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# Environmental Information Avoidance When Comparing to Moral Others

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The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics or Erasmus University Rotterdam.

## **Abstract**

This study explores the influence of anticipated moral comparison on environmental information avoidance and pro-environmental choices. In that way, it can be seen if the anticipation of moral comparison has the same positive effect as moral comparison itself. This is done through an online survey experiment involving environmental choices. The treatment group, unlike the control group, anticipates that their number of pro-environmental choices made is compared to other participants at the end. For the experiment, 166 observations are obtained. With a Fisher's Exact test, the effect of anticipated moral comparison on environmental information avoidance is investigated. The effect on the number of pro-environmental choices is tested for with the Mann-Whitney U test. Results of the tests indicate no significant influence on both. Knowing to be compared, does not feel as threatening to shift informational and pro-environmental preferences. Therefore, the usage of anticipated moral comparison to establish behavioural change in a field setting should be done with caution and tested first.

*Keywords:* Anticipated moral comparison, environmental information avoidance, environmental choices

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# 1. Introduction

People have always been curious creatures. This is how we are born, exploring and obtaining new information to develop our knowledge and skills. However, throughout our lives, not all information is preferred to be acquired. Some people do not want to know the gender of their unborn child. Others do not want information on if they have an increased likelihood of developing a particular disease. There are numerous situations in which people avoid information, even if it might be helpful (Golman et al., 2017). Information avoidance can have negative effects on decision-making. This is also seen in the domain of environmental choices, which is becoming more and more important for our world. People avoid environmental information that could help them behave more pro-environmental (Marshall, 2015). Therefore, investigating interventions that counter these negative effects of information avoidance is of great importance.

Information avoidance has several motivations. Some are driven by the preference to not experience negative thoughts, feelings, and emotions. One is the avoidance of cognitive dissonance, which is a state in which attitudes, beliefs, or behaviours conflict (Festinger, 1962). There are also internal and relational strategic causes. Exploiting moral wiggle room is one of them. People avoid information to have an excuse for selfish behaviour. This self-centred cause is found in the environmental context (Momsen & Ohndorf, 2022). Others may have a social reason to avoid information. In that way, informational resources could be redirected to other people (Leydon et al., 2000). Some of the same reasons are identified with the avoidance of environmental information. Climate change has no clear markers that would normally, with big threats, have the consequence of our brain ignoring short-term interests and behaving accordingly (Marshall, 2015).

Moral comparison interventions have proven to encourage pro-environmental behaviour. These interventions compare the behaviours in the moral domain of oneself to others. The most common type are home reports stating the energy consumption of a household compared to other households in the same neighbourhood. People want to seem moral and follow the consumption behaviours of others (Bergquist et al., 2023). There is no research done on the direct influence of these interventions on environmental information avoidance. For instance, the avoidance of environmental information on energy consumption after receiving a home energy report.

With these interventions, the behavioural change is measured after the comparison. In that stage, people already have experienced the moral comparison and might know another round will come. In the case of energy consumption, this is a behaviour that is almost continuous nowadays. However, in everyday life, there are instances in which people make choices that are not part of regularly recurring consumption behaviours. For instance, when buying a refrigerator. People would have already forgotten about the moral comparison of their last purchase if these interventions would be used with these decisions. What could be used in these situations is the anticipation of moral comparison. Then people only know to experience the moral comparison after their decision is made.

Therefore, in this study, I test the influence of anticipated moral comparison on environmental information avoidance and pro-environmental choices. In that way, it can be found out if the anticipation of moral comparison elicits the same pro-environmental change as the moral comparison interventions. Accordingly, it can be stated whether anticipated moral comparison interventions can also be effective to let people make more pro-environmental choices. To obtain insights into this, I try to answer the following research question:

*How does anticipated moral comparison influence the negative effects of information avoidance in environmental choices?*

To answer this question, I run an online survey experiment. In the survey, 8 hypothetical choices between 2 options unequal in environmental pollution must be made. For instance, choosing between taking a bath as long as you like or taking a 5-minute shower. The participants allocated to the treatment group are informed that they will see a ranking list afterwards based on the amount of pro-environmental choices made. This is not the case for the control group. The participants are first asked if they want to obtain or avoid environmental information about the upcoming choices. This contains information on the difference in environmental pollution between the 2 options. There are 166 observations in my final sample. Through a Fisher's Exact test, I find that the anticipated moral comparison has no significant influence on environmental information avoidance. Moreover, a Mann-Whitney U test shows that it has no significant effect on the number of pro-environmental choices made.

The next chapters are organised as follows. Chapter 2 contains a review of the literature relevant to my study and the hypotheses. The methodology used to test the hypotheses is then described in Chapter 3. After that, the results are presented in Chapter 4. A discussion of these results is portrayed in Chapter 5. In Chapter 6, a conclusion to this study is then given.

## **2. Literature Review**

### **2.1 Information Avoidance**

According to the standard economic theory of information by Stigler (1961), information only strengthens decision-making. During this process, information indirectly impacts utility as stated by most traditional economic models. However, some more recent models also portray that information can have a direct effect through beliefs about future utility (Epstein & Zin, 1989; Kreps & Porteus, 1978). Abelson (1986) argued that beliefs in many important cases are even seen as possessions. Neuroscience studies also found this to be true by looking at the activation of brain areas when obtaining information about future outcomes (Knutson & Peterson, 2005).

This direct impact of information establishes that it can have a negative influence on utility. People can experience situations in which beliefs about outcomes are formed before obtaining information. These may result in time inconsistency and informational preferences (Caplin & Leahy, 2001; Köszegi, 2010). Therefore, information could be unwanted. In these situations, information avoidance, defined as any behaviour intended to prevent or delay the acquisition of available but potentially unwanted information, can be present (Sweeny et al., 2010). These behaviours are found to occur in everyday life situations and have a passive and active aspect. Passive is a long-term behaviour of avoiding abstract information challenging long-held beliefs which is encountered in everyday life. This becomes passive and involuntary over time. Active is a short-term coping mechanism for occasionally concrete information that is processed affectively (Narayan et al., 2011).

#### **2.1.1 Causes**

There are several causes of information avoidance portrayed in theoretical and empirical studies. Some causes are somewhat related to each other. There are ones driven by people not wanting to experience negative thoughts, feelings, and emotions. Anxiety is one of them and there is a large literature on the connection to information avoidance. This reason is even seen in situations where the information may be in favour of the person. Köszegi (2003) described this in his model of patient decision-making in which beliefs about future health enter the utility function. Anxiety leads to avoiding the doctor, getting tested, or other easily available information. Evidence for this avoidance of health information due to anxiety has been found in numerous studies relating to cancer (Case et al., 2005; Lerman, 1999; Nosarti et al., 2000;

Reisch et al., 2021). Next to that, it is found in studies concerning sexually transmitted diseases (STDs) like HIV, in which more than half of the participants chose not to get tested, not to go to their appointment, or not to get to know the results (Lyter et al., 1987; Thornton, 2008). People also avoid self-threatening genetic risk information, like Alzheimer's and Huntington's disease (Cutler & Hodgson, 2003; Ferrer et al., 2015; Oster et al., 2013). Moreover, avoidance is found to occur in situations with infectious diseases as seen with the recent global Covid-19 pandemic (Soroya et al., 2021).

Next to this, risk, loss, disappointment, and regret aversion are seen as causing information avoidance (Golman et al., 2017). People avoid risky situations by pretending they do not exist. Galai and Sade (2006) found that people faced with uncertain investments preferred unreported risk over frequently reported risk. Next to that, the general dynamic model of reference-dependent utility by Kőszegi and Rabin (2009) states that people are loss averse to changes in beliefs about present and future consumption. Negative information is more painful than positive information is pleasant. Boen et al. (2002) found evidence of disappointment aversion with Dutch and Belgian soccer fans who avoided information after their club lost a game. People were less likely to visit the club websites following a loss than a victory. In addition, through an experiment Melnyk and Shepperd (2012) found that when presented with uncontrollable information about breast cancer risk, women avoided more information. Potential regret over seeking what may be unwanted information and having fewer coping resources led to this.

Humans have limited cognitive abilities. Therefore, situations of cognitive overload can occur. This results in people not being able to put their attention on everything, and therefore avoiding information. The literature on this describes it as the Ostrich effect (Galai & Sade, 2006; Karlsson et al., 2009). People selectively decide what information to give attention to and put their heads in the sand for unwanted information (Chater & Loewenstein, 2016). Sicherman et al. (2016) found this effect when investigating panel data on daily investor online accounts. Account logins decreased by 9.5 per cent after market declines.

This limited cognitive ability also has the consequence of dissonance avoidance. Cognitive dissonance, which was first introduced by Festinger (1962), is a state in which attitudes, beliefs, or behaviours conflict. This can be prevented by avoiding information that is not in line with the current state. After the introduction of the concept, a large number of studies were conducted (Smith et al., 2008). Chater and Loewenstein (2016) explained this avoidance by the fact that people are motivated to simplify our representation of the world. This sense-making could be interrupted by information going against current understanding. People may

even avoid discussions on topics in which disagreement could be present (Golman et al., 2016). A meta-analysis by Hart et al. (2009) stated that people are almost two times more likely to avoid information that does not conform to their attitudes, beliefs, and behaviour than information that does align.

Another reason for information avoidance is optimism maintenance. Brunnermeier and Parker (2005) portrayed this with the fact that people care about expected future utility. Therefore, people feel happier when better outcomes are more likely. Information avoidance is used to not obtain information suggesting otherwise. People for that reason keep away from negative feedback and information supporting previous negative evaluations (Frey & Stahlberg, 1986). As feedback is near, people also shift predictions downward. In that way, optimism can be better maintained (Carroll et al., 2006). This is again also seen with patients and people not wanting to get tested. Information is avoided by them to keep hope and carry on with life (Leydon et al., 2000). Oster et al. (2013) found that 90 per cent avoided information by not getting tested for Huntington's disease. People who suffer from this disease have a healthy life expectancy of around 50. To not live with anticipation of future negative outcomes information is avoided.

There are also more strategically driven causes of information avoidance. Some are internal. People may want to keep elements of surprise in their life. This is seen with people avoiding information on the gender of their unborn children (Shipp et al., 2004). Another reason is that people may not want to be obligated to undesirable behaviour. An online experiment by Howell and Shepperd (2013) found this to be true for a situation in which people could be obligated to take medication for a certain period. More people avoided the information when there was a possibility that medication needed to be taken for the rest of their life compared to only two weeks.

Another personal reason could be to exploit moral wiggle room. In this way, responsibility can be abdicated. Dana et al. (2007) were the first to present evidence for this phenomenon. Through a binary version of the dictator game, it was observed that people use the opportunity to leave the relationship between their actions and resulting outcomes uncertain to themselves or another person. Moreover, people act less morally when using this opportunity for information avoidance. Mazar et al. (2008) found that people behave dishonestly enough to profit, however, not so much that their self-concept changes. This strategic ignorance of the relationship between action and outcome gives an excuse for selfish behaviour (Dana et al., 2006; Grossman & van der Weele, 2017).



Environmental and psychological factors may influence this exploitation of moral wiggle room. This selfish behaviour is also seen in a binary trust game experiment by Regner (2018) where reciprocal behaviour is possible. Situational excuses decrease the preference of the second mover to give back. Contrary, no influence on second movers in a trust game and moonlighting game, where reciprocal behaviour is also possible, was found by van der Weele et al. (2014). Lind et al. (2019) also did not find evidence that people exploited moral wiggle room when an environmental charity was the recipient of a binary dictator game. Next to that, defaults have a big impact on this selfish behaviour. In an experiment by Grossman (2014) 45 per cent of participants remained ignorant when that was the default option. However, this decreased to 25 per cent when there was no default option and to only 3 per cent when being informed was the default option. In an experiment by Momsen and Ohndorf (2023), evidence for pro-social motives for information avoidance was presented. Participants were given two options that gave different amounts of money to a corona fund and themselves. The amounts were hidden, however, revealable in two stages. Participants did the opposite of exploiting moral wiggle room and only avoided information about their payoff.

There are also relational strategically driven causes of information avoidance. In-depth interviews by Leydon et al. 2000 revealed that one cause of information avoidance of cancer patients had a social aspect. Some saw other patients as more needy than themselves. Therefore, some scarce resources of information, like a doctor's visit, would be avoided so that others could get more information. However, it may be the case that people want others not to be informed. Obtaining information for themselves may also result in this. This could for instance be the case for an outside research team to assess a company. Moreover, people can avoid information that was intended by others to influence them. In that way, the distribution of power during negotiations can be influenced (Golman et al., 2017).

### **2.1.2 Consequences**

Information avoidance has several consequences. Some are for oneself, as with one's financial situation. Decision-making is most optimal when having obtained all available information. Due to the Ostrich effect, important financial information can be missed which may give a negative feeling (Sicherman et al., 2016). Through a diary study of information-related thoughts and activities, Narayan et al. (2011) stated that financial information is actively avoided. This means that it is a short-term coping mechanism in response to information that was processed affectively. Not letting emotions come into play and looking at the long-term goal would be more beneficial.

The study by Narayan et al. (2011) also portrayed this effect in everyday life for health information. Medical examinations and tests are avoided to not be anxious or need to be obligated to unwanted behaviours (Howell & Shepperd, 2013; Kőszegi, 2003). This can have a big impact on one's health. Knowing to have certain diseases can increase optimal decision-making. Someone knowing to have a short healthy life expectancy knows to not wait with things on their bucket list. Someone knowing to have a higher risk of developing cancer knows to get tested more often.

On the other way around, information avoidance can have the consequence of keeping positive thoughts, feelings, and emotions. Carroll et al. (2006) found that optimism can be maintained by avoiding feedback information. People tend to shift down predictions when anticipating this self-relevant feedback. It is also seen with people avoiding negative thoughts, feelings and emotions. Information about a negative situation is avoided to more easily forget about it (Boen et al., 2002).

Next to this, there are consequences of information avoidance that also impact others. Avoiding information can result in a negative influence on the economy. Avoiding health information can lead to higher pressure on health care in the long run. Leading the government to take measures that have economic effects. This was seen recently with the Covid-19 pandemic (Soroya et al., 2021). Additionally, investor attention behaviour can affect asset pricing (Sicherman et al., 2016). Inattention due to the Ostrich effect results in underreaction to new information and ignoring portfolios. In that way, liquidity can dry up, which can lead to financial crises (Andrei & Hasler, 2015). Confirmation bias also plays a role in this. People are twice as likely to obtain information confirming their actions than information not doing this (Hart et al., 2009). Schulz-Hardt et al. (2000) found that managers, experienced in making responsible economic decisions, still encounter this bias. Leading to poorer business practices.

People also project confirmation bias over climate change. Avoiding climate change information gives the chance of holding the belief that variable and extreme weather is proof of natural causes (Marshall, 2015). Next to that inactivity to climate change is an outcome of information avoidance. Reisch et al. (2021) found a comparatively lower willingness to pay for environmental information compared to health and consumer information on food products. People have a perceived unwillingness to abandon personal consumption. The social gain of countering climate change is not perceived as high enough compared to this loss (Stoll-Kleemann et al., 2001). This environmental information avoidance will be further elaborated on in Chapter 2.3.

