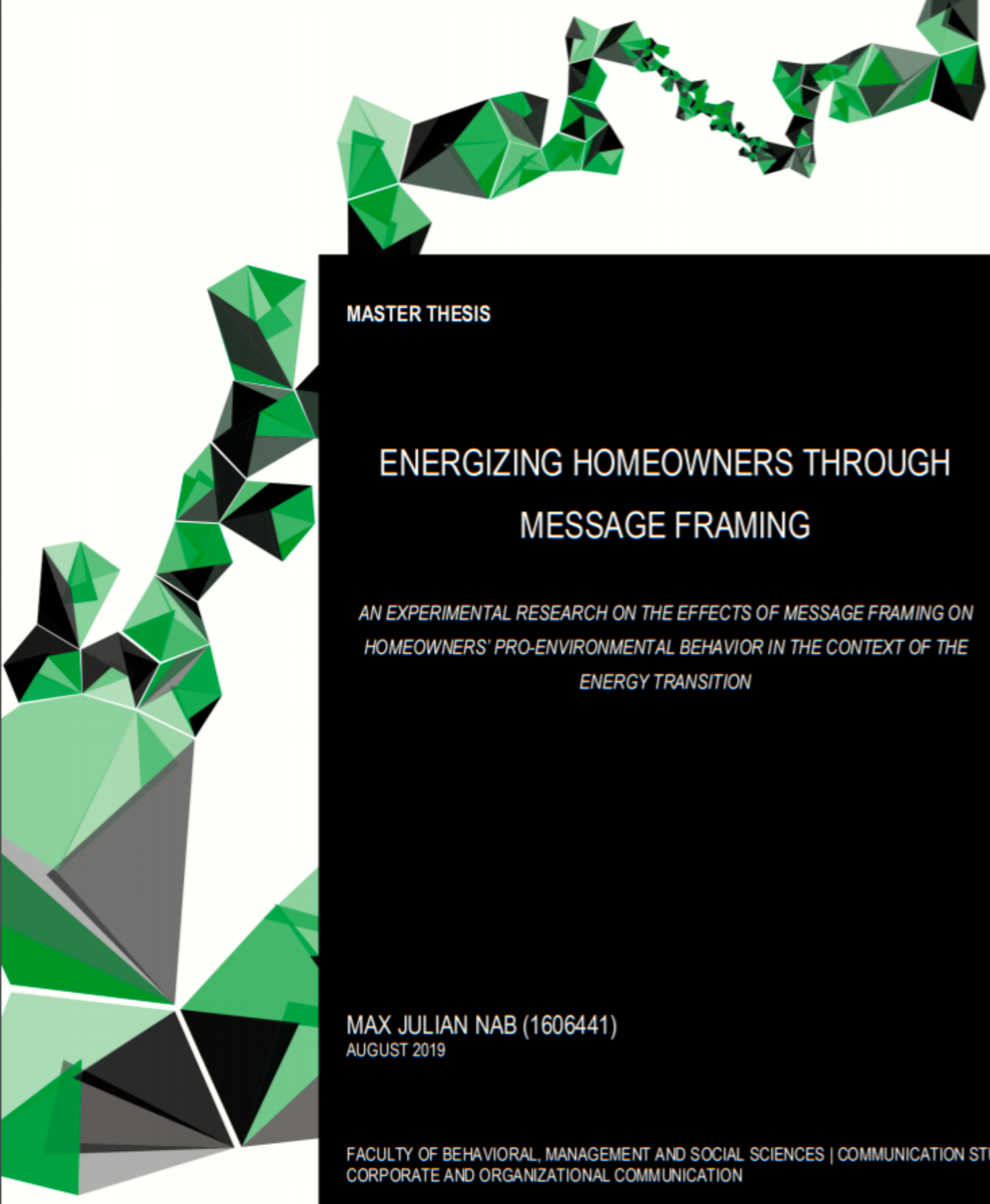

MASTER THESIS

ENERGIZING HOMEOWNERS THROUGH MESSAGE FRAMING

AN EXPERIMENTAL RESEARCH ON THE EFFECTS OF MESSAGE FRAMING ON HOMEOWNERS' PRO-ENVIRONMENTAL BEHAVIOR IN THE CONTEXT OF THE ENERGY TRANSITION

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Abstract

Aim - Behavioral scientists in the field of climate change communication increasingly recognize that in order to engage the public in a sustainable energy transition, a 'one size fits all' approach will most definitely fail. There is a call for better understanding of how the information provided should be presented in order to be effective. This research aims to gain insights into the effects of framing a persuasive message that attempts to convince homeowners to disconnect their houses from the gas grid. The framing types that are of interest in the current study are *outcome framing* (gain vs. loss) and *point-of-reference framing* (self vs. environment), since they have proven to be effective in various contexts, both directly and interactively. Another aim of this research is to examine whether these framing effects are moderated by an individual's *regulatory focus*, since literature shows that the effectiveness of outcome framing depends upon this psychological concept.

