg, DK phonecall
Name of Expert	Moritz Möller
Company	Veganz Group AG
Position	Head of Marketing and E-Commerce
Interviewed by	Katharina Herwig

Appendix K: E-mail Correspondence with Sebastian Gries, Eaternity Institute 25th of May 2020, own documentation.

Eaternity Score - Masterarbeit

Katharina Herwig
An mail@eaternity.ch

Antworten | Allen antworten | Weiterleiten | ...
Mo 25.05.2020 14:33

Liebes Eaternity-Team,

Im Rahmen meiner Masterarbeit die der Erarbeitung von Kommunikationsempfehlungen zu größerem Handeln für die Eindämmung des Klimawandels gewidmet ist, ist der herausgefundenen Hauptgrund für nicht-Handeln eingeschränktes Beurteilungsvermögen von Produkten anhand derer CO_2 Emissionen. Ich folge Ihrem Institut seit der Veröffentlichung Ihrer Kooperation mit Veganz, und führe diese als Lösungsbeispiel an für mehr Transparenz den Konsumierenden gegenüber.

Leider reicht es in der Arbeit nicht nur aus persönlicher Erfahrung zu sprechen. Entsprechend meine Frage und Bitte an Sie, ob Sie kurz beschreiben können wie das Feedback zu der Aufnahme des Scores ausfällt bei Ihren Kunden und, falls möglich, was diese dazu bewegt Ihren Score zu übernehmen?

Für eine Antwort wäre ich Ihnen sehr verbunden und verbleibe mit freundlichen Grüßen

Katharina Herwig

Von: Sebastian Gries from Eaternity <mail@eaternity.ch>
Gesendet: Dienstag, 26. Mai 2020 14:37
An: Katharina Herwig <kaher18@student.sdu.dk>
Betreff: Re: Eaternity Score - Masterarbeit

Hallo Katharina,

gerne helfen wir dir weiter.
Das Feedback zum Score ist sehr gut - gerade unser Partner [redacted] fährt damit einen großen Teil seines Marketings. Die Beweggründe zur Adaption zum Score sind vielseitig - hauptsächlich jedoch das Ziel Nachhaltigkeit, einfach und glaubwürdig von einem Dritten ausweisen zu lassen. Der Unterschied zu Klima-Neutralitätslabels liegt auf der Hand: transparente Zahlen, Daten, Fakten...
Falls du noch Fragen hast rufe mich doch kurz an unter [redacted]
Lieben Gruß Sebastian Gries

Sebastian Gries

Eaternity
Siewerdtstrasse 95
8050 Zürich, Switzerland
www.eaternity.com

Watch Eaternity on the news.

AW: Eaternity Score - Masterarbeit

Katharina Herwig
An 'Sebastian Gries from Eaternity'

Antworten | Allen antworten | Weiterleiten | ...
Di 26.05.2020 15:24

Hallo Sebastian,

Ich habe eben versucht dich zu erreichen um mich für die Antwort zu bedanken.

Mein persönliches Interesse reicht durchaus über die Fragen hinaus, für die Masterarbeit allerdings interessiert mich noch ob du davon ausgehst, dass sich insgesamt Unternehmenskommunikation und CSR in Zukunft soweit entwickeln, dass ein Großteil der (für den europäischen Markt relevanten) Lebensmittelhersteller euren Score übernehmen?

Des Weiteren bitte ich um Erlaubnis diesen Emailaustausch im Rahmen der Arbeit zu zitieren, oder um einen Hinweis auf entsprechend zu zensierende Inhalte.

Nochmals vielen Dank für deine Antwort und mit freundlichem Gruß

Katharina

From: Sebastian Gries from Eaternity <mail@eaternity.ch>
Sent: Tuesday, 26 May 2020 3:39:16 PM
To: Katharina Herwig
Subject: Re: AW: Eaternity Score - Masterarbeit

Hallo Katharina,
du darfst das natürlich nutzen für deine MA. Bitte nenne nur keine Unternehmensnamen unserer Kunden.
Wir nehmen an, dass in den nächsten Jahren das Interesse zum Thema Nachhaltigkeit in der Ernährung stark steigt. Die CSR-Abteilungen sind da schon auf dem Stand, die restlichen Teile der Konzerne noch nicht wirklich. Wir nehmen an, dass einige Hersteller den Score übernehmen werden. Eine Einschätzung über die Marktpenetration ist jedoch aktuell sehr schwierig.

Sebastian Gries

Eaternity
Siewerdtstrasse 95
8050 Zürich, Switzerland
www.eaternity.com

Watch Eaternity on the news.