Confirmation bias additionally causes political polarisation. Momen and Ohndorf (2023) found evidence through their experiment that political polarisation may be driven by information avoidance. In their study, Democrats rather exhibited pro-social information avoidance. Contrary, Republicans exhibited self-serving information avoidance. This form of information avoidance is a long-term behaviour of avoiding abstract everyday information that challenges long-held beliefs. Eventually, this behaviour becomes passive and involuntary (Narayan et al., 2011). People with different political positions avoid information that contradicts their views and that of the group they belong to. Therefore, people are less likely to find common ground (Kahan et al., 2011, 2012).

People not getting tested for diseases can also form a threat to the health of others. This is the case with STDs. Choosing not to get tested, failing to show up, or not looking into the results are no exceptions (Lyter et al., 1987; Thornton, 2008). Other infectious diseases, like Covid-19, have the same problem. Through anxiety about a positive test, information is avoided (Soroya et al., 2021). Without knowing that someone has a disease, there is no obligation to refrain from certain behaviours. In this way, these diseases can spread more easily.

There are more unethical decisions taken as a consequence of information avoidance as this gives an excuse for this behaviour. Mata et al. (2022) found this in their trolley-type sacrificial moral dilemma experiment. Participants needed to choose between sacrificing one person to save more or not. They were then asked if they would like to receive information about the identity of the one being sacrificed and the number of people saved before choosing again. Regardless of their choice, every participant got the information. It was seen that people who chose to avoid the information were just as likely to alter their choice the second time as people who obtained the information. People exploit this moral wiggle room that is available by avoiding information (Dana et al., 2007). This has played a part in political and corporate corruption, conflict, and even genocide (Grossman, 2014). Moreover, avoiding information about the occurrence of such unethical behaviour has the consequence of people not learning from it.

## **2.2 Social Comparison in the Moral Domain**

Social comparison processes were first illustrated by the theory of Festinger (1954). These processes are best described as behaviours in which one compares certain aspects of oneself to others for better self-evaluation. Similarities between people increase closeness so that someone's characteristics and capabilities can be evaluated. Through this comparison, people gain self-knowledge (Blanton, 2013; Tesser, 1988). Wills (1981) later portrayed that social

comparison is not limited to self-evaluation as it also is a mechanism for self-enhancement. Wood (1989) added that the process of comparing also helps with self-improvement.

There are two directions of comparison: upward and downward. Upward comparison is with perceived better performing individuals and downward with worse performing individuals. There are some mixed results on which direction people prefer. Upward would be preferred to look up to people and get inspiration from them to try to become better (Buunk & Gibbons, 2007). Wheeler and Miyake (1992) found this in the everyday life of college students. Especially when experiencing negative affect. Dijkstra et al. (2008) even found this upward comparison to increase negative affect. Nonetheless, students strongly prefer upward comparison. A review by Buunk and Gibbons (2007) portrayed that the literature on social comparison generally sees a preference for upward comparison. The meta-analysis by Gerber et al. (2018) also found this to be true.

However, some studies found a preference for downward comparison. This would be preferred to increase subjective well-being by looking down at people and seeing the worse state they are in (Wills, 1981). In that way, people protect how they feel and think about themselves (Meese, 2022). This is used by breast cancer patients. In interviews by Taylor et al. (1983) only 2 out of 78 women indicated doing somewhat worse than other patients. This was also seen in an online open course study by Rogers and Feller (2016). Participants needed to assess each other's work. A large proportion of students quit the course when this work was better than their own. Displaying an aversion to upward comparison.

Social comparison in the moral domain can also be named moral comparison. This term will be used to describe this form of social comparison from now onwards. Morality is an important factor in a person's perception. Through six experiments Landy et al. (2016) found that moral people are always evaluated positively, regardless of their sociability or competence. Social and competent people are even evaluated more positively if they are moral. People consider moral traits as the most essential part of identity, the self, and the soul (Strohming & Nichols, 2014).

Moral comparison is different from other forms of social comparison in some aspects (Monin, 2007). Fleischmann et al. (2021) found through several experiments that the threat principle, stating that threatened people tend to like downward comparison more than upward, is increased in the moral domain. Contrary, the diagnosticity principle, portraying that upward comparisons are threatening when the other person is close or similar, is decreased. For the reason that morality is such an important factor in evaluating an individual, people prefer to compare downwards in the moral domain.

Information avoidance also occurs when people compare themselves to others. People see themselves as moral (Ybarra et al., 2012). Also, they want others to see them as moral. Therefore, information suggesting otherwise is avoided (Fleischmann et al., 2021). A study by Huang (2018) found that people especially avoid upward comparison information of people pursuing the same goal. This is seen for people in the middle of their goal-obtaining process, not in the beginning nor near the end. Heck and Meyer (2019) stated that people who avoid genetic health information, even when the information is described as non-actionable, are perceived as less moral by others. More particularly, relating it to moral wiggle room, Kandul and Lanz (2018) found that feedback from moral others was avoided in a repeated public goods experiment. Moral comparison imposes exploitation of moral wiggle room through the need to maintain a positive self-image. Information avoidance can thus be used to protect someone's moral perception of themselves. Moreover, it is seen that if the information holds the knowledge of other people's behaviour, avoidance decreases (Thunström et al., 2014). As the literature on the relationship between information avoidance and moral comparison is limited, Meese (2022) stated that it needs to be further investigated.

### **2.3 Environmental Information Avoidance**

Information about the impact certain products or services have on the environment is often avoided (Reisch et al., 2021). Most people recognise climate change as an important danger, however, not everyone takes action to stop it. Kahan et al. (2012) found that this has nothing to do with science literacy. There are some psychological mechanisms, described by Marshall (2015), that cause this avoidance of environmental information and inaction to it. One of them is that people project confirmation bias over climate change. Variable and extreme weather is only seen as proof that this can naturally happen (Kahan et al., 2011). Climate change also presents no immediate evidence of danger that is normally present with big threats. Therefore, our brain does not overrule short-term interests and behaves accordingly as it would do in other situations. Behaviours and technologies contributing to climate change have become so normalised that they do not trigger our risk responses. Next to this, decision-making around climate change involves losses and no gains through the need to diminish old consumption habits (Stoll-Kleemann et al., 2001). The danger is in the distant future and not present and involves great uncertainty. This all makes that we are biased around this decision-making. Due to the limited cognitive capacity to worry, our attention is driven towards other dangers. This may also be because climate change reminds people of death. Now we can cope with this idea by investing in things that survive us, however, climate change takes away that idea. Searching

for environmental information about products or services can cause these negative thoughts, feelings and emotions (Ehrich, 2005; Norgaard, 2006a; Thunström et al., 2014; Yang & Kahlor, 2013).

Information avoidance can also be an excuse to not make pro-environmental choices. Avoiding information about the environmental impact a product or service has leaves room for behaving selfishly. In a laboratory experiment by Momsen and Ohndorf (2020), 17 per cent of participants avoided such information even when it was costless. d'Adda et al. (2018) also found such exploitation of moral wiggle room with air conditioning usage. This avoidance became stronger during their online field experiment when behavioural change became more costly due to higher temperatures. This effect is also seen in other contexts (van der Weele et al., 2014). Furthermore, this form of information avoidance is identified when people do choose pro-environmental products and services. A laboratory experiment by Momsen and Ohndorf (2022) found that participants exploited moral wiggle room to buy cheaper eco-labelled products. This information avoidance can also be socially organised. Economies tied to oil production, collectively avoid environmental information to abdicate responsibility (Norgaard, 2006b).

### **2.3.1 Moral Comparison Interventions**

Moral comparison interventions belong to the social norms category. There are two kinds of social norms: descriptive and injunctive. Descriptive norms state the behaviour of social others to influence the behaviour of people. These have proven to be effective for pro-environmental behaviour (Abrahamse & Steg, 2013; Cialdini & Jacobson, 2021; Farrow et al., 2017). Goldstein et al. (2008) conducted two field experiments to investigate this effect on towel reuse. Hanging signs in hotel rooms with the message that the majority of guests reuse their towels resulted in a 44 per cent higher towel reuse rate. Also stating that others in the same hotel room portrayed this behaviour was most effective. In that way, the described behaviour of others is in a setting most closely to the individuals' current situational circumstances. This experiment however, used a fake percentage of other people reusing their towels on the social norm signs. Moral and reputational issues of social norm interventions can be a consequence of such design (Bicchieri & Dimant, 2022). Descriptive norms can cause another problem. Because these norms only display the behaviour of others, people want to conform to that. This can therefore also be an unwanted change of behaviour, and therefore a boomerang effect may occur. The cause of this is the bandwagon effect, in which people express behaviour primarily because

other people are doing it. To do this, own beliefs are ignored or changed if needed (Frederiks et al., 2015).

Injunctive norms state what is socially approved. These do not have this boomerang effect. The current state of the behaviour of others does not matter, only what ought to be the behaviour (Cialdini et al., 1991). Schultz et al. (2007) found that adding an injunctive norm to a descriptive norm resolved the boomerang effect. However, there was no evidence found for this by a natural field experiment with a much larger sample size of 600,000 households (Allcott, 2011). Bhanot (2021) ran a field experiment in California with over 40,000 households only using an injunctive norm. He found a positive effect on pro-environmental behaviour.

Moral comparison interventions use the behaviour of others like descriptive norms, however, also compare it to the behaviour of oneself. These comparisons are often used to establish pro-environmental behaviour by sending data reports to households comparing their consumption behaviour to others. There is a vast body of research examining the effects of moral comparison. The U.S. company OPOWER sent out home energy reports to hundreds of thousands of households during several natural field experiments. Allcott (2011) used their data and found a 2 per cent reduction in energy consumption because of the moral comparison. This effect was equivalent to a short-run electricity price increase of 11 to 20 per cent. Allcott and Rogers (2014) later investigated this for the longest-running experiment. They found that discontinuing the moral comparison reports after 2 years did not have a large effect on energy consumption. Moreover, people still changed their behaviour after repeated treatment for 2 years. Contrary, an experiment by Andor et al. (2020) found a rather smaller effect of 0.7 per cent. The paper investigated the effectiveness of home energy reports in other industrialised countries than the U.S. Since U.S. electricity consumption levels are relatively high, the reports would only be cost-effective in these other countries if the treatment effects are much larger. This positive effect of the interventions was also seen in other domains. Ferraro and Price (2013) found a 5.6 per cent reduction in water consumption after one month of the intervention. This short-run effect was even to an average water price increase of 12 to 15 per cent. Ayres et al. (2013) found the comparison to work for reducing natural gas consumption. The moral comparison interventions seem to have a lasting effect. This is for the reason that the comparison may promote durable conservation investments next to behavioural adjustments (Ferraro et al., 2011).

Nonetheless, some studies found the moral comparison interventions not to have the desired effect (Fischer, 2008; Karlin et al., 2015; Kurz et al., 2005). Moreover, a negative effect on other behaviours than that was presented in the comparison. Tiefenbeck et al. (2013) found

that although the comparison of water consumption lowered water consumption by 6 per cent, electricity consumption was increased by 5.6 per cent. However, overall, there is a positive effect found by reviews and meta-analyses. A review of 44 studies by Andor and Fels (2018) stated that a vast majority found significant reductions in consumption ranging between 1.2 and 30 per cent. Bergquist et al. (2023) conducted a second-order meta-analysis, assessing 10 meta-analyses, and found an effect size of 0.12.

Altogether, research has found that environmental information is avoided for several reasons. People do see themselves as moral, want to seem moral, and prefer downward moral comparison over upward. Therefore, I expect people to be less willing to avoid information that could be used to seem moral when they anticipate that their morality will be compared. This results in my first hypothesis:

*H1: Anticipated moral comparison decreases information avoidance in environmental choices.*

In addition, there is a vast literature on the effectiveness of moral comparison interventions on pro-environmental behaviour. People want to conform to the norms and behave morally. In my experiment choices are only measured when participants anticipate the moral comparison. Not after the comparison has taken place, as with all other studies. I expect that this will have the same effect since beliefs about future states are important for current behaviour. This results in my second hypothesis:

*H2: Anticipated moral comparison increases pro-environmental choices.*

### **3. Methods**

I tested the influence anticipated moral comparison has on the negative effects of information avoidance in environmental choices. This was done via an online survey experiment. Before starting to collect the data, I completed the ethical thesis check and received approval.

#### **3.1 Experimental Design**

I investigated this through a between-subject randomised controlled trial design. The treatment, Anticipated Moral Comparison, was used as the independent variable. I first ran a pilot survey to obtain data for a ranking list to establish this comparison in the main survey. The surveys



were constructed with Qualtrics. Two outcomes, Information Avoidance and Environmental Score, were used separately as dependent variables. The randomisation process was done by Qualtrics, assigning half of the participants randomly to the treatment group and half to the control group.

GPower was used to calculate the minimum sample size to see an effect. Starting with the first hypothesis, stating that anticipated moral comparison decreases environmental information avoidance. For this hypothesis the Fisher's Exact test was used, wherefore 2 proportions for the control and treatment group that would avoid information were needed. I expected that 40 per cent of the control group and 30 per cent of the treatment group would avoid the environmental information. This was based on 2 papers. Reisch et al. (2021) found that almost 60 per cent of people avoided information about their environmental footprint of overall consumption. Also, Momsen and Ohndorf (2020) found that 17 per cent of people avoided information in a green market setting when revealing the information was costless. In my study, the information is not so extreme as to tell anything about someone's exact footprint of overall consumption. This means less anticipation of possible negative thoughts, feelings and emotions. Therefore, I expected a somewhat lower percentage for the control group, that lies between the 2 papers, of 40. I expected the comparison effect to go against this information avoidance. Therefore, 30 per cent of the participants in the treatment group were expected to avoid the environmental information. This resulted in a total sample size of 750, meaning 375 participants for both the control and treatment group.

Following, the second hypothesis, stating that anticipated moral comparison increases the number of pro-environmental choices made. For this hypothesis, the Mann-Whitney U test was used, which needed an effect size as input for the sample size calculation. The second-order meta-analysis by Bergquist et al. (2023) stated an effect size of 0.12. This was calculated over 199 studies testing the effect comparison has on pro-environmental behaviour. My study is somewhat different. Participants do not show behaviour, only intentions. Evidence shows an intention-behaviour gap is present in pro-environmental consumption (Hassan et al., 2016). This gap would be present for both the control and treatment group. However, I expected it to be larger for the treatment group anticipating moral comparison due to the extra motivation to portray themselves as moral. Moreover, participants in the treatment group may not even have the intention to portray pro-environmental behaviour. They may just choose the pro-environmental options to again seem moral. Therefore, I assumed a somewhat larger effect size of 0.2. This resulted in a total sample size of 824, meaning 412 participants for both the control

and treatment group. Further details on the input and output of the sample size calculations in GPower are presented in Appendix A.

The participants were recruited via my network. Distribution of the survey was done through a post on LinkedIn, Facebook, Instagram, and texts via WhatsApp. People under the age of 18 could not participate in the experiment. This was done due to ethical concerns with minors. In total 190 participants opened and started the survey. From that number, 20 observations were excluded since they failed to finish the survey. Next to that, 4 participants did not pass a control question to see if they were still paying attention. This comes down to a final sample for the hypotheses of 166 participants, 82 in the control group and 84 in the treatment group. I excluded another 20 observations to see the impact of the demographic variables on the dependent variables. This was done since they preferred to not state their household income. The survey took them all approximately 6 minutes and no compensation was given.

In this experiment, several variables were tested. The first one is the binary variable Information Avoidance. Participants could choose to obtain or not obtain environmental information in the survey. Not obtaining it was considered as avoiding the information.