Method - An online, scenario-based experiment was conducted among 170 Dutch homeowners, using a 2 x 2 between-group design. Subjects had to read a communal newsletter advocating that they should disconnect their houses from the gas grid, in which both the outcome (gain vs. loss) and the point of reference (self vs. environment) were manipulated. An online survey was conducted to measure all relevant variables, including regulatory focus and message effectiveness. Regulatory focus was measured through the Regulatory Focus Questionnaire (Higgins et al., 2001). Message effectiveness consisted of one measure of attitude towards the behavior, and four different behavioral intentions that covered two different behaviors (investment in insulation and investment in energy) across two different time frames (short-term and long-term).

Results - The results of this research indicate that, as expected, the effect of outcome framing on message effectiveness depends on the point of reference employed in a message, as well as on a recipient's regulatory focus. No direct effects have been found for either outcome framing or point of reference. With respect to the interaction between outcome framing and point of reference, results show that homeowners' short-term intention to invest in an alternative heating system is higher if the message is presented in a loss frame with a reference to the self, compared to presenting the message in a loss frame with a reference to the environment. With respect to the interaction between outcome framing and regulatory focus, short-term intention to invest in insulation is higher if the message is presented in a gain frame to homeowners with a promotion focus, compared to homeowners with a prevention focus. Results show that the reversed is also true: short-term intention to invest in insulation is higher if the message is presented in a loss frame to homeowners with a prevention focus, compared to homeowners with a promotion focus.

Conclusion - It can be concluded that outcome framing effects exist by the virtue of other factors present or absent in a persuasive appeal. This research proves that in the specific context in which the experiment took place, neither the outcome framing, nor the point-of-reference framing on itself affect message effectiveness directly. In order to optimize message effectiveness, persuasive appeals aimed at stimulating homeowners to disconnect their houses from the gas grid, should be presented in a loss frame with a reference to the self. Furthermore, it can be concluded that the effectiveness of outcome framing also depends on a recipient's regulatory focus. In order to optimize message effectiveness in this regard, the persuasive appeal should contain an outcome frame that fits a recipient's regulatory focus. Finally, it can be concluded that the effect of point of reference on the effectiveness of the persuasive appeal, does not depend upon the recipient's regulatory focus.

Keywords - *message framing; outcome framing effects; point of reference; regulatory focus; pro-environmental communication*

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1. Introduction

Climate change is seen as one of the most substantial challenges ever faced by humanity (Shome & Marx, 2009). Especially after 195 countries adopted the Paris Agreement in 2015, the issue is on top of many national and international agendas (Brosch, Sander & Patel, 2016). By signing the convention, countries are legally obliged to establish and implement far-reaching measures to limit global warming to 2 degrees Celsius. One of the most important prerequisites for meeting these climate objectives is to mitigate greenhouse-gas-emissions through a sustainable energy transition. In order to realize this, extensive adaptions of household energy behaviors are needed, including investment in sustainable technologies, sustainable energy sources and energy-efficient appliances. It is therefore of vital importance to change homeowners' behavior in order to reduce total energy demand, and match it with available supply of renewable energy (Steg, Perlaviciute & Van der Werff, 2015).

In the Netherlands, the Paris Agreement resulted in a proposed climate agreement stating that in 2030 two million houses should be disconnected from the gas grid, and in 2050 all of the approximately eight million houses. In order to meet these proposed requirements of the government, an average of 50.000 houses a year should be disconnected from the gas grid starting from now on until 2030. The major challenge for policymakers is to ensure that homeowners are willing and are able to invest in the sustainability of their homes, including adopting alternative heating systems and ensuring a good degree of insulation in their house.

Despite all the evidence for the impact of human behavior on climate change, together with the increasing knowledge and awareness of the public on climate change related issues, and the growing availability of sustainable energy technologies, only a small proportion of homeowners actually adopts these technologies (Moser & Dilling, 2012). In 2018, still 90 percent of the houses were connected to the gas grid (Natuur & Milieu, 2018, p. 5). One of the biggest challenges for climate change advocates is to engage the public to the extent that it is willing to adjust its behavior and hence convince homeowners to disconnect their houses from the gas grid.