The second one is the discrete variable Environmental Score. Participants needed to answer 8 questions involving 2 options with unequal pollution on the environment. Choosing the one with lower environmental pollution resulted in one additional point for the overall score. Therefore, the possible scores were between 0 and 8.

Next to that, I used the binary variable Anticipated Moral Comparison. This variable portrayed if someone belonged to the control or treatment group. The ones knowing to see themselves on the ranking list at the end of the experiment were in the treatment group. The ones not experiencing this were in the control group.

Additionally, I used the nominal variable Informational Reason. This tested the reason for avoiding or not avoiding the environmental information. Three possible reasons were already options to choose from and participants could also come up with other reasons themselves. The already stated reasons for obtaining the environmental information were curiosity, to make pro-environmental choices during the survey, and to behave pro-environmental after the survey. For avoiding the environmental information, the presented reasons were to minimise the time needed to fill in the survey, to have no foreseen influence on the choices made, and to make the choices without additional information about the environmental pollution. Participants could choose multiple answers.

Also, I tested the ordinal variable Environmental Awareness. Participants needed to indicate the level of agreement to 2 statements on this using a 5-point Likert Scale with answers ranging from strongly disagree to strongly agree. The first one stated the importance to the participant of environmental pollution when buying a new product or service. The second one stated that humans play a part in climate change.

Lastly, the participants were asked about their Age, Gender, Education, and Household Income. Age is a continuous variable. Gender is a nominal variable with three categories: male, female and other. Education is an ordinal variable divided into several levels. Stating the options for no diploma, primary, secondary, secondary vocational, bachelor, master, and PhD as levels of highest degree obtained. To run the Logistic and Multiple linear regression, I grouped the observations into three levels of education. This resulted in 3 new categories: little, middle, and high education. No diploma, primary, and secondary observations belong to the little category. Secondary vocational and bachelor observations are part of the middle category. The high category consists of master's and PhD observations. In that way, the categories consist of enough observations to make meaningful interpretations. The ordinal variable Household Income was measured as the total gross income of all members of the household per month. Participants were given the option to state their Household Income in steps of 3,000 euros. The options started with up to 3,000 euros and ended with more than 12,000 euros. Participants could also choose to prefer not to say.

### **3.2 Procedure**

I first asked 9 individuals to participate in the pilot survey that followed the path of the control group. With their obtained Environmental Score, I could make possible ranking lists the participants in the treatment group of the main survey could see. These 9 individuals were selected keeping in mind that variance in Age, Gender, Education, and Household Income was preferred. After finishing the ranking lists, I put the link to the main survey on different social media channels.

Before deciding to participate, individuals were given some information about my study. Stating I conduct my research on environmental choices. The participants had to agree that I could use their responses for my research and confirmed that they were 18 years or older. It was told that their answers were processed anonymously. Explicitly stating that neither I nor anyone else would know which answers the participant would give. This would help against social desirability bias.

After agreeing to the rules, the participants were randomly assigned to the control or treatment group. The treatment group got informed that the Environmental Score of the same coming choices made by others and themselves would be seen at the end in a ranking list. Comparing to a participant higher on the ranking list would be considered upward comparison and to a participant lower downward comparison. Garcia et al. (2013) stated that comparison concerns increase when a meaningful standard for comparison, such as a ranking is present. Also concerns increase when the number of others to compare with decreases. Therefore, I only used a ranking list with 9 others to compare with to establish the concerns that come with the comparison. I also included a percentage of participants having a lower Environmental Score, following prior social psychology work negatively highlighting how many people engage in more desirable behaviour (Schultz et al., 2007).

Proceeding, the participants were asked if they wanted to receive information on the environmental pollution of the coming choices. Falk and Zimmermann (2016) found that people are averse to piecemeal information. Therefore, I provided the information for all the coming choices at once to possibly increase attention. Next, the participants saw the environmental information or not. This also told them how much a person pollutes the environment by just breathing to give some perspective. After that, 8 questions on choices the participants would hypothetically choose. This amount of questions was chosen to obtain enough information and limit the chance of not getting enough usable responses. It has been found that people on average take less time to answer a question when the amount of questions increases. Moreover, when the duration of online surveys increases the chance of people not participating or finishing also increases (Galesic & Bosnjak, 2009). The hypothetical questions belonged to 5 categories following the paper on social norms and pro-environmental behaviour by Cialdini and Jacobson (2021). These were consumer choices, recycling, food choices, energy conservation, and water conservation. Every time one option was less environmentally pollutive than the other. Following, participants that chose to obtain the environmental information were redirected to a question about why they did that. Participants that avoided the environmental information saw a different question also asking about the reasons behind this. Then two questions were presented asking about environmental awareness. These questions were included to test the influence of environmental beliefs on the hypothetical choices, following the paper by Thunström et al. (2014). Investigating the correlation between Environmental Awareness and Environmental Score allows arguing if people answered according to their beliefs. After that, 4 demographic questions were asked considering age, gender, educational level, and household income. I put these questions at the end to give an even higher sense of anonymity during the

environmental choices part. Bourque and Fielder (2002) portrayed that many respondents consider demographic topics as highly personal, therefore beginning with these reduces the chance of completion of the survey. Lastly, the treatment group saw a ranking list with their score and of others. Also displaying which percentage of participants made less pollutive choices. After completing the survey, participants were thanked for participating and informed that questions could be sent to my email. The complete survey layout can also be seen in Appendix B.

### **3.3 Analysis**

All statistical analyses were conducted in Rstudio. To see if randomisation was done correctly, I first conducted balance tests. A Mann-Whitney U test was performed with Anticipated Moral Comparison and Age, as the latter is a continuous variable, to see the difference in distributions between the control and treatment group. I visually checked, through frequency histograms, for balance in Gender, Education, and Household Income. I also conducted a Kolmogorov-Smirnov test for normality. This normality test was chosen as my sample size is above 50 (Mishra et al., 2019). For the first hypothesis, a two-sided Fisher's Exact test was used since my data is nominal. For this test, observations should be independent and samples random. This is established in my experiment. Moreover, the levels of the variables should be mutually exclusive, which is the case for the Anticipated Moral Comparison and Information Avoidance variables. With this test, the difference in the distribution of Information Avoidance between the control and treatment group could be tested. I conducted a two-sided Mann-Whitney U test for the second hypothesis since my data is on the interval scale and my experimental design between-subject. For this test, again observations should be independent and samples random. With this test, the difference in the distribution of Environmental Score between the control and treatment group could be tested. Next to that, I investigated the effect of demographic variables on Information Avoidance and Environmental Score by conducting regression tests. A Logistic regression test for Information Avoidance as this is a binary variable and a Multiple linear regression test for Environmental Score as this is a discrete variable. In addition, I calculated Spearman's rank correlation coefficient to test the effect of environmental beliefs on the number of pro-environmental choices. The Environmental Awareness variable is measured at an ordinal level, which suits this test.

## 4. Results

The final sample, used to test the hypotheses, consisted of 166 participants. Table 4.1 shows the descriptive statistics of Age by group. The ages of the participants ranged from 18 to 81. Tables 4.2, 4.3, and 4.4 illustrate the frequencies of Gender, Education, and Household Income by group. Of the final sample, 42.2 per cent were male, 57.2 per cent female, and 0.6 per cent identified with an other gender. All participants did have a diploma. Next to that, 82.5 per cent of the participants proceeded with their education after secondary school. Of them, 15.7 per cent also continued to get a master's degree or PhD. Most participants had a household income lower than or equivalent to 3,000 euros per month. Only 18 stated to earn more than 12,000 euros per month as a household. A summary of these variables for the participants of the pilot survey is shown in Appendix C.

Table 4.1: Descriptive Statistics Age

<b>Statistic</b>	<b>Control</b>					<b>Treatment</b>				
	<b>N</b>	<b>Mean</b>	<b>St. Dev.</b>	<b>Min</b>	<b>Max</b>	<b>N</b>	<b>Mean</b>	<b>St. Dev.</b>	<b>Min</b>	<b>Max</b>
Age	82	34.73	15.44	18	76	84	34.82	15.79	18	81

Table 4.2: Frequencies of Gender

<b>Gender</b>	<b>Control</b>		<b>Treatment</b>	
	<b>Frequency</b>	<b>Per cent</b>	<b>Frequency</b>	<b>Per cent</b>
Male	34	41.46	36	42.86
Female	47	57.32	48	57.14
Other	1	1.22	0	0.00
Total	82	100.00	84	100.00

Table 4.3: Frequencies of Education

<b>Education</b>	<b>Control</b>		<b>Treatment</b>	
	Frequency	Per cent	Frequency	Per cent
No degree	0	0.00	0	0.00
Primary education	2	2.44	0	0.00
Secondary education	14	17.07	13	15.48
Secondary vocational education	19	23.17	20	23.81
Bachelor's degree	32	39.02	40	47.62
Master's degree	15	18.29	9	10.71
PhD	0	0.00	2	2.38
<b>Total</b>	<b>82</b>	<b>100.00</b>	<b>84</b>	<b>100.00</b>

Table 4.4: Frequencies of Household Income

<b>Household Income (€)</b>	<b>Control</b>		<b>Treatment</b>	
	Frequency	Per cent	Frequency	Per cent
0 – 3,000	25	30.49	19	22.62
3,001 – 6,000	22	26.83	16	19.05
6,001 – 9,000	9	10.98	17	20.24
9,001 – 12,000	9	10.98	11	13.10
> 12,000	5	6.10	13	15.48
Prefer not to say	12	14.63	8	9.52
<b>Total</b>	<b>82</b>	<b>100.00</b>	<b>84</b>	<b>100.00</b>

There were no outliers present in my data. This is visually illustrated for Age in Appendix D. To see if randomisation was done correctly, the balance of the demographics between the control and treatment group was tested. A Mann-Whitney U test was performed with Anticipated Moral Comparison and Age, since this is a continuous variable. Participants of the control and treatment group did not significantly differ in age,  $U = 3534$ ,  $p = .772$ . As seen the result of the Mann-Whitney U test is statistically insignificant at the 5% level. Therefore, the null hypothesis stating that the distribution of age is the same between participants who

anticipated moral comparison and participants who did not cannot be rejected. To see if Gender, Education, and Household Income are balanced, I used visualisation. The histograms with the frequencies of the variables are shown in Appendix E. It can be seen that the distributions of the frequencies are alike. This suggests that the observable characteristics were balanced between the groups. Therefore, I also assume that the unobservable characteristics are balanced and that randomisation was executed correctly.

Next to that, I ran a Kolmogorov-Smirnov test for normality for the control and treatment group for the dependent variable Environmental Score. The results of the Kolmogorov-Smirnov tests for Environmental Score are statistically significant at the 1% level for the control,  $D = 0.94$ ,  $p < .001$ , and treatment group,  $D = 0.95$ ,  $p < .001$ . Therefore, the null hypothesis stating that the distributions of the data follow a normal distribution can be rejected. Additionally, an illustration of the distribution is presented in Appendix F. Normality cannot be assumed. For that reason, I used non-parametric tests for my hypotheses.

#### **4.1 Hypothesis 1**

To test whether anticipating moral comparison decreased avoidance of environmental information, a two-sided Fisher's Exact test was run. The test was performed with the control group of 82 observations and the treatment group of 84 observations. Figure 4.1 illustrates the distribution of Information Avoidance by group. Overall 85 participants avoided the environmental information, of which 44 anticipated moral comparison and 41 did not. This accounts for 50% of the control group and 52% of the treatment group, which is a small change in the opposite direction of what I expected. The difference in the distribution of information avoidance in the treatment group compared to the control group is statistically insignificant at the 5% level ( $p = .877$ ). This means that there is no significant difference in the number of participants choosing to avoid environmental information when anticipating moral comparison compared to not anticipating this. The null hypothesis, stating that the distribution of information avoidance between the control and treatment group is the same, cannot be rejected. Therefore, there is no evidence found to support the first hypothesis.



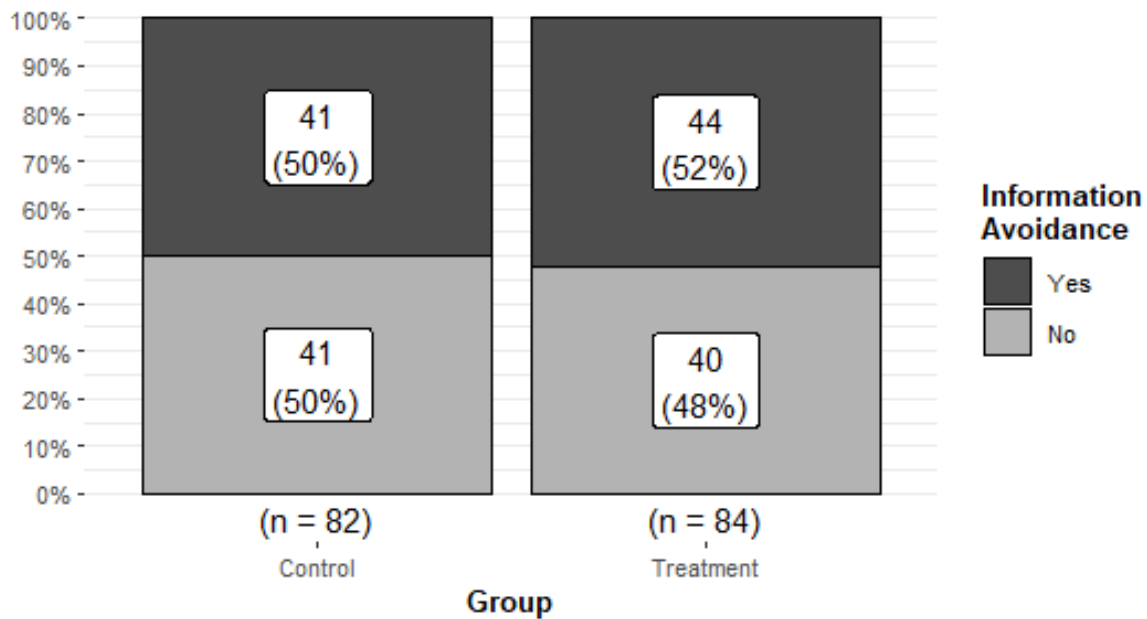


Figure 4.1: Bar Chart of the Distribution of Information Avoidance

#### 4.2 Hypothesis 2

To test whether anticipating moral comparison increased the number of pro-environmental choices, a two-sided Mann-Whitney U test was conducted. The test was performed with the control group of 82 observations and the treatment group of 84 observations. Figure 4.2 illustrates the distribution of Environmental Score by group. The mean Environmental Score of the participants was 4.27 ( $SD = 1.56$ ), for the group anticipating moral comparison it was 4.33 ( $SD = 1.62$ ) and for the group not anticipating this, it was 4.21 ( $SD = 1.50$ ). This is a slight increase in the direction of the treatment group as expected. The difference in the distribution of environmental scores in the treatment group compared to the control group is statistically insignificant at the 5% level,  $U = 3328.5$ ,  $p = .705$ . This means that there is no significant difference in the number of pro-environmental choices when anticipating moral comparison compared to not anticipating this. The null hypothesis, stating that the distribution of environmental scores between the control and treatment group is the same, cannot be rejected. Therefore, there is no evidence found to support the second hypothesis.

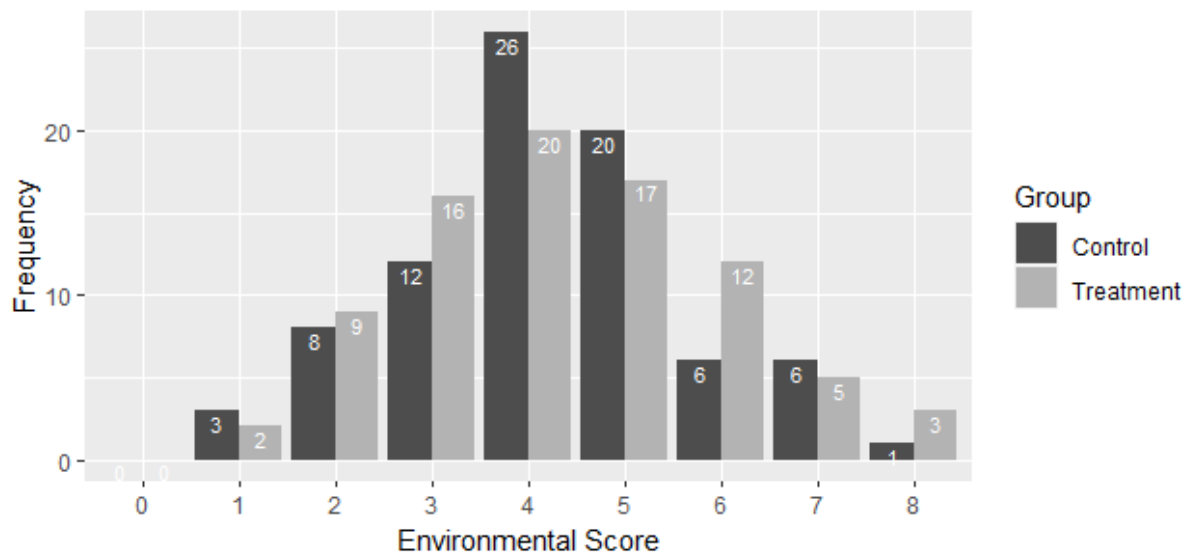


Figure 4.2: Histogram of the Distribution of Environmental Score

### 4.3 Additional Analysis

#### 4.3.1 Impact of Demographics

Next to testing the hypotheses, I investigated the impact Age, Gender, Education, and Household Income had on Information Avoidance and Environmental Score. First I ran a Logistic regression test to see the effect on Information Avoidance. For this, I excluded 20 observations from the sample, since they preferred to not state their household income. I assumed that participants who did not want to disclose their income were not likely to systematically differ in Information Avoidance compared to ones who did disclose this. Therefore, I used 146 observations for this test. The outcome of the test is displayed in Table 4.5. There were no observations left identifying with an other gender in this sample due to the exclusion of the 20 observations. Also, There were no participants without a diploma in the initial sample of 166 observations. I grouped the observations for Education into 3 categories to have a higher number of observations per category. In that way, more meaningful interpretations could be made. This was done because there were only 2 observations in both the primary education and PhD category. Table G.1 in Appendix G shows the Logistic regression results with the maintained 166 observations as a robustness check. It is seen that the results do not differ substantially.

Table 4.5: Logistic regression Information Avoidance

	<i>Dependent variable:</i>
	Information Avoidance
Age	0.019 (0.012)
Gender: Female	-0.541 (0.358)
Education: Middle	-0.810* (0.477)
Education: High	-1.416** (0.625)
Household Income: 3,001 - 6,000 euros	0.145 (0.490)
Household Income: 6,001 - 9,000 euros	0.828 (0.533)
Household Income: 9,001 - 12,000 euros	0.331 (0.566)
Household Income: More than 12,000 euros	0.082 (0.601)
Constant	0.207 (0.620)
Observations	146
Log Likelihood	-94.997
Akaike Inf. Crit.	207.995

*Note:* standard errors in parentheses. Information Avoidance can have values 0 or 1. The reference category for Gender is Male, for Education is Little, and for Household Income is 0 - 3,000 euros. Education: Little consists of primary and secondary, Middle of secondary vocational and bachelor, and High of master and PhD. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$

One additional year of age does not significantly change the probability of avoiding environmental information. Moreover, being a female does not significantly change the probability of avoiding environmental information compared to being a male. Next to that, having finished secondary vocational education or a bachelor's degree does not significantly change the probability of environmental information avoidance, compared to only having finished primary or secondary education. Also, earning a level of monthly household income above 3,000 euros does not lead to significant changes in the probability of avoiding environmental information compared to earning up to 3,000 euros. People having obtained a

master's degree or PhD compared to those having primary or secondary school as the highest level of education show a significantly lower probability of avoiding environmental information. The magnitude of this effect in Table 4.5 cannot be interpreted. Therefore, I used the average marginal effects to interpret the results from the Logistic regression test. The results are shown in Table 4.6. On average, having obtained a master's degree or PhD decreases the probability of environmental information avoidance by 32.2 percentage points, compared to only having completed primary or secondary education. This effect is statistically significant at the 5% level. High education displays a significant relationship with Information Avoidance. Therefore, I can reject the null hypothesis, stating that there is no statistically significant relationship between the variables and Information Avoidance.

Table 4.6: Average Marginal Effects Information Avoidance

	AME	SE	z	p	Lower	Upper
Age	0.004	0.003	1.658	.097	-0.001	0.010
Gender: Female	-0.125	0.082	-1.531	.126	-0.286	0.035
Education: Middle	-0.183	0.101	-1.808	.071	-0.382	0.015
Education: High	-0.322	0.131	-2.458	.014	-0.579	-0.065
Household Income: 3,001 - 6,000 euros	0.034	0.114	0.295	.768	-0.189	0.256
Household Income: 6,001 - 9,000 euros	0.189	0.118	1.604	.109	-0.042	0.420
Household Income: 9,001 - 12,000 euros	0.077	0.131	0.586	.558	-0.180	0.333
Household Income: More than 12,000 euros	0.019	0.139	0.135	.892	-0.254	0.291

*Note:* AME: Average marginal effect, SE: standard error, z: z-statistic, p: p-value, Lower: lower bound 95% CI, Upper: upper bound 95% CI. The reference category for Gender is Male, for Education is Little, and for Household Income is 0 - 3,000 euros. Education: Little consists of primary and secondary, Middle of secondary vocational and bachelor, and High of master and PhD.

Additionally, I ran a Multiple linear regression test to investigate the effect of the demographics on the Environmental Score. I again excluded the 20 observations that did not disclose their household income. I assumed that participants who did not want to disclose their income were not likely to systematically differ on Environmental Score compared to ones who did disclose this. Therefore, I used 146 observations for this test. The observations of Education were again

grouped into 3 categories. Environmental Score does not follow a normal distribution as the Kolmogorov-Smirnov test portrays. This is a caveat, which concerns the Multiple linear regression results. However, this concern is small as the distribution is not far from normal as illustrated in Appendix F. Table 4.7 shows the test results. An additional year of age increases the number of pro-environmental choices by 0.027. This effect is statistically significant at the 1% level. It counts as less than 1 extra pro-environmental choice out of 8 choices per year of ageing. Furthermore, being a female increases the number of pro-environmental choices by 0.525 compared to being a male. This effect is statistically significant at the 5% level. It also counts as less than 1 pro-environmental choice more out of 8 choices for females compared to males. These small individual changes can have a large effect on big populations.

Next to that, having finished secondary vocational education or a bachelor's degree does not significantly change the number of pro-environmental choices made, compared to only having completed primary or secondary education. Having obtained a master's degree or PhD increases the number of pro-environmental choices by 1.203, compared to only having completed primary or secondary education. The effect is statistically significant at the 1% level. This implies more than 1 extra pro-environmental choice for highly-educated people compared to little-educated people. Overall this can have a vast impact on the environmental pollution of a population. Earning a level of monthly household income above 3,000 euros does not lead to significant changes in the number of pro-environmental choices made compared to earning up to 3,000 euros. I can reject the null hypothesis, stating that none of the variables has a statistically significant relationship with Environmental Score. Table G.2 in Appendix G shows the Multiple linear regression results with the maintained 166 observations as a robustness check. It is seen that the results do not differ substantially.

Table 4.7: Multiple Linear Regression Environmental Score

	<i>Dependent variable:</i>
	Environmental Score
Age	0.027*** (0.008)
Gender: Female	0.525** (0.257)
Education: Middle	0.455 (0.330)
Education: High	1.203*** (0.432)
Household Income: 3,001 - 6,000 euros	-0.239 (0.352)
Household Income: 6,001 - 9,000 euros	-0.708* (0.378)
Household Income: 9,001 - 12,000 euros	-0.176 (0.409)
Household Income: More than 12,000 euros	-0.476 (0.432)
Constant	2.832*** (0.442)
Observations	146
R <sup>2</sup>	0.161
Adjusted R <sup>2</sup>	0.112
Residual Std. Error	1.499 (df = 137)
F Statistic	3.295*** (df = 8; 137)

*Note:* standard errors in parentheses. Environmental Score can have values 0 to 8. The reference category for Gender is Male, for Education is Little, and for Household Income is 0 - 3,000 euros. Education: Little consists of primary and secondary, Middle of secondary vocational and bachelor, and High of master and PhD. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

#### 4.3.2 Reasons for Avoiding and Obtaining Information

The participants also needed to state their reasons for avoiding the environmental information or not. Participants had the opportunity to give multiple answers and other answers than the 3 answers that already were presented. Out of the 85 participants who avoided the environmental information 24 said this was due to saving time during the survey. Moreover, 49 participants did not see the need for the environmental information as their choices would not have been

influenced by it. Also, 24 participants wanted to make the environmental choices without having added information about the negative consequences for the environment. In addition, 4 participants gave a not presented reason which stated that they already possessed the knowledge that would have been presented. Of the participants, one gave the not presented reason for wanting to answer based on how one would have done with current knowledge.

Out of 81 participants who obtained the environmental information 72 said to be curious. Of the participants, 15 wanted to use the information to make more pro-environmental choices during the survey. Somewhat more, 23, wanted to use the information to make more pro-environmental choices after the survey. Next to this, 2 participants gave the not presented answer of wanting to have more information about the upcoming choices in general. Also, 2 participants wanted to see where their current behaviour was in terms of pro-environmental choices.

### **4.3.3 Environmental Beliefs**

To test the influence beliefs about the environment had on the number of pro-environmental choices, I calculated Spearman's rank correlation coefficient between Environmental Awareness and Environmental Score. I asked the participants a question if they agreed on the importance of environmental pollution when buying a new product or service. Also, I asked the participants if they agreed that humans contribute to climate change. These questions could be answered on a 5-point Likert Scale of agreeableness. I calculated the coefficient for the answers given to these questions separately and combined. Therefore, obtaining 3 Spearman's rank correlation coefficients. I found a significant positive correlation between the perceived importance of environmental pollution and Environmental Score,  $r = .34, p < .001$ . Next to that, I found a significant positive correlation between the perceived contribution of humans to climate change and Environmental Score,  $r = .17, p = .024$ . Consequently, I found a significant positive correlation between the combination of the answers and Environmental Score,  $r = .33, p < .001$ . This states that people with a higher Environmental Awareness also had a higher Environmental Score. The relationship between the variables is only moderate. People's environmental beliefs influence the number of hypothetical pro-environmental choices they make.

## 5. Discussion

In this experiment, I tested the influence anticipated moral comparison has on avoiding environmental information. This information was about the environmental pollution of hypothetical choices between two options participants had to make. Moreover, I tested the effect this knowledge of future moral comparison has on the number of pro-environmental choices made. With every choice, the two options were unequal in the level of environmental pollution. The data illustrates the following findings. First, the results indicate that 51.2 per cent of participants avoided environmental information. Anticipating moral comparison has not been found to affect the decision to avoid the environmental information. Knowing to get information on how others did in terms of pro-environmental choices compared to oneself does not change the perceived need for environmental information. Second, on average 53.4 per cent of the choices made by the participants were pro-environmental. Anticipation of moral comparison has not been found to have an effect on the number of pro-environmental choices people made. Being informed on future moral comparison has no consequence of altering the environmental choices people make.

The data does not support what was hypothesised in this study. For the first hypothesis, I assumed the tendencies of people to avoid environmental information to be decreased by the anticipated moral comparison. However, there was no evidence found supporting this. This contradicts the existing literature on moral comparison. Fleischmann et al. (2021) found that people want to present themselves as moral and therefore avoid upward comparison. Avoiding environmental information does not help to establish this. In my study, morality is not found to be as important as in other literature (Landy et al., 2016; Strohminger & Nichols, 2014). Participants did not overrule other motives to avoid environmental information due to the perceived importance of seeming moral.

Anticipation of moral comparison was insufficient to go against the keeping away from negativity and strategically driven causes of environmental information avoidance. This can have several possible reasons. Potentially, participants did not take the time to really think about what the comparison would entail. Therefore, people possibly did not process the information completely until after the environmental choices. It could also be that the future moral comparison did not feel real enough in this online setting to establish the expected effect. Moreover, participants may evaluate their current behaviour towards pro-environmental choices compared to other people positively. If this does not involve obtaining additional



environmental information, they probably maintain this behavioural pattern. Next to that, focused goal-oriented behaviour has the consequence of incapacity to observe information that is right in front (Poli, 2010). Therefore, the perceived need for environmental information to avoid upward comparison may be lower in my experiment as participants were focused on the upcoming choices and ranking list.

For the second hypothesis, I assumed that anticipating moral comparison would result in making more pro-environmental choices. The data did not align with this. It also is not in line with most studies using moral comparison interventions to increase pro-environmental behaviour. The second-order meta-analysis by Bergquist et al. (2023) found these interventions overall to be effective.

This difference may be because in this study the participants only anticipated moral comparison. Choices were not measured after the comparison, as with previous studies. However, there is no current literature on this anticipation of moral comparison. Additionally, most previous studies used neighbourhoods to conduct their tests. The diagnosticity principle states that upward moral comparisons are threatening when the other person is close or similar. Although this principle is reduced in the moral domain, neighbourhood members may be perceived as closer and more similar than anonymous participants in an online experiment (Fleischmann et al., 2021). Therefore, the feeling to avoid upward comparison could have been diminished.

Next to that, age and gender had no significant effect on the probability of avoiding environmental information. This result for age is not in line with prior research. Studies found that older people avoid more information than younger people before making decisions (Deng et al., 2023). Older people have obtained more information during their lifetime. The perceived need for additional information may therefore decrease. Moreover, the insignificant effect of gender goes against the results of Reisch et al. (2021), who found men have a higher tendency to avoid information. This is for instance seen with health information since men have lower health risk perceptions than women (Dryhurst et al., 2020). Contrary, Ho et al. (2021) did find gender to have no impact on information avoidance. They also found education not to have any influence. This was also the case in my data for middle-level educated people, compared to little-educated people. However, a high level of education, compared to little education, did have a significant impact on average. Higher-educated people are generally more concerned about the environment (Gifford & Nilsson, 2014). Therefore, higher educational levels may result in a higher probability of obtaining environmental information. Ho et al. (2021) did not

find evidence for an effect of income on information avoidance, which is also the case in my study.