Behavioral scientists in the field of climate change communication increasingly recognize that in order to spur the public into action, a 'one size fits all' approach will most certainly fail (Moser & Dilling, 2012; Van de Velde, Verbeke, Popp & Van Huylenbroeck, 2010). To enhance the effectiveness of persuasive appeals in the context of the energy transition, the information provided should emphasize the specific needs of the target audience, and should be presented in such a way that it can be easily processed and utilized by the target group (Loroz, 2007). One way of doing so, is by using message framing techniques (Gifford & Comeau, 2011; Moser & Dilling, 2012; Van der Linden, Maibach & Leiserowitz, 2015). These techniques can be used to strategically shape perceptions of the promoted behavior and, combined with specific characteristics of the targeted audience, substantially enhance the adaption intention of the advocated behavior (Cheng, Woon & Lynes, 2011). Although message framing

has been proven effective in influencing behavior in a variety of contexts, such as health communication, studies addressing this concept within the specific context of the energy transition are scarce. In order to gain a better understanding of how message framing can be applied in the specific context of the energy transition, more research is needed.

In this study, insights from framing theory, message processing theory and regulatory focus theory are combined in order to constitute a conceptual model that helps in gaining understanding on outcome framing and point-of-reference-framing effects in a context in which they have not been studied before. The research question that is central to this research reads:

> *To what extent does framing the outcome and point of reference of a persuasive appeal advocating pro-environmental behaviors positively affect homeowner's attitude and behavioral intention towards the advocated behaviors?*

The current research examines whether outcome framing and point-of-reference-framing, which are widely used and studied message framing techniques, can be successfully applied in the context of the energy transition. More specifically, of interest is whether outcome framing (emphasizing gains versus losses) and point-of-reference-framing (emphasizing the outcomes for the self versus the environment) can be applied in order to positively affect attitude and intentions (both short-term and long-term) of homeowners towards investment in insulation and alternative heating solutions for their house. Additionally, it is examined whether homeowners' self-regulatory orientation (promotion versus prevention) towards future end-goals, referred to as regulatory focus, moderates the effect of outcome framing and point of reference on message effectiveness.

2. Theoretical background

This section discusses relevant theory and concepts central to this research. First, pro-environmental behavior is defined and the dependent variables are presented, after which it is explained how pro-environmental behavior can be stimulated by using message framing techniques. At the end of this section, the conceptual model of this research is presented.

2.1 Pro-environmental behavior

The behavior of interest in the current study could be referred to as environmentally significant behavior (Stern, 2000). Although scholars use various names for behavior that benefits the environment (e.g. "mitigative behavior"(Gifford & Comeau, 2011); "environmentally conscious behavior" (Ellen, Wiener, & Cobb-Walgren, 1991); "prosocial behavior*"* (Loroz, 2007)), the current research used Stern's (2000) conceptual framework for advancing theories of environmentally significant behavior to further specify this type of behavior. According to Stern (2000), environmentally significant behavior could be defined as "behavior that is undertaken with the intention to change (normally, to benefit) the environment" (p. 408). The framework distinguishes between environmental activism, non-activist behaviors in the public sphere, and private-sphere environmentalism. Private-sphere environmentalism is particularly relevant for this study, as it covers "the purchase, use and disposal of personal and household products that have environmental impact'' (Stern, 2000, p. 409). According to Stern (2000), examples of environmentally significant behaviors that fall under private-sphere environmentalism are the purchase or use of automobiles, energy for the home, recreational travel and home heating and cooling systems. The environmentally significant behaviors that are of interest in the current study are 'investing in insulation' and 'investing in an alternative heating system', as these behaviors are seen as a necessary condition of being able to be disconnected from the gas grid.

Although research shows that adoption of these environmentally significant behaviors could contribute to a sustainable energy transition (Steg, Perlaviciute & Van der Werff, 2015), only a small amount of homeowners is actually willing to perform these behaviors (Cheng et al., 2010; Moser & Dilling, 2012; Natuur & Milieu, 2018, p. 5). Therefore, it is important to activate homeowners to adopt new and sustainable energy solutions for their homes (Moser & Dilling, 2012). In order to stimulate environmentally significant behaviors, the effectiveness of persuasive messages advocating the adoption of these behaviors should be enhanced (Cheng et al., 2010).

2.2 Influencing private-sphere environmentalism through communication

An import and increasingly acknowledged challenge for climate change advocates is bridging the existing gap between the knowledge of the public on issues related to climate change, and showing actual behavior that is necessary for dealing with these issues (Cheng et al., 2011; Moser & Dilling, 2012). In order to stimulate private-sphere environmentalism through communication, and hence

contribute to bridging the 'knowledge-action gap', insights in human behavior are crucial (Cheng et al., 2011; Moser & Dilling, 2012).