Ageing accounted for a significant increase in the number of pro-environmental choices. This is in line with the existing literature. Although most research shows that younger people are more environmentally concerned, older people exhibit more pro-environmental behaviour. This may be due to their better financial situation (Gifford & Nilsson, 2014). Being a female compared to a male also displayed a significant increase. They did not even count for 1 extra pro-environmental choice out of 8. However, in large populations, such small individual changes can make a big difference in total environmental pollution. Therefore, these results are also economically relevant. Prior research also found women to portray more pro-environmental behaviour. This may be due to the increased agreeableness of women. This personality trait has the consequence of placing more importance on environmental concerns (Gifford & Nilsson, 2014). Having a middle level of education, compared to little education, had no influence on the number of pro-environmental choices. Contrary, being highly educated, compared to little educated, did have a significant increase of more than 1 pro-environmental choice. Household income did not have any impact on the number of pro-environmental choices. These results partly go against the existing literature. Education is found to increase pro-environmental behaviour in prior literature. Obtaining environmental information through education results in higher concern and knowledge on how to tackle the problem (Gifford & Nilsson, 2014). Welsch and Kühling (2009) found higher earners to make more pro-environmental choices. This, however, may be for bigger investments, like solar panels. Making pro-environmental choices, like taking a short shower instead of a long bath, can also be for monetary reasons. Therefore, the effect of household income may vary between choices.

Additionally, more than half of the participants said that they avoided the environmental information as it would not have influenced their decision-making. A relevant share of people thinks that information about environmental pollution does not alter their choices. Previous literature has also found that having more environmental knowledge does not change pro-environmental behaviour (Bartiaux, 2008). Approximately one-quarter of the participants wanted to save time during the survey. This may also be in daily life where people value their time over the impact they can have by obtaining environmental information. About one quarter wanted to answer without added environmental information. This avoidance may be used to remain unaware of their environmental pollution to not feel guilty. However, it could also function as an excuse for not knowing about the environmental impact and behaving selfishly.

This effect of exploiting moral wiggle room has been found with environmental information (d'Adda et al., 2018).

Almost all participants who obtained the environmental information stated to be curious. This may be due to the fact that I distributed the survey in my network. Participants may have wanted to know what I put together out of personal interest. Around one-fifth of the participants wanted to make more pro-environmental choices during the survey. This suggests the preference of a part of the participants for downward comparison as portrayed by Fleischmann et al. (2021). Making more pro-environmental choices gets the participants higher up the ranking list, leaving more space to compare with others below them. Approximately a quarter wanted to extend their pro-environmental behaviour afterwards. When presented with environmental information a part of people may be interested to use it in real life. However, again it remains to be seen whether this also will be translated into behavioural change.

## **5.1 Limitations**

There are limitations that may have had an impact on my research. First, the number of observations obtained and the way of distributing the survey. The generalisability of the results is limited by a small sample size. Calculating the needed sample size resulted in a total of 750 participants to test the first hypothesis and 824 for the second hypothesis. The final sample, used to test the hypotheses, consisted of 166 participants. This is a large difference. The statistical power was lower than the sample size calculated. I had less information about the population, which decreases the precision of the test statistic. Therefore, I did not have sufficient power to extrapolate the results to the overall population (Faber & Fonseca, 2014). The participants that did take part in the online experiment may also not be completely representative of the population. I distributed the survey through my personal network. Almost all participants stated to be curious when being asked about the reason for obtaining the environmental information. This curiosity could have been caused by the fact the participants knew me. They possibly just wanted to get to know what I put together and therefore obtained the information. Therefore, the results might not be representative of the population. This would be different in a setting in which the experimenter and participant do not know each other.

In addition, hypothetical bias may be present in my data. I used hypothetical questions to elicit the pro-environmental scores of the participants. The answers to these questions can differ from the choices people would make in a field setting (Hausman, 2012). The meta-analysis by Murphy et al. (2005) found a ratio of hypothetical to actual value of willingness-to-

pay for a product of 1.35. Therefore, it can be that participants made more or less pro-environmental hypothetical choices than when the decisions would be made in real life.

The experimenter demand effect may also have affected the participants. They were aware that their data was being collected. By knowing this, participants may give different answers than in a field setting. Participants base their answers on the instructions that are provided (Zizzo, 2010). In this survey, it was explicitly told that participants making more pro-environmental choices would end up higher on the ranking list. Moreover, it was explicitly told that the information that could be obtained or avoided contained knowledge on the environmental pollution of choices. This obviousness of what the research is about gives that it might be possible for the participants to know what I wanted to test. Resulting in that answers may be biased towards that demand.

## **5.2 Future Research**

Future studies should use visualisation to portray upcoming moral comparison. I now only explained in the text that the participants would see themselves in a ranking list at the end. Giving a visualisation to this of a ranking list, or another way to establish the moral comparison, could increase the effect it has. Visual information draws more attention, communicates more information, and is better remembered compared to text (Adaval et al., 2018). In that way, the feeling of future moral comparison could be enhanced as it may be more clear what is going to be displayed at the end.

Future research should also test the effect of anticipated moral comparison in a field setting. Hypothetical bias and the experimenter demand effect should then not be present in the data. In that way, it can be seen how people behave. Moreover, it could be established that the moral comparison is done when people can actually also see each other. In my study participants only saw the data of the pilot survey. Experiencing the moral comparison in a setting where people are physically there potentially could increase the threat to people. This would possibly then increase the preference for downward moral comparison (Fleischmann et al., 2021).

Next to that, there is still a gap in the literature on the effect of moral comparison on information avoidance. In this study, I test this for the anticipation of moral comparison. However, the effect of moral comparison could be different. There are already studies looking at the effect of moral comparison on social information (Huang, 2018; Thunström et al., 2014). For this suggestion, the information should be about future choices people can make, as in this study. In that way, it can be seen if moral comparison can go against the avoidance of information that could help people with decision-making.

Moreover, evidence of the boomerang effect is found in several studies investigating the effect of descriptive norms. People want to conform to the behaviours of others. When told about the average behaviour, people initially acting in a more pro-environmental way may want to shift towards the average. Therefore, the pro-environmental behaviour gained for people below average is also lost for people above average (Cialdini et al., 1991). It should be investigated if this effect is also present with the anticipation of moral comparison. People would not know the exact average behaviour, as the moral comparison still has to take place. However, through lifelong experience and information obtained, people could have an idea of what most people would do. Therefore, they can make up the average in their mind and shift towards it. If this effect is found, it should also be tested if the anticipation of an added injunctive norm helps against it as found in the other descriptive norm studies (Schultz et al., 2007).

## **6. Conclusion**

This research aimed to identify whether anticipated moral comparison influences the negative effects of information avoidance in environmental choices. An online survey experiment with 166 participants involving environmental choices was conducted. It can be concluded that the knowledge of future moral comparison does not alter the choice of avoiding environmental information. Moreover, it does not influence the negative effect, which is making less pro-environmental choices. The results suggest that anticipating moral comparison does not offset the causes of environmental information avoidance. Also, that the desire for downward comparison is not big enough to obtain environmental information. Other participants in an online experiment are not perceived as a sufficient threat to change informational and pro-environmental preferences.

A high educational level decreases the tendency to avoid environmental information. However, a middle educational level does not have any effect. Age, gender, and household income also have no effect. Older people do display a higher number of pro-environmental choices. Also, females exhibit this effect on environmental choices compared to males. Although the increase in the number of pro-environmental choices is low on the individual level, it can have a big impact on populations. Next to that, being highly educated results in making more pro-environmental choices. Contrary, being middle educated does not influence the number of pro-environmental choices. A higher household income does not have the

consequence of making more pro-environmental choices. Additionally, there are different prominent reasons for avoiding or obtaining the environmental information. The environmental information is perceived as not influencing decisions, wherefore it is avoided. People do not take account of the environment or think they have obtained enough knowledge throughout their lives. Curiosity is stated as the number one reason for obtaining the environmental information. It is questioned if this curiosity would be found in a different setting where experimenter and participant do not know each other.

These results contribute to the existing environmental information avoidance literature by stating that anticipated moral comparison does not decrease avoidance. It contributes to the moral comparison literature by illustrating the influence of anticipating the comparison. Previous studies only tested behaviour after moral comparison took place and possibly another round of comparison was to come. This study portrays no effect, however, it raises the question if there would be an effect in different settings. Next to that, this study portrays a practical implication. Policymakers should be cautious with using anticipated moral comparison to decrease environmental information avoidance and increase pro-environmental behaviour. The results of studies using moral comparison cannot be adopted over situations in which only the anticipated form can be used. Therefore, it should be tested if the anticipated moral comparison interventions work in a specific setting. Having the knowledge to be compared to others in the future may not influence the avoidance of environmental information and pro-environmental behaviour.

## References

- Abelson, R. P. (1986). Beliefs Are Like Possessions. *Journal for the Theory of Social Behaviour*, 16(3), 223–250. <https://doi.org/10.1111/j.1468-5914.1986.tb00078.x>
- Abrahamse, W., & Steg, L. (2013). Social influence approaches to encourage resource conservation: A meta-analysis. *Global Environmental Change*, 23(6), 1773–1785. <https://doi.org/10.1016/j.gloenvcha.2013.07.029>
- Adaval, R., Saluja, G., & Jiang, Y. (2018). Seeing and thinking in pictures: A review of visual information processing. *Consumer Psychology Review*, arcp.1049. <https://doi.org/10.1002/arcp.1049>
- Allcott, H. (2011). Social norms and energy conservation. *Journal of Public Economics*, 95(9–10), 1082–1095. <https://doi.org/10.1016/j.jpubeco.2011.03.003>
- Allcott, H., & Rogers, T. (2014). The Short-Run and Long-Run Effects of Behavioral Interventions: Experimental Evidence from Energy Conservation. *American Economic Review*, 104(10), 3003–3037. <https://doi.org/10.1257/aer.104.10.3003>
- Andor, M. A., & Fels, K. M. (2018). Behavioral Economics and Energy Conservation – A Systematic Review of Non-price Interventions and Their Causal Effects. *Ecological Economics*, 148, 178–210. <https://doi.org/10.1016/j.ecolecon.2018.01.018>
- Andor, M. A., Gerster, A., Peters, J., & Schmidt, C. M. (2020). Social Norms and Energy Conservation Beyond the US. *Journal of Environmental Economics and Management*, 103, 102351. <https://doi.org/10.1016/j.jeem.2020.102351>
- Andrei, D., & Hasler, M. (2015). Investor Attention and Stock Market Volatility. *Review of Financial Studies*, 28(1), 33–72. <https://doi.org/10.1093/rfs/hhu059>
- Ayres, I., Raseman, S., & Shih, A. (2013). Evidence from Two Large Field Experiments that Peer Comparison Feedback Can Reduce Residential Energy Usage. *Journal of Law, Economics, and Organization*, 29(5), 992–1022. <https://doi.org/10.1093/jleo/ews020>
- Bartiaux, F. (2008). Does environmental information overcome practice compartmentalisation and change consumers' behaviours? *Journal of Cleaner Production*, 16(11), 1170–1180. <https://doi.org/10.1016/j.jclepro.2007.08.013>
- Bergquist, M., Thiel, M., Goldberg, M. H., & van der Linden, S. (2023). Field interventions for climate change mitigation behaviors: A second-order meta-analysis. *Proceedings of the National Academy of Sciences*, 120(13). <https://doi.org/10.1073/pnas.2214851120>

- Bhanot, S. P. (2021). Isolating the effect of injunctive norms on conservation behavior: New evidence from a field experiment in California. *Organizational Behavior and Human Decision Processes*, *163*, 30–42. <https://doi.org/10.1016/j.obhdp.2018.11.002>
- Bicchieri, C., & Dimant, E. (2022). Nudging with care: the risks and benefits of social information. *Public Choice*, *191*(3–4), 443–464. <https://doi.org/10.1007/s11127-019-00684-6>
- Blanton, H. (2013). Evaluating the self in the context of another: The three-selves model of social comparison assimilation and contrast. In *Cognitive social psychology* (pp. 79–91). Psychology Press.
- Boen, F., Vanbeselaere, N., & Feys, J. (2002). Behavioral Consequences of Fluctuating Group Success: An Internet Study of Soccer-Team Fans. *The Journal of Social Psychology*, *142*(6), 769–781. <https://doi.org/10.1080/00224540209603935>
- Bourque, L. B., & Fielder, E. P. (2002). *The survey kit: How to conduct self-administered and mail surveys* (3rd ed.). Sage Publications.
- Brunnermeier, M. K., & Parker, J. A. (2005). Optimal Expectations. *American Economic Review*, *95*(4), 1092–1118. <https://doi.org/10.1257/0002828054825493>
- Buunk, A. P., & Gibbons, F. X. (2007). Social comparison: The end of a theory and the emergence of a field. *Organizational Behavior and Human Decision Processes*, *102*(1), 3–21. <https://doi.org/10.1016/j.obhdp.2006.09.007>
- Caplin, A., & Leahy, J. (2001). Psychological Expected Utility Theory and Anticipatory Feelings. *The Quarterly Journal of Economics*, *116*(1), 55–79. <https://doi.org/10.1162/003355301556347>
- Carroll, P., Sweeny, K., & Shepperd, J. A. (2006). Forsaking Optimism. *Review of General Psychology*, *10*(1), 56–73. <https://doi.org/10.1037/1089-2680.10.1.56>
- Case, D. O., Andrews, J. E., Johnson, J. D., & Allard, S. L. (2005). Avoiding versus seeking: the relationship of information seeking to avoidance, blunting, coping, dissonance, and related concepts. *Journal of the Medical Library Association*, *93*(3), 353.
- Chater, N., & Loewenstein, G. (2016). The under-appreciated drive for sense-making. *Journal of Economic Behavior & Organization*, *126*, 137–154. <https://doi.org/10.1016/j.jebo.2015.10.016>
- Cialdini, R. B., & Jacobson, R. P. (2021). Influences of social norms on climate change-related behaviors. *Current Opinion in Behavioral Sciences*, *42*, 1–8. <https://doi.org/10.1016/j.cobeha.2021.01.005>



- Cialdini, R. B., Kallgren, C. A., & Reno, R. R. (1991). *A Focus Theory of Normative Conduct: A Theoretical Refinement and Reevaluation of the Role of Norms in Human Behavior* (pp. 201–234). [https://doi.org/10.1016/S0065-2601\(08\)60330-5](https://doi.org/10.1016/S0065-2601(08)60330-5)
- Cutler, S. J., & Hodgson, L. G. (2003). To test or not to test: Interest in genetic testing for Alzheimer's disease among middle-aged adults. *American Journal of Alzheimer's Disease & Other Dementias*, *18*(1), 9–20.
- d'Adda, G., Gao, Y., Golman, R., & Tavoni, M. (2018). *It's so hot in here: Information avoidance, moral wiggle room, and high air conditioning usage* (No. 1232).
- Dana, J., Cain, D. M., & Dawes, R. M. (2006). What you don't know won't hurt me: Costly (but quiet) exit in dictator games. *Organizational Behavior and Human Decision Processes*, *100*(2), 193–201. <https://doi.org/10.1016/j.obhdp.2005.10.001>
- Dana, J., Weber, R. A., & Kuang, J. X. (2007). Exploiting moral wiggle room: experiments demonstrating an illusory preference for fairness. *Economic Theory*, *33*(1), 67–80. <https://doi.org/10.1007/s00199-006-0153-z>
- Deng, S. L., Nolte, J., & Löckenhoff, C. E. (2023). Information Avoidance in Consumer Choice: Do Avoidance Tendencies and Motives Vary by Age? *Experimental Aging Research*, *49*(2), 112–129. <https://doi.org/10.1080/0361073X.2022.2051967>
- Dijkstra, P., Kuyper, H., van der Werf, G., Buunk, A. P., & van der Zee, Y. G. (2008). Social Comparison in the Classroom: A Review. *Review of Educational Research*, *78*(4), 828–879. <https://doi.org/10.3102/0034654308321210>
- Dryhurst, S., Schneider, C. R., Kerr, J., Freeman, A. L. J., Recchia, G., van der Bles, A. M., Spiegelhalter, D., & van der Linden, S. (2020). Risk perceptions of COVID-19 around the world. *Journal of Risk Research*, *23*(7–8), 994–1006. <https://doi.org/10.1080/13669877.2020.1758193>
- Ehrich, K. R. (2005). Willful ignorance in the request for product attribute information. *Irwin, J. R.*, *42*(3), 266–277.
- Epstein, L. G., & Zin, S. E. (1989). Substitution, risk aversion and the temporal behavior of consumption and asset returns: A theoretical framework. *Econometrica*, *57*(4), 937–969.
- Faber, J., & Fonseca, L. M. (2014). How sample size influences research outcomes. *Dental Press Journal of Orthodontics*, *19*(4), 27–29. <https://doi.org/10.1590/2176-9451.19.4.027-029.ebo>
- Falk, A., & Zimmermann, F. (2016). Beliefs and Utility: Experimental Evidence on Preferences for Information. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2851750>

- Farrow, K., Grolleau, G., & Ibanez, L. (2017). Social Norms and Pro-environmental Behavior: A Review of the Evidence. *Ecological Economics*, *140*, 1–13. <https://doi.org/10.1016/j.ecolecon.2017.04.017>
- Ferraro, P. J., Miranda, J. J., & Price, M. K. (2011). The Persistence of Treatment Effects with Norm-Based Policy Instruments: Evidence from a Randomized Environmental Policy Experiment. *American Economic Review*, *101*(3), 318–322. <https://doi.org/10.1257/aer.101.3.318>
- Ferraro, P. J., & Price, M. K. (2013). Using Nonpecuniary Strategies to Influence Behavior: Evidence from a Large-Scale Field Experiment. *Review of Economics and Statistics*, *95*(1), 64–73. [https://doi.org/10.1162/REST\\_a\\_00344](https://doi.org/10.1162/REST_a_00344)
- Ferrer, R. A., Taber, J. M., Klein, W. M. P., Harris, P. R., Lewis, K. L., & Biesecker, L. G. (2015). The role of current affect, anticipated affect and spontaneous self-affirmation in decisions to receive self-threatening genetic risk information. *Cognition and Emotion*, *29*(8), 1456–1465. <https://doi.org/10.1080/02699931.2014.985188>
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, *7*(2), 117–140.
- Festinger, L. (1962). *A theory of cognitive dissonance* (Vol. 2). Stanford university press.
- Fischer, C. (2008). Feedback on household electricity consumption: a tool for saving energy? *Energy Efficiency*, *1*(1), 79–104. <https://doi.org/10.1007/s12053-008-9009-7>
- Fleischmann, A., Lammers, J., Diel, K., Hofmann, W., & Galinsky, A. D. (2021). More threatening and more diagnostic: How moral comparisons differ from social comparisons. *Journal of Personality and Social Psychology*, *121*(5), 1057–1078. <https://doi.org/10.1037/pspi0000361>
- Frederiks, E. R., Stenner, K., & Hobman, E. V. (2015). Household energy use: Applying behavioural economics to understand consumer decision-making and behaviour. *Renewable and Sustainable Energy Reviews*, *41*, 1385–1394. <https://doi.org/10.1016/j.rser.2014.09.026>
- Frey, D., & Stahlberg, D. (1986). Frey, D., & Stahlberg, D. (1986). Selection of information after receiving more or less reliable self-threatening information. *Personality and Social Psychology Bulletin*, *12*(4), 434–441.
- Galai, D., & Sade, O. (2006). The “Ostrich Effect” and the Relationship between the Liquidity and the Yields of Financial Assets\*. *The Journal of Business*, *79*(5), 2741–2759. <https://doi.org/10.1086/505250>

- Galesic, M., & Bosnjak, M. (2009). Effects of Questionnaire Length on Participation and Indicators of Response Quality in a Web Survey. *Public Opinion Quarterly*, 73(2), 349–360. <https://doi.org/10.1093/poq/nfp031>
- Garcia, S. M., Tor, A., & Schiff, T. M. (2013). The Psychology of Competition. *Perspectives on Psychological Science*, 8(6), 634–650. <https://doi.org/10.1177/1745691613504114>
- Gerber, J. P., Wheeler, L., & Suls, J. (2018). A social comparison theory meta-analysis 60+ years on. *Psychological Bulletin*, 144(2), 177–197. <https://doi.org/10.1037/bul0000127>
- Gifford, R., & Nilsson, A. (2014). Personal and social factors that influence pro-environmental concern and behaviour: A review. *International Journal of Psychology*, n/a-n/a. <https://doi.org/10.1002/ijop.12034>
- Goldstein, N. J., Cialdini, R. B., & Griskevicius, V. (2008). A Room with a Viewpoint: Using Social Norms to Motivate Environmental Conservation in Hotels. *Journal of Consumer Research*, 35(3), 472–482. <https://doi.org/10.1086/586910>
- Golman, R., Hagmann, D., & Loewenstein, G. (2017). Information Avoidance. *Journal of Economic Literature*, 55(1), 96–135. <https://doi.org/10.1257/jel.20151245>
- Golman, R., Loewenstein, G., Moene, K. O., & Zarri, L. (2016). The Preference for Belief Consonance. *Journal of Economic Perspectives*, 30(3), 165–188. <https://doi.org/10.1257/jep.30.3.165>
- Grossman, Z. (2014). Strategic Ignorance and the Robustness of Social Preferences. *Management Science*, 60(11), 2659–2665. <https://doi.org/10.1287/mnsc.2014.1989>
- Grossman, Z., & van der Weele, J. J. (2017). Self-Image and Willful Ignorance in Social Decisions. *Journal of the European Economic Association*, 15(1), 173–217. <https://doi.org/10.1093/jeea/jvw001>
- Hart, W., Albarracín, D., Eagly, A. H., Brechan, I., Lindberg, M. J., & Merrill, L. (2009). Feeling validated versus being correct: A meta-analysis of selective exposure to information. *Psychological Bulletin*, 135(4), 555–588. <https://doi.org/10.1037/a0015701>
- Hassan, L. M., Shiu, E., & Shaw, D. (2016). Who Says There is an Intention–Behaviour Gap? Assessing the Empirical Evidence of an Intention–Behaviour Gap in Ethical Consumption. *Journal of Business Ethics*, 136(2), 219–236. <https://doi.org/10.1007/s10551-014-2440-0>
- Hausman, J. (2012). Contingent Valuation: From Dubious to Hopeless. *Journal of Economic Perspectives*, 26(4), 43–56. <https://doi.org/10.1257/jep.26.4.43>
- Heck, P. R., & Meyer, M. N. (2019). Information Avoidance in Genetic Health: Perceptions, Norms, and Preferences. *Social Cognition*, 37(3), 266–293. <https://doi.org/10.1521/soco.2019.37.3.266>

- Ho, E. H., Hagmann, D., & Loewenstein, G. (2021). Measuring Information Preferences. *Management Science*, *67*(1), 126–145. <https://doi.org/10.1287/mnsc.2019.3543>
- Howell, J. L., & Shepperd, J. A. (2013). Behavioral Obligation and Information Avoidance. *Annals of Behavioral Medicine*, *45*(2), 258–263. <https://doi.org/10.1007/s12160-012-9451-9>
- Huang, S.-C. (2018). Social Information Avoidance: When, why, and how it is Costly in Goal Pursuit. *Journal of Marketing Research*, *55*(3), 382–395. <https://doi.org/10.1509/jmr.16.0268>
- Kahan, D. M., Jenkins-Smith, H., & Braman, D. (2011). Cultural cognition of scientific consensus. *Journal of Risk Research*, *14*(2), 147–174. <https://doi.org/10.1080/13669877.2010.511246>
- Kahan, D. M., Peters, E., Wittlin, M., Slovic, P., Ouellette, L. L., Braman, D., & Mandel, G. (2012). The polarizing impact of science literacy and numeracy on perceived climate change risks. *Nature Climate Change*, *2*(10), 732–735. <https://doi.org/10.1038/nclimate1547>
- Kandul, S., & Lanz, B. (2018). *When social norms and self-image conflict: A public good experiment with social comparison feedback* (No. 18–06).
- Karlin, B., Zinger, J. F., & Ford, R. (2015). The effects of feedback on energy conservation: A meta-analysis. *Psychological Bulletin*, *141*(6), 1205–1227. <https://doi.org/10.1037/a0039650>
- Karlsson, N., Loewenstein, G., & Seppi, D. (2009). The ostrich effect: Selective attention to information. *Journal of Risk and Uncertainty*, *38*(2), 95–115. <https://doi.org/10.1007/s11166-009-9060-6>
- Knutson, B., & Peterson, R. (2005). Neurally reconstructing expected utility. *Games and Economic Behavior*, *52*(2), 305–315. <https://doi.org/10.1016/j.geb.2005.01.002>
- Kőszegi, B. (2003). Health anxiety and patient behavior. *Journal of Health Economics*, *22*(6), 1073–1084. <https://doi.org/10.1016/j.jhealeco.2003.06.002>
- Kőszegi, B. (2010). Utility from anticipation and personal equilibrium. *Economic Theory*, *44*(3), 415–444. <https://doi.org/10.1007/s00199-009-0465-x>
- Kőszegi, B., & Rabin, M. (2009). Reference-Dependent Consumption Plans. *American Economic Review*, *99*(3), 909–936. <https://doi.org/10.1257/aer.99.3.909>
- Kreps, D. M., & Porteus, E. L. (1978). Temporal Resolution of Uncertainty and Dynamic Choice Theory. *Econometrica*, *46*(1), 185. <https://doi.org/10.2307/1913656>

- Kurz, T., Donaghue, N., & Walker, I. (2005). Utilizing a Social-Ecological Framework to Promote Water and Energy Conservation: A Field Experiment1. *Journal of Applied Social Psychology, 35*(6), 1281–1300. <https://doi.org/10.1111/j.1559-1816.2005.tb02171.x>
- Landy, J. F., Piazza, J., & Goodwin, G. P. (2016). When It’s Bad to Be Friendly and Smart. *Personality and Social Psychology Bulletin, 42*(9), 1272–1290. <https://doi.org/10.1177/0146167216655984>
- Lerman, C. (1999). Genetic Testing in Families With Hereditary Nonpolyposis Colon Cancer. *JAMA, 281*(17), 1618. <https://doi.org/10.1001/jama.281.17.1618>
- Leydon, G. M., Boulton, M., Moynihan, C., Jones, A., Mossman, J., Boudioni, M., & McPherson, K. (2000). Cancer patients’ information needs and information seeking behaviour: in depth interview study. *BMJ, 320*(7239), 909–913. <https://doi.org/10.1136/bmj.320.7239.909>
- Lind, J. T., Nyborg, K., & Pauls, A. (2019). Save the planet or close your eyes? Testing strategic ignorance in a charity context. *Ecological Economics, 161*, 9–19. <https://doi.org/10.1016/j.ecolecon.2019.02.010>
- Lyster, D. W., Valdiserri, R. O., Kingsley, L. A., Amoroso, W. P., & Rinaldo, C. R. (1987). The HIV antibody test: why gay and bisexual men want or do not want to know their results. *Public Health Reports (Washington, D.C. : 1974), 102*(5), 468–474.
- Marshall, G. (2015). *Don’t Even Think About It: Why Our Brains Are Wired to Ignore Climate Change*. Bloomsbury Publishing USA.
- Mata, A., Vaz, A., & Mendonça, B. (2022). Deliberate ignorance in moral dilemmas: Protecting judgment from conflicting information. *Journal of Economic Psychology, 90*, 102523. <https://doi.org/10.1016/j.joep.2022.102523>
- Mazar, N., Amir, O., & Ariely, D. (2008). The Dishonesty of Honest People: A Theory of Self-Concept Maintenance. *Journal of Marketing Research, 45*(6), 633–644. <https://doi.org/10.1509/jmkr.45.6.633>
- Meese, W. B. (2022). Information Avoidance: An Interchangeable Mechanism of Self-Protection. (*Doctoral Dissertation, UC Merced*).
- Melnyk, D., & Shepperd, J. A. (2012). Avoiding Risk Information About Breast Cancer. *Annals of Behavioral Medicine, 44*(2), 216–224. <https://doi.org/10.1007/s12160-012-9382-5>
- Mishra, P., Pandey, C., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of Cardiac Anaesthesia, 22*(1), 67. [https://doi.org/10.4103/aca.ACA\\_157\\_18](https://doi.org/10.4103/aca.ACA_157_18)

- Momsen, K., & Ohndorf, M. (2020). When do people exploit moral wiggle room? An experimental analysis of information avoidance in a market setup. *Ecological Economics*, 169, 106479. <https://doi.org/10.1016/j.ecolecon.2019.106479>
- Momsen, K., & Ohndorf, M. (2022). Information avoidance, selective exposure, and fake (?) news: Theory and experimental evidence on green consumption. *Journal of Economic Psychology*, 88, 102457. <https://doi.org/10.1016/j.joep.2021.102457>
- Momsen, K., & Ohndorf, M. (2023). Information avoidance: Self-image concerns, inattention, and ideology. *Journal of Economic Behavior & Organization*, 211, 386–400. <https://doi.org/10.1016/j.jebo.2023.04.032>
- Monin, B. (2007). Holier than me? Threatening social comparison in the moral domain. *Revue Internationale de Psychologie Sociale*, 20(1), 53–68.
- Murphy, J. J., Allen, P. G., Stevens, T. H., & Weatherhead, D. (2005). A Meta-analysis of Hypothetical Bias in Stated Preference Valuation. *Environmental & Resource Economics*, 30(3), 313–325. <https://doi.org/10.1007/s10640-004-3332-z>
- Narayan, B., Case, D. O., & Edwards, S. L. (2011). The role of information avoidance in everyday-life information behaviors. *Proceedings of the American Society for Information Science and Technology*, 48(1), 1–9. <https://doi.org/10.1002/meet.2011.14504801085>
- Norgaard, K. M. (2006a). ‘People Want to Protect Themselves a Little Bit’: Emotions, Denial, and Social Movement Nonparticipation\*. *Sociological Inquiry*, 76(3), 372–396. <https://doi.org/10.1111/j.1475-682X.2006.00160.x>
- Norgaard, K. M. (2006b). “We Don’t Really Want to Know”. *Organization & Environment*, 19(3), 347–370. <https://doi.org/10.1177/1086026606292571>
- Nosarti, C., Crayford, T., Roberts, J. V., Elias, E., McKenzie, K., & David, A. S. (2000). Delay in presentation of symptomatic referrals to a breast clinic: patient and system factors. *British Journal of Cancer*, 82(3), 742–748. <https://doi.org/10.1054/bjoc.1999.0990>
- Oster, E., Shoulson, I., & Dorsey, E. R. (2013). Optimal Expectations and Limited Medical Testing: Evidence from Huntington Disease. *American Economic Review*, 103(2), 804–830. <https://doi.org/10.1257/aer.103.2.804>
- Poli, R. (2010). The many aspects of anticipation. *Foresight*, 12(3), 7–17. <https://doi.org/10.1108/14636681011049839>
- Regner, T. (2018). Reciprocity under moral wiggle room: Is it a preference or a constraint? *Experimental Economics*, 21(4), 779–792. <https://doi.org/10.1007/s10683-017-9551-2>