A theory that is essential for understanding how human behavior is established, and in what way it can be influenced is Ajzen's (1991) theory of planned behavior [TPB]. Although this theory is by no means exhaustive in explaining all human behavior, it is widely supported and cited as a fundamental theory in behavioral research (Cheng et al., 2011). According to TPB, behavioral intention is the most accurate prediction of actual behavior. This means that in order to influence actual behavioral, a person's intention to engage in the behavior should be enhanced. Compliant with TPB, this can be done by positively affecting a person's attitude towards the behavior (Ajzen, 1991). Attitude is considered important in predicting behavioral intention. It is constituted by the perceived desirability of the behavior, together with the desirability of the expected outcome of the behavior. In the current research, attitude towards the behavior and intention to engage in the behavior will be the dependent variables of interest and serve as a function of message effectiveness, since, according to Cheng et al. (2011), these concepts can be effectively enhanced by using message framing techniques.

Given the specific context in which this research takes place, the dependent variable 'behavioral intention' will consist of four different behavioral intentions that cover two different behaviors (investment in insulation and investment in energy) across two different time frames (short-term and long-term).

2.3 Framing theory

Framing theory aims to understand how related sets of ideas in the public sphere are presented, constructed and debated (Spence & Pidgeon, 2010). The major assumption of framing theory is that an issue can be viewed from a variety of perspectives and be construed as having implications for multiple values or considerations. Framing refers to the process by which people develop a particular conceptualization of an issue or reorient their thinking about an issue (Chong & Druckman, 2007). The most cited definition of framing is the one by Entman (1993, p. 52): "selecting some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation". Frames cannot only be deployed to define issues and point in the direction of who or what bears responsibility. They may also convey what the most effective solution for the problem might be, and even may trigger a flood of responses and prime an audience for action or not (Gifford & Comeau, 2011; Moser & Dilling, 2012; Shome & Marx, 2009). This is why insights from framing theory are increasingly used to understand a range of environmental problems and issues, and to strategically design communication aimed at influencing attitudes and behavior of relevant audiences (Spence & Pidgeon, 2010).

A variety of message frames is discussed in literature within the context of the environment and climate related topics (e.g. green purchasing, domestic energy saving etc.). However, Levin, Schneider and Gaeth (1998) call for a critical assessment of research on message framing in general, because scholars differ in their understanding of different types of valence framing, that tap on different underlying mental processes. The typology proposed by Levin et al. (1998) distinguishes three different types of message frames (see Table 1). The first one is referred to as the *risky choice frame*, which involves "the outcomes of a potential choice involving options differing in level of risk are described in different ways'' (Levin et al., 1998, p. 150). By manipulating the set of options with different risk levels, the risk preference of a recipient is affected. The effectiveness of the frame can be measured by comparing the choices for risky options. The second one is referred to as *attribute frame*. In this type frame ''some characteristics of an object or event serve as the focus of the framing manipulation'' (Levin et al., 1998, p. 150). By manipulating the valence of attributes or characteristics of an issue or object, the recipient's evaluation of a particular issue or object could be affected. The effectiveness of the frame can be measured by comparing the attractiveness of ratings of the issue or object. The third type of framing is referred to as *outcome framing* as ''the goal of an action or behavior is framed'' (Levin et al., 1998, p. 150). By framing the consequence or outcome of a behavior, the impact of a persuasive message could be affected. When comparing the rate of the recipient's (intended) behavior, the effectiveness of the frame can be measured. The most conventional way of framing the goal of a persuasive message is by framing the outcome of the advocated behavior in terms of either pleasures of adhering to the advocated action (gains) or in terms of pains of non-adhering to the advocated action (losses) (Loroz, 2007).

In order to meet the directives for carefully distinguishing different types of valence framing, which stem from the framework by Levin et al. (1998), the focus of the current research is on outcome framing. This type of valence framing is the most relevant in the context of environmentally significant behavior, considering the fixed desirable valence from the perspective of the climate advocates. That means that both the gain frame and the loss frame promote the same behavior. The aim of the research is however, to examine which outcome frame, under which circumstances, is most effective for messages aimed at convincing individuals to adopt sustainable household technologies and invest in good insulation for their homes.

Table 1

Overview of the differences between risky choice, attribute and outcome framing

Frame type	What is framed	What is affected	How effect is measured
Risky choice	Set of options with different risk levels	Risk preference	Comparison of choice for risky options
Attribute	Object/event attributes or characteristics	Item evaluation	Comparison of attractiveness ratings for the single item
Outcome	Consequence or implied outcome of a behavior	Impact of persuasion	Comparison of rate of adoption (intention) of the behavior

Note. Adapted from "All frames are not created equal: A typology and critical analysis of framing effects," by I. P. Levin, S. L. Schneider, and G. J. Gaeth, 1998, *Organizational behavior and human decision processes*, *76*, p. 151.