- Reisch, L. A., Sunstein, C. R., & Kaiser, M. (2021). What do people want to know? Information avoidance and food policy implications. *Food Policy*, *102*, 102076. <https://doi.org/10.1016/j.foodpol.2021.102076>
- Rogers, T., & Feller, A. (2016). Discouraged by Peer Excellence. *Psychological Science*, *27*(3), 365–374. <https://doi.org/10.1177/0956797615623770>
- Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). The Constructive, Destructive, and Reconstructive Power of Social Norms. *Psychological Science*, *18*(5), 429–434. <https://doi.org/10.1111/j.1467-9280.2007.01917.x>
- Schulz-Hardt, S., Frey, D., Lüthgens, C., & Moscovici, S. (2000). Biased information search in group decision making. *Journal of Personality and Social Psychology*, *78*(4), 655–669. <https://doi.org/10.1037/0022-3514.78.4.655>
- Shipp, T. D., Shipp, D. Z., Bromley, B., Sheahan, R., Cohen, A., Lieberman, E., & Benacerraf, B. (2004). What Factors Are Associated with Parents' Desire To Know the Sex of Their Unborn Child? *Birth*, *31*(4), 272–279. <https://doi.org/10.1111/j.0730-7659.2004.00319.x>
- Sicherman, N., Loewenstein, G., Seppi, D. J., & Utkus, S. P. (2016). Financial Attention. *Review of Financial Studies*, *29*(4), 863–897. <https://doi.org/10.1093/rfs/hhv073>
- Smith, S. M., Fabrigar, L. R., & Norris, M. E. (2008). Reflecting on Six Decades of Selective Exposure Research: Progress, Challenges, and Opportunities. *Social and Personality Psychology Compass*, *2*(1), 464–493. <https://doi.org/10.1111/j.1751-9004.2007.00060.x>
- Soroya, S. H., Farooq, A., Mahmood, K., Isoaho, J., & Zara, S. (2021). From information seeking to information avoidance: Understanding the health information behavior during a global health crisis. *Information Processing & Management*, *58*(2), 102440. <https://doi.org/10.1016/j.ipm.2020.102440>
- Stigler, G. J. (1961). The economics of information. *Journal of Political Economy*, *69*(3), 213–225.
- Stoll-Kleemann, S., O'Riordan, T., & Jaeger, C. C. (2001). The psychology of denial concerning climate mitigation measures: evidence from Swiss focus groups. *Global Environmental Change*, *11*(2), 107–117. [https://doi.org/10.1016/S0959-3780\(00\)00061-3](https://doi.org/10.1016/S0959-3780(00)00061-3)
- Strohlinger, N., & Nichols, S. (2014). The essential moral self. *Cognition*, *131*(1), 159–171. <https://doi.org/10.1016/j.cognition.2013.12.005>
- Sweeny, K., Melnyk, D., Miller, W., & Shepperd, J. A. (2010). Information Avoidance: Who, What, When, and Why. *Review of General Psychology*, *14*(4), 340–353. <https://doi.org/10.1037/a0021288>

- Taylor, S. E., Wood, J. V., & Lichtman, R. R. (1983). It Could Be Worse: Selective Evaluation as a Response to Victimization. *Journal of Social Issues*, 39(2), 19–40. <https://doi.org/10.1111/j.1540-4560.1983.tb00139.x>
- Tesser, A. (1988). *Toward a Self-Evaluation Maintenance Model of Social Behavior* (pp. 181–227). [https://doi.org/10.1016/S0065-2601\(08\)60227-0](https://doi.org/10.1016/S0065-2601(08)60227-0)
- Thornton, R. L. (2008). The Demand for, and Impact of, Learning HIV Status. *American Economic Review*, 98(5), 1829–1863. <https://doi.org/10.1257/aer.98.5.1829>
- Thunström, L., van 't Veld, K., Shogren, J. F., & Nordström, J. (2014). On strategic ignorance of environmental harm and social norms. *Revue d'économie Politique*, Vol. 124(2), 195–214. <https://doi.org/10.3917/redp.242.0195>
- Tiefenbeck, V., Staake, T., Roth, K., & Sachs, O. (2013). For better or for worse? Empirical evidence of moral licensing in a behavioral energy conservation campaign. *Energy Policy*, 57, 160–171. <https://doi.org/10.1016/j.enpol.2013.01.021>
- van der Weele, J. J., Kulisa, J., Kosfeld, M., & Friebe, G. (2014). Resisting Moral Wiggle Room: How Robust Is Reciprocal Behavior? *American Economic Journal: Microeconomics*, 6(3), 256–264. <https://doi.org/10.1257/mic.6.3.256>
- Welsch, H., & Kühling, J. (2009). Determinants of pro-environmental consumption: The role of reference groups and routine behavior. *Ecological Economics*, 69(1), 166–176. <https://doi.org/10.1016/j.ecolecon.2009.08.009>
- Wheeler, L., & Miyake, K. (1992). Social comparison in everyday life. *Journal of Personality and Social Psychology*, 62(5), 760–773. <https://doi.org/10.1037/0022-3514.62.5.760>
- Wills, T. A. (1981). Downward comparison principles in social psychology. *Psychological Bulletin*, 90(2), 245–271. <https://doi.org/10.1037/0033-2909.90.2.245>
- Wood, J. V. (1989). Theory and research concerning social comparisons of personal attributes. *Psychological Bulletin*, 106(2), 231–248. <https://doi.org/10.1037/0033-2909.106.2.231>
- Yang, Z. J., & Kahlor, L. (2013). What, Me Worry? The Role of Affect in Information Seeking and Avoidance. *Science Communication*, 35(2), 189–212. <https://doi.org/10.1177/1075547012441873>
- Ybarra, O., Park, H., Stanik, C., & Lee, D. S. (2012). Self-judgment and reputation monitoring as a function of the fundamental dimensions, temporal perspective, and culture. *European Journal of Social Psychology*, 42(2), 200–209. <https://doi.org/10.1002/ejsp.854>
- Zizzo, D. J. (2010). Experimenter demand effects in economic experiments. *Experimental Economics*, 13(1), 75–98. <https://doi.org/10.1007/s10683-009-9230-z>



# Appendix

## Appendix A: GPower Sample Size Calculations

H1:

Test family		Statistical test		
Exact		Proportions: Inequality, two independent groups (Fisher's exact test)		
Type of power analysis				
A priori: Compute required sample size – given $\alpha$ , power, and effect size				
Input Parameters		Output Parameters		
Determine =>	Tail(s)	Two	Sample size group 1	375
	Proportion p1	0.4	Sample size group 2	375
	Proportion p2	0.3	Total sample size	750
	$\alpha$ err prob	0.05	Actual power	0.8010224
	Power (1- $\beta$ err prob)	0.8	Actual $\alpha$	0.0417226
	Allocation ratio N2/N1	1		

H2:

Test family		Statistical test		
t tests		Means: Wilcoxon-Mann-Whitney test (two groups)		
Type of power analysis				
A priori: Compute required sample size – given $\alpha$ , power, and effect size				
Input Parameters		Output Parameters		
Determine =>	Tail(s)	Two	Noncentrality parameter $\delta$	2.8051061
	Parent distribution	Normal	Critical t	1.9629911
	Effect size d	0.2	Df	784.862
	$\alpha$ err prob	0.05	Sample size group 1	412
	Power (1- $\beta$ err prob)	0.8	Sample size group 2	412
	Allocation ratio N2/N1	1	Total sample size	824
		Actual power	0.8000253	

## Appendix B: Survey Layout

### Introduction

*Als u deze enquête liever in het Nederlands invult, wijzigt u de taal in de rechterbovenhoek.*

Thank you for taking the time to fill in this survey!

It will take approximately 6 minutes to complete. Your answers are anonymous and will be processed with care. I cannot trace back which answers you gave.

I'm conducting my thesis research on environmental choices as part of my master's degree in

Behavioural Economics at the Erasmus University Rotterdam.

If you have any questions, please send me an e-mail at: 529804gb@eur.nl

By ticking "agree", you confirm that you're 18 years old or older and that your data may be used for this research. The data will not be shared with third parties.

Thanks again!

Gijs Brabander

Agree (1)

**Q1 (treatment group)**

All your answers are completely anonymous. There will follow several hypothetical choice questions, where you have to choose between 2 options. The 2 options differ in their negative impact on the environment and therefore sustainability. At the end of this survey, you will be presented with a ranking list that includes you and 9 other participants. The ranking is based on the sustainability of the choices made. The first place is for the participant with the most sustainable chosen options and the last place for the participant with the least sustainable chosen options. You will also see the percentage of the 9 others who made more sustainable choices than you. Would you first like to get information about the difference in sustainability of the options?

Yes (1)

No (2)

**Q1 (control group)**

All your answers are completely anonymous. There will follow several hypothetical choice questions, where you have to choose between 2 options. The 2 options differ in their negative impact on the environment and therefore sustainability. Would you first like to get information about the difference in sustainability of the options?

Yes (1)

No (2)

**Environmental information**

To better understand how much a given weight of CO<sub>2</sub> emissions really is, consider the following: an average person exhales about 1.04 kg of CO<sub>2</sub> on an average day (*Do We Exhale Carbon?*, 2015).

Holidays:

Going on holiday by train instead of by plane can save a lot of CO<sub>2</sub> emissions. For example, a train journey from Amsterdam to Prague produces 50 kg of CO<sub>2</sub> per person and a plane journey 260 kg CO<sub>2</sub> per person (*Stedentrips per Trein: Lang Onderweg, Maar Goed Voor Klimaat*, 2022).

#### Public transport:

Travelling by public transport is a lot less polluting than travelling by car. An electric train emits 2 grams of CO<sub>2</sub> per kilometre per person on average. For an electric car, this is 54 grams of CO<sub>2</sub> per kilometre per person on average and for a petrol car 149 grams of CO<sub>2</sub> per kilometre per person (Milieu Centraal, n.d.-b).

#### Second-hand clothes:

Each purchase of a second-hand garment, instead of a new one, saves on average 1 kg of waste, 3,040 litres of water, and 22 kg of CO<sub>2</sub> (COSH!, 2023).

#### The thrift shop:

Taking items away to a thrift shop can save a lot of CO<sub>2</sub> emissions compared to throwing them away. For example, a new sofa produces about 90 kg of CO<sub>2</sub>, which can be saved if the sofa is bought from a thrift shop (Van Wechem, n.d.).

#### Shower or bath:

An average bathtub can hold 120 litres of water. This uses more than three times as much water and energy as a five-minute shower. Enough water is important in the increasingly dry Netherlands, next to that the energy and chemicals used in processing and cleaning water are bad for the environment (Milieu Centraal, n.d.-a).

#### Meat:

A beef burger produces an average of 22.1 kg of CO<sub>2</sub>. This is between 1.8 and 4.6 kg of CO<sub>2</sub> for a plant-based burger (Fransen, 2020).

#### Energy-efficient fridge:

A fridge freezer with energy label B uses about 120 kWh electricity per year. A model with label E uses 230 kWh electricity year (Milieu Centraal, n.d.-c).

#### Water bottle:

One million single-use plastic bottles are sold every minute worldwide. By using a reusable water bottle, you can save an average of 156 plastic bottles a year. Tap water produces 1 gram of CO<sub>2</sub> per litre. Water from single-use plastic bottles produces 160 grams of CO<sub>2</sub> per litre (*Wat Is De Milieu-impact Van Plastic En Glazen Flessenwater?*, 2023).

### **Instructions**

It is important to remember that the following choices are hypothetical. You, therefore, have all the resources necessary to execute the options at your disposal. You must choose between the two options, no other options are possible.

**Environmental choices (question and answer order randomised)**

*Q2*

You're going on holiday next summer. Travelling by train and plane takes the same amount of time and is equally comfortable. How do you travel?

- Train Costs: €90,- (1)
- Plane Costs: €70,- (2)

*Q3*

Tomorrow you travel to work. The two options are equally comfortable and cost you the same amount of money. What means of transport do you use?

- Train Duration: 60 minutes (1)
- Car Duration: 40 minutes (2)

*Q4*

Choose option 2 here. (To see if you are still paying attention)

- Option 1 (1)
- Option 2 (2)

*Q5*

You need pants for next winter. The options are the same kind of pants. The second-hand pants are still in perfect condition and the new pants are discounted. What pants are you getting?

- Second-hand pants Costs: €50,- (1)
- New pants Costs: €50,- (2)

*Q6*

You're buying a new sofa next week. Where does your old sofa, which is still in good condition, go?

- The thrift store Travel time: 25 minutes (1)
- The junkyard Travel time: 15 minutes (2)

*Q7*

What will you choose tomorrow: take a bath for as long as you want or shower for 5 minutes?

- Bath Duration: as long as you like (1)
- Shower Duration: 5 minutes (2)

*Q8*

You're going out for dinner at a restaurant this Saturday and you're not a vegetarian or vegan. You can choose from a beef burger or a plant-based burger, which do not differ in taste. Which one do you choose?

- Beef burger Costs: €12,- (1)
- Plant-based burger Costs: €14,- (2)

*Q9*

You need a new fridge. The fridges are the same in size and appearance. Which one do you buy?

- Fridge-freezer Energy label: A Costs: €1,200,- (1)
- Fridge-freezer Energy label: B Costs: €1,000,- (2)

*Q10*

You want to drink water from a bottle every day next year and don't have a bottle left in your house. Will you buy 1 reusable water bottle, which will be unusable after the year, or several plastic water bottles?

- 1 reusable bottle Costs: €25,- (1)
- Several plastic bottles Costs: €20,- (2)

### **Information avoidance/obtaining reasons**

*Q11*

Why did you choose to get the information on the sustainability of the choices? Multiple answers are possible.

- I was curious. (1)
- I wanted to use the information to make more sustainable choices during this survey. (2)
- I wanted to use the information to make more sustainable choices after this survey. (3)

- Other, namely: (You can fill in more than one answer) (4)
- 

*Q12*

Why did you choose not to get the information about the sustainability of the choices?  
Multiple answers are possible.

- This saved time filling in this survey. (1)
- My choices would not have been influenced by the information obtained. (2)
- To be able to make choices without having (extra) information about the consequences for the environment. (3)
- Other, namely: (You can fill in more than one answer) (4)
- 

### **Environmental awareness**

To what extent do you agree with the following statements?

*Q13*

The sustainability of a product or service is important to me when purchasing it.

- Strongly disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly agree (5)

*Q14*

CO<sub>2</sub> emissions by humans contribute to climate change.

- Strongly disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)

Agree (4)

Strongly agree (5)

### **Demographics**

*Q15*

What is your age?

---

*Q16*

To which gender do you identify?

Male (1)

Female (2)

Other (3)

*Q17*

What is your highest degree obtained?

No degree (1)

Primary education (2)

Secondary education (3)

Secondary vocational education (4)

Bachelor's degree (5)

Master's degree (6)

PhD (7)

*Q18*

What is the total combined gross income of all members of your household per month?

0 - 3,000 euros (1)

3,001 - 6,000 euros (2)

6,001 - 9,000 euros (3)

- 9,001 - 12,000 euros (4)
- More than 12,000 euros (5)
- Prefer not to say (6)

### Possible ranking list example

Ranking list

Participant:	Score:
Participant C	6
Participant F	6
Participant G	6
Participant D	5
You	<i>Score</i>
Participant A	4
Participant H	4
Participant B	3
Participant I	3
Participant E	2

Your choices would have a greater negative impact on the environment than 44% of the 9 other participants.