2.4 Explaining outcome framing effects

In literature, two different explanations for outcome framing effects have been brought forward (Levin et al., 1998). The first explanation stems from Tversky and Kahneman's prospect theory. In a similar vein as the explanation for risky choice effects, it is proposed that the effectiveness of either gain outcomes or loss outcomes, depends on the riskiness of the intended behavior (Levin et al., 1998). Substantial evidence has been found for this explanation in the context of health communication and persuasion (Loroz, 2007; Segev, Fernandes & Wang, 2015). When the intended behavior is perceived as risky (e.g. 'detection behavior' in health science), using a loss frame is more effective, whereas a gain frame is more effective when the intended behavior is perceived as cautious or less risky (e.g. 'preventive behavior' in health sciences) (for review, see O'Keefe & Jensen, 2009).

Under the assumption that pro-environmental behaviors could be considered a preventive behavior, Segev et al. (2015) found results which are congruent with prospect theory. Results indicate that gain-framed messages are more effective than loss-framed message in positively affecting consumer responses to green advertisement. Other scholars however (e.g. Rutte, Wilke & Messick, 1987), have questioned this explanation bases on prospect theory by pointing out the complexity of determining the relative riskiness of choice options in messages in which the outcome of a certain behavior is framed. In other words, it is difficult to objectively determine whether the choice options 'adhering to the advocated behavior' and 'not adhering to the advocated behavior' actual differ in the degree of risks involved in the choice option.

The second explanation for message framing effects is that humans have a negativity bias when processing information (Levin et al., 1998). According to this explanation, negative information has systematically stronger effects on people's assessments than objectively equivalent positive information (Levin et al., 1998). This explanation is grounded in the notion of loss aversion. Regardless of whether

the riskiness of an action is implicit or explicit, the impact of negative information has been found stronger, compared to the impact of objectively equivalent positive information (Levin et al., 1998). For example, Chang and Lee (2010) found that a loss-framed message is more effective than a gain-framed message in the context of donating to charity. In contrast to what one would expect based on prospect theory, a negative frame for persuasive messages aimed at stimulating pro-environmental behavior will be the most effective, according to loss aversion.

Given the different explanations for outcome framing effects, and the varying implications they entail for enhancing the effectiveness of pro-environmental messages, it can be concluded that the nature of the relationship between outcome framing effects and message effective is more complex than suggested by previous literature. Therefore, formulating and substantiating hypotheses based on one of these explanations for the specific context in which this research takes place, would be unsatisfactory. With this in mind, the following research question for the direct relationship between outcome framing and message effectiveness is formulated:

RQ1: Which outcome frame (gain frame versus loss frame) is the most effective in convincing homeowners to adopt sustainable household technology and invest in good insulation for their homes?

The inconsistent findings of studies addressing outcome framing effects could be explained by two factors that are not taken into account in those studies: the point of reference used in a persuasive appeal (Loroz, 2007; Segev et al., 2015) and the receiver's regulatory focus (Cesario et al., 2013). The current research examines the relationship between outcome framing, the point of reference of a message and the recipients' regulatory focus, and how these factors affect the effectiveness of persuasive appeals in the context of pro-environmental communication. Below these concepts are elaborated on.

2.5 Point of reference

An important factor that may account for the mixed findings of outcome framing effects in health and environmental communication is the reference point used in persuasive appeals (Loroz, 2007; Segev et al., 2015). The point of reference of a message refers to the target affected by the outcomes of the behavior addressed in the message. Before explaining why point of reference is expected to interact with outcome framing, the different underlying mental processes are explained which are invoked by different kind of references.

Loroz (2007) distinguishes between *self-referencing* messages and *self-other referencing* messages. The former are more common in health communication, since health issues and associated prevention or detection behaviors are primarily of concern to the individual targeted. The latter are more common in environmental communication, because pro-environmental behaviors generally affect both the individual and others (e.g. community, environment or future generations). Although this distinct focus in persuasive messages follows logically and intuitively from the area in which the message

operates, they can account for different effects. Namely, a self-referencing message triggers an independent self-view that relies on a very rich representational structure that, once activated, evokes a high level of involvement in the persuasive appeal, and increases the cognitive resources available for processing the advocated behavior at hand (Loroz, 2007; Segev et al., 2015). In contrast, when the focus is on the self in combination with others, an interdependent self-view is activated in which these well-developed schemas are not activated, because the representational structure of others is less rich and distinctive. As a consequence, message involvement is lower (Loroz, 2007).

In research on environmental communication, a reference to 'others' can range from 'others' close to the self, such as family and friends (e.g. Loroz, 2007), to more distant others, such as the environment in general (e.g. Segev et al., 2015). The current study distinguishes between a reference to the self by referring to the outcomes of the individual's behavior to him- or herself, and a reference to the environment by referring to the outcomes of the individual's behavior to the environment. The reason for conceptualizing others as the environment, instead of others close to the self, is that it provides a more clear-cut distinction between the two points of reference (Segev et al., 2015).

Insights of Loroz (2007) and Segev et al. (2015) are used to test the direct relationship between point of reference (self vs. environment) and message effectiveness. In terms of framing persuasive messages, a central assumption of the current research is that self-referencing messages are more effective than environment-referencing messages. Based on this expected relationship, the following hypotheses are formulated:

H1a: A message with a reference to the self affects Attitude towards investment in the sustainability of one's house more positively than a pro-environmental message with a reference to the environment.

H1b: A message with a reference to the self affects Short-term intention to invest in insulation more positively than a pro-environmental message with a reference to the environment.

H1c: A message with a reference to the self affects Long-term intention to invest in insulation more positively than a pro-environmental message with a reference to the environment.

H1d: A message with a reference to the self affects Short-term intention to invest in an alternative heating system more positively than a pro-environmental message with a reference to the environment.

H1e: A message with a reference to the self affects Long-term intention to invest in an alternative heating system more positively than a pro-environmental message with a reference to the environment.

2.6 Point of reference and outcome framing

As mentioned, it is found that the point of reference in a message could play an important role in the relationship between outcome frames and message effectiveness. According to Loroz (2007), the impact of using outcome framing in pro-environmental communications is contingent on whether the message is self-referencing (the message describes how the behavior affects the recipient) or makes a reference to others (the message describes how the behavior affects others). It was found that loss-framed messages appear to be more persuasive in promoting recycling behavior when the message is self-referencing, while gain frames are more persuasive when the message is self-other referencing. Kareklas, Carlson and Muehling (2012) found comparable results indicating that gain-focused appeals performed better when participants were situationally primed with an interdependent self-view, and loss-focused appeals performed better when participants were primed with an independent self-view.

The reasoning behind the interaction between outcome frames and point of reference is based on the notion that loss frames could be seen in a similar vein as high-fear appeals (Loroz, 2007). Following this line of reasoning, one could say that for both fear appeals and loss frames, extensive cognitive resources are necessary to process the message and coping mechanisms to avoid the problem at stake. As opposed to loss frames, gain-framed messages stress the favorable outcomes of adopting the advocated behavior. Like loss-framed messages, they also present a potential problem faced by recipients. However, the negative affect entailed by the message substantially reduces by focusing on the benefits of adopting the advocated behavior (Loroz, 2007). Accordingly, gain frames could be seen in a similar vein as low-fear appeals, because as with low-fear appeals, gain-framed messages acquire fewer resources than loss framed messages. Inasmuch as processing gain-framed and loss-framed messages requires different resource demands, it could be expected that the outcome frame will interact with the point of reference used in a persuasive message to affect its effectiveness.

In the current study, insights of Loroz (2007) and Kareklas et al. (2012) are used to test the interaction between outcome framing (gain versus loss) and point of reference (self-referencing versus environment-referencing) to predict message effectiveness. Based on this expected relationship, the following hypotheses are formulated:

> *H2a Attitude towards investment in the sustainability of one's house is higher when the message is presented in a loss (gain) frame combined with a reference to the self (environment), compared to a loss frame (gain) combined with a reference to the environment (self).*
>
> *H2b Short-term intention to invest in insulation is higher when the message is presented in a loss (gain) frame combined with a reference to the self (environment), compared to a loss (gain) frame combined with a reference to the environment (self).*

H2c Long-term intention to invest in insulation is higher when the message is presented in a loss (gain) frame combined with a reference to the self (environment), compared to a loss (gain) frame combined with a reference to the environment (self).

H2d Short-term intention to invest in an alternative heating system is higher when the message is presented in a loss (gain) frame combined with a reference to the self (environment), compared to a loss (gain) frame combined with a reference to the environment (self).

H2e Long-term intention to invest in an alternative heating system is higher when the message is presented in a loss (gain) frame combined with a reference to the self (environment), compared to a loss (gain) frame combined with a reference to the environment (self).

2.7 Regulatory focus and outcome framing

As previously mentioned, Cesario et al., (2013) proposed that the outcome framing effects cannot be understood without considering how these frames relate to the message recipients' regulatory focus. Regulatory focus is referring to a person's self-regulatory orientation toward future end-states. The basic notion of regulatory focus theory is that a person can be either guided by 'growth and nurturance needs' or by 'safety and security needs' to reach these future end-states (Bryant & Dunford, 2008; Higgins, 1997). If a person is guided by growth and nurturance needs, this is expressed in a promotion focus in which the person tries to align himself with his ideal self. The self-standards that are important for persons with an active promotion focus are based on aspirations and wishes of who they ideally would like to become. Therefore, persons with an active promotion focus are highly receptive for potential gains. Conversely, if an individual is guided by safety and security needs, this is expressed in a prevention focus in which a person tries to align himself with his ought self. The self-standards that are important for persons with an active prevention focus are based on felt responsibilities, duties and avoiding undesired end-states. Therefore, persons with an active prevention focus are highly concerned with avoiding potential losses (Bryant & Dunford, 2008; Higgins, 1997).