### Ending

Thank you for completing this survey!

Your information will be handled with care and the results processed completely anonymously. If you have any questions, please email: 529804gb@eur.nl.

Have a great day! You can close this tab now.

### References Survey

- COSH! (2023). *Overweeg jij om tweedehands kleding in je kleerkast te integreren?* Retrieved April 15, 2023, from <https://cosh.eco/nl/blog/dossier-tweedehands-voordelen-thrifting#:~:text=Tweedehands%20kleding%20is%20goed%20voor%20het%20milieu&text=Hierdoor%20worden%20minder%20waardevolle%20grondstoffen,water%2C%20en%2022%20kg%20CO2>.
- Do We Exhale Carbon?* (2015). Retrieved May 2, 2023, from <https://www.nrdc.org/stories/do-we-exhale-carbon#:~:text=So%20breathe%20easy.,dioxide%20on%20an%20average%20day>.
- Fransen, I. (2020). Hoe duurzaam zijn vleesvervangers nou echt? *Women's Health*. Retrieved April 15, 2023, from <https://www.womenshealthmag.com/nl/duurzaamheid/a34999578/duurzaam-vleesvervangers/#:~:text=Het%20alternatief%3A%20vleesvervanger,8%20en%204%20C6%20kilo>.



- Milieu Centraal. (n.d.-a). *Besparen onder de douche en in bad*. Retrieved April 15, 2023, from <https://www.milieucentraal.nl/energie-besparen/duurzaam-warm-water/besparen-onder-de-douche/>
- Milieu Centraal. (n.d.-b). *Fiets, ov of auto*. Retrieved April 15, 2023, from <https://www.milieucentraal.nl/duurzaam-vervoer/co2-uitstoot-fiets-ov-en-auto/>
- Milieu Centraal. (n.d.-c). *Koelkasten en vriezers: welke kies ik?* Retrieved April 15, 2023, from <https://www.milieucentraal.nl/energie-besparen/apparaten-in-huis/koelkasten-en-vriezers/>
- Stedentrips per trein: lang onderweg, maar goed voor klimaat*. (2022). RTL Nieuws. Retrieved April 15, 2023, from <https://www.rtlnieuws.nl/nieuws/nederland/artikel/5310726/meer-stedentrips-trein-gunstig-voor-klimaat-maar-het-duurt-even#:~:text=Praag%3A%2050%20om%20260%20kilo&text=Voor%20een%20overnachting%20rekenen%20we,het%2085%20kilo%20per%20persoon.%22>
- Van Wechem, R. (n.d.). *Meubels met ervaring, beter voor de CO2-uitstoot*. Trouw. Retrieved April 15, 2023, from <https://www.trouw.nl/duurzaamheid-economie/meubels-met-ervaring-beter-voor-de-co2-uitstoot~b6256a10/?referrer=https%3A%2F%2Fwww.google.com%2F>
- Wat is de milieu-impact van plastic en glazen flessenwater?* (2023). MyFontinet. Retrieved April 15, 2023, from <https://www.myfontinet.com/blog/over-water-6/wat-is-de-milieu-impact-van-flessenwater-176>

## Appendix C: Summary Statistics Pilot Survey

Table C.1: Descriptive Statistics Age

Statistic	N	Mean	St. Dev.	Min	Max
Age	9	37.56	17.47	19	58

Table C.2: Frequencies of Gender

Gender	Frequency	Per cent
Male	5	55.56
Female	4	44.44
Other	0	0.00
Total	9	100.00

Table C.3: Frequencies of Education

<b>Education</b>	<b>Frequency</b>	<b>Per cent</b>
No degree	0	0.00
Primary education	0	0.00
Secondary education	2	23.00
Secondary vocational education	3	33.00
Bachelor's degree	1	11.00
Master's degree	3	33.00
PhD	0	0.00
Total	9	100.00

Table C.4: Frequencies of Household Income

<b>Household Income (€)</b>	<b>Frequency</b>	<b>Per cent</b>
0 – 3,000	1	11.11
3,001 – 6,000	5	55.56
6,001 – 9,000	1	11.11
9,001 – 12,000	1	11.11
> 12,000	0	0.00
Prefer not to say	1	11.11
Total	9	100.00

#### Appendix D: Visualisation Outliers Age

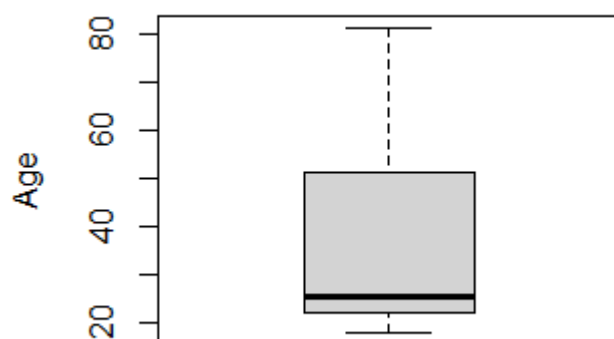


Figure D.1: Boxplot Outliers Age

## Appendix E: Frequency Histograms

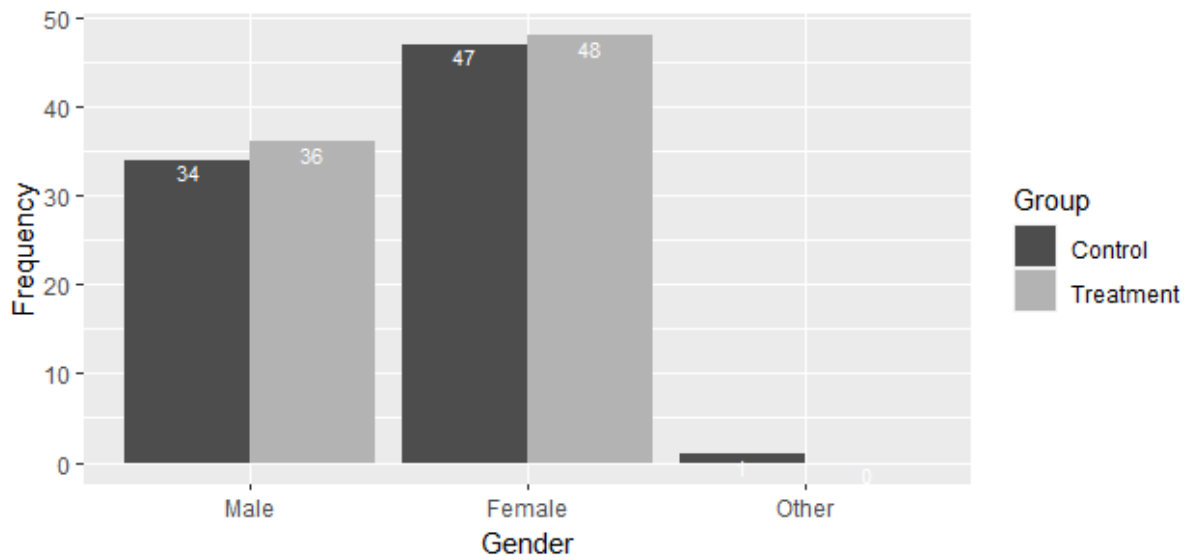


Figure E.1: Frequency Histogram Gender

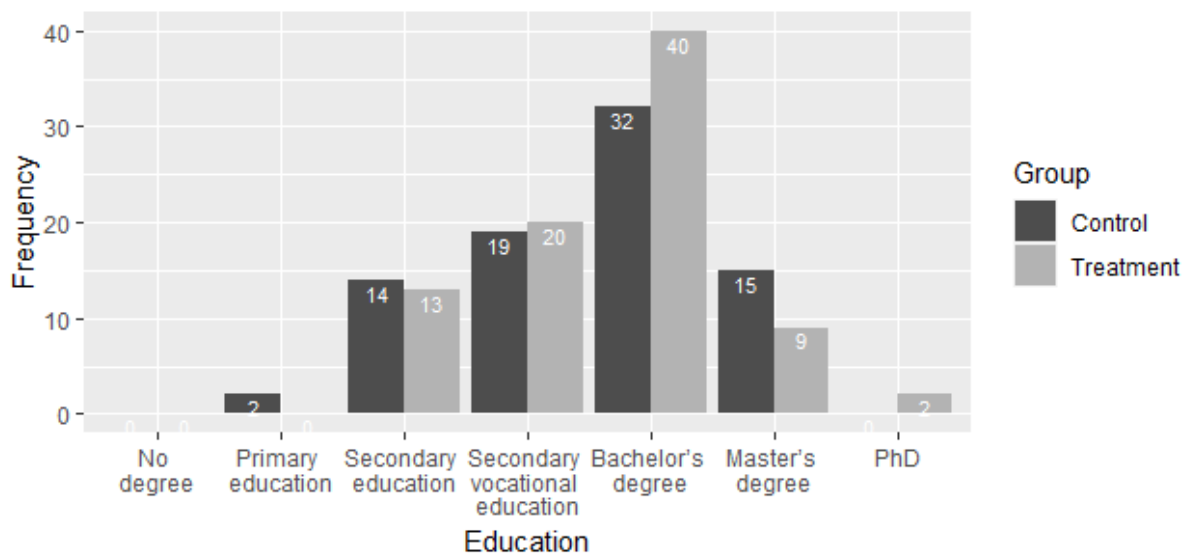


Figure E.2: Frequency Histogram Education

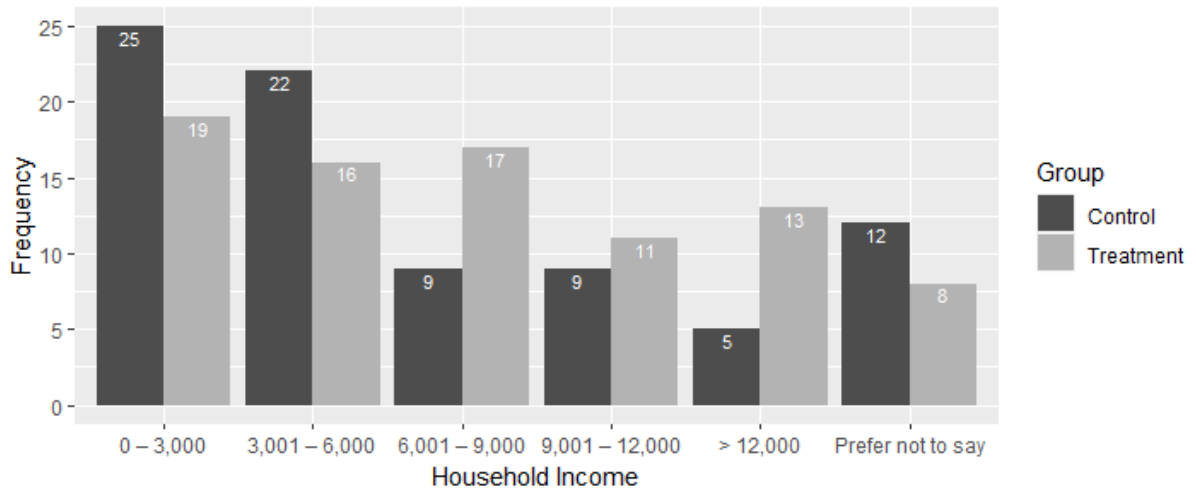


Figure E.3: Frequency Histogram Household Income

### Appendix F: Distribution Environmental Score

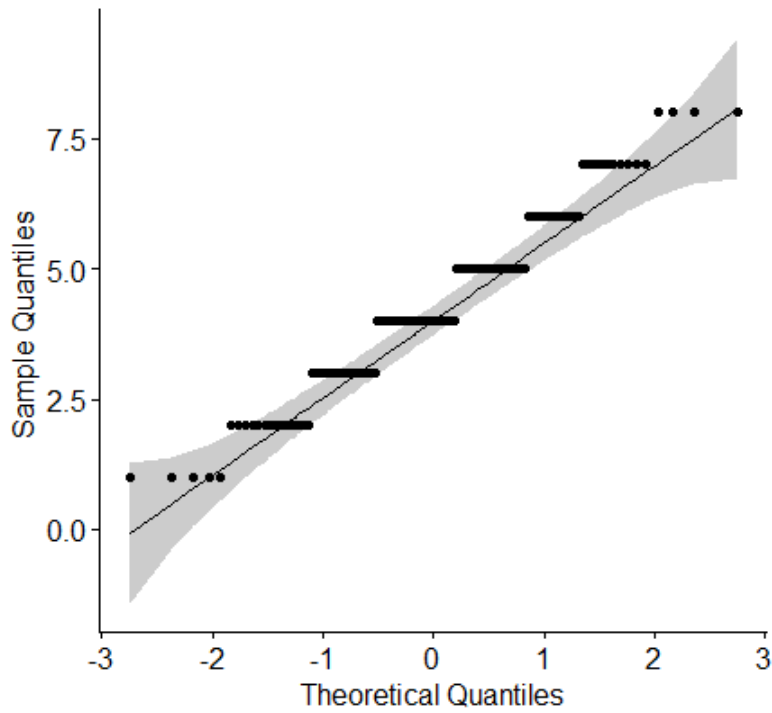


Figure F.1: Distribution Environmental Score

## Appendix G: Regression Robustness Checks

Table G.1: Logistic regression Information Avoidance 166 Observations

	<i>Dependent variable:</i> Information Avoidance
Age	0.016 (0.011)
Gender: Female	-0.553 (0.342)
Gender: Other	-15.426 (882.744)
Education: Middle	-0.855* (0.466)
Education: High	-1.712*** (0.608)
Household Income: 0 - 3,000 euros	-0.597 (0.595)
Household Income: 3,001 - 6,000 euros	-0.407 (0.593)
Household Income: 6,001 - 9,000 euros	0.302 (0.649)
Household Income: 9,001 - 12,000 euros	-0.225 (0.680)
Household Income: More than 12,000 euros	-0.473 (0.714)
Constant	0.942 (0.800)
Observations	166
Log Likelihood	-106.543
Akaike Inf. Crit.	235.085

*Note:* standard errors in parentheses. Information Avoidance can have values 0 or 1. The reference category for Gender is Male, for Education is Little, and for Household Income is Prefer not to say. Education: Little consists of primary and secondary, Middle of secondary vocational and bachelor, and High of master and PhD. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Table G.2: Multiple Linear Regression Environmental Score 166 Observations

	<i>Dependent variable:</i>
	Environmental Score
Age	0.024*** (0.008)
Gender: Female	0.501** (0.239)
Gender: Other	-0.186 (1.521)
Education: Middle	0.407 (0.313)
Education: High	1.269*** (0.403)
Household Income: 0 - 3,000 euros	0.309 (0.416)
Household Income: 3,001 - 6,000 euros	0.096 (0.416)
Household Income: 6,001 - 9,000 euros	-0.411 (0.451)
Household Income: 9,001 - 12,000 euros	0.129 (0.478)
Household Income: More than 12,000 euros	-0.187 (0.497)
Constant	2.630*** (0.542)
Observations	166
R <sup>2</sup>	0.163
Adjusted R <sup>2</sup>	0.109
Residual Std. Error	1.471 (df = 155)
F Statistic	3.018*** (df = 10; 155)

*Note:* standard errors in parentheses. Environmental Score can have values 0 to 8. The reference category for Gender is Male, for Education is Little, and for Household Income is Prefer not to say. Education: Little consists of primary and secondary, Middle of secondary vocational and bachelor, and High of master and PhD. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01