It is furthermore known that regulatory focus may occur as both a dispositional focus and a situational focus (Bryant & Dunford, 2008). Dispositional regulatory focus is relatively stable over time and could be derived from a person's history of failure and success with strategies related to avoidance and approach strategies (Bryant & Dunford, 2008; Higgins et al., 2001). In contrast, a person's situational regulatory focus changes over time and could be induced. By framing a problem in terms of gains or non-gains, a situational promotion focus is induced. When a problem is framed in terms of losses or non-losses, a situational prevention focus is induced (Bryant & Dunford, 2008). As dispositional and situational regulatory focus operate independently, they might both be present in either congruent or incongruent combinations. Congruence occurs when a person possesses a dispositional and situational prevention focus, or a dispositional and situational promotion focus. Conversely,

incongruence occurs when a person possesses a dispositional prevention focus and situational promotion focus, or vice versa (Bryant & Dunford, 2008).

When relating these insights from regulatory focus theory to persuasion, regulatory fit theory comes into play. This goal-attainment theory suggests that when a person's dispositional regulatory focus is congruent with the situational regulatory focus induced by an outcome frame, communication is likely to be more effective, because information is processed more easily (Aaker & Lee, 2001; Cesario et al., 2013; Chernev, 2004; Fellner, Kirchler, & Holler, 2004; Gierl, 2005; Werth, Mayer, & Mussweiler, 2006). This congruency between dispositional regulatory focus and the induced situationally regulatory focus is called regulatory fit (Higgins, 2000).

In the current study, these insights from regulatory fit theory are used to test the interaction between outcome framing and a recipient's dispositional regulatory focus. In terms of framing persuasive messages within the context of the energy transition, then, a prediction for the current research is that messages framed in terms of the presence of positive outcomes of performing the advocated behavior (gain frame) are more effective for homeowners with a dispositional promotion focus, whereas messages framed in terms of the presence of negative outcomes of not performing the advocated behavior (loss frame) are more motivating for homeowners with a dispositional prevention focus. Based on these presumptions, the following hypotheses are formulated:

H3a Attitude towards investment in the sustainability of one's house is higher when the outcome frame used is congruent with a recipient's regulatory focus.

H3b Short-term intention to invest in insulation is higher when the outcome frame used is congruent with a recipient's regulatory focus.

H3c Long-term intention to invest in insulation is higher when the outcome frame used is congruent with a recipient's regulatory focus.

H3d Short-term intention to invest in an alternative heating system is higher when the outcome frame used is congruent with a recipient's regulatory focus.

H3e Long-term intention to invest in an alternative heating system is higher when the outcome frame used is congruent with a recipient's regulatory focus.

2.8 Regulatory focus and reference point

Aside from the impact of an individual's regulatory focus on the effectiveness of outcome frames in persuasive appeals, an individual's regulatory focus may also interact with the reference point of a persuasive message. Aaker and Lee (2001) found that messages focusing on promotion are more persuasive for individuals with an active, independent self-view, whereas messages focusing on

prevention are more persuasive for individuals with an active, interdependent self-view. The theoretical explanation for this relationship is goal compatibility. It is found that independent goals are more compatible with a promotion focus, because they are associated with autonomy and achieving success. Conversely, interdependent goals are more compatible with a prevention focus, since they are associated with a desire to be part of a collective group and one's obligations and responsibilities (Aaker & Lee, 2001; Karekas et al., 2012).

It should however be noted that Aaker and Lee (2001) applied a different conceptualization of regulatory focus, as their subjects were exposed to either promotion-framed or prevention-framed information. Since they operationalized regulatory focus as a function of the persuasive message by either exposing recipients to promotion focused appeals or prevention focused appeals, rather than considering recipient's dispositional regulatory focus. Whether recipients' dispositional regulatory also interacts with the point of reference of a message, is examined in the current study.

These insights of Aaker and Lee (2001) are used to test the interaction between point of reference (self versus environment) and regulatory focus (promotion versus prevention). In order to test this presumption, the following hypotheses are formulated:

H4a: Attitude towards investment in the sustainability of one's house is higher when the message is presented in a self-referencing (environment-referencing) frame to a recipient with a promotion (prevention) focus.

H4b: Short-term intention to invest in insulation is higher when the message is presented in a self-referencing (environment-referencing) frame to a recipient with a promotion (prevention) focus.

H4c: Long-term intention to invest in insulation is higher when the message is presented in a self-referencing (environment-referencing) frame to a recipient with a promotion (prevention) focus.

H4d: Short- term intention to invest in an alternative heating system is higher when the message is presented in a self-referencing (environment-referencing) frame to a recipient with a promotion (prevention) focus.

H4e: Long-term intention to invest in an alternative heating system is higher when the message is presented in a self-referencing (environment-referencing) frame to a recipient with a promotion (prevention) focus.

Figure 1 depicts the conceptual model which is central to this research.

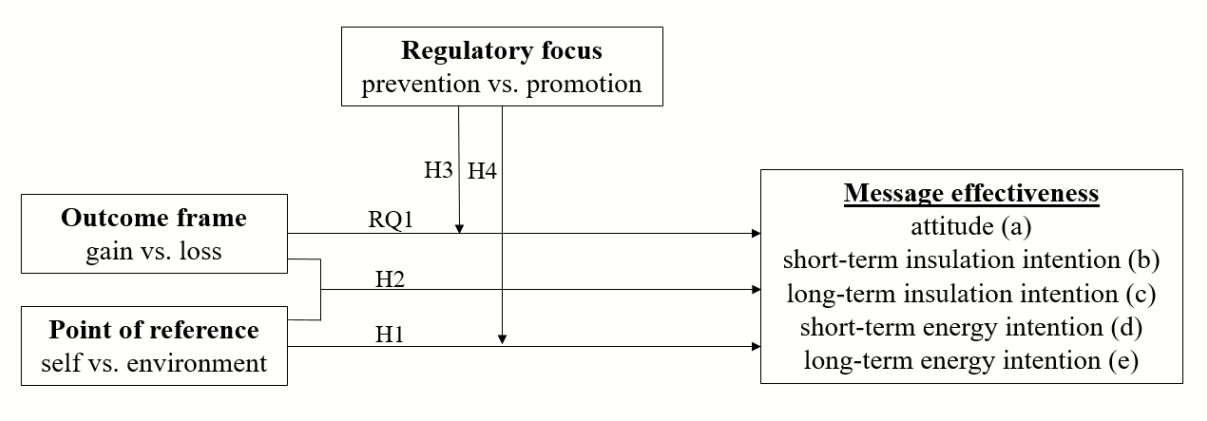

Figure 1. Conceptual model for examing the effects of message framing in the context of public communication about the energy transition.

3. Method

In this section, the method will be explained that was used to examine how message framing could be successfully applied in public communication about the energy transition. The section outlines the research design and stimulus material, the experimental measurements, the sample and the research procedure.

3.1 Design and stimuli

To investigate how Outcome framing, Point of reference and Regulatory focus influence the effectiveness of pro-environmental messages, an online experiment with a 2 (outcome framing: gain versus loss) x 2 (point of reference: self versus environment) between-group design was conducted. Regulatory focus (prevention vs. promotion) was experimentally measured to ensure that score could be computed for regulatory predominance.

The stimulus material consisted of a communal newsletters advocating investment in sustainable home energy solutions for private houses. A newsletter was selected as the vehicle for communicating the message, as it is a common way for municipalities to inform and engage their residents about issues related to sustainability (Calder & Beckie, 2011).

The Outcome frame of the newsletter was manipulated by focusing in the texts either on the positive outcomes of adopting sustainable energy solutions for the home (gain-framed message) or on the negative consequences of not adopting sustainable energy solutions for the home (loss-framed message). In order to strengthen the Outcome frame manipulation, the newsletter contained visual elements as well. In the gain conditions, ‘plus-signs’ were added to emphasize the positive outcomes. In the loss conditions, ‘minus-signs’ were added to emphasize the negative outcomes.

The Point of reference was manipulated by either emphasizing the outcomes for the individual (reference to the self) or emphasizing outcomes for the environment (reference to the environment). In order to strengthen the Point of reference manipulation, a visual element was added. The texts with a reference to the self contained an image of an individual, whereas the texts with a reference to the environment contained an image of a globe.

The gain/self message emphasized positive outcomes of adopting sustainable energy solutions that solely affect the recipient’s personal (financial) situation. For example, that it will lower the energy bill. The positive/environment message emphasized positive outcomes for the recipient’s environment. For example, that it will lead to a cleaner environment and healthier living environment. The loss/self message emphasized negative outcomes of refraining to adopt sustainable energy solutions that affect the recipient’s personal (financial) situation. For example, that it will lead to a reduction of the value of the recipients’ house. Lastly, the negative/environment message emphasized negative outcomes of refraining to adopt sustainable energy solutions for the recipient’s environment. For example, that it will

lead to an unsafe living environment for inhabitants of areas in which gas extraction takes place. An overview of the stimulus material can be found in Appendix A.

3.2 Experimental measurements

Manipulation checks

Two items were used to assess whether the Outcome frame was noticed (on a 5-point Likert-scale; 1 = strongly disagree, 5 = strongly agree): "*The newsletter was stating the drawbacks of not investing in the sustainability of my house"* and "*The newsletter was stating the advantages of investing in the sustainability of my house"*. By reversed scoring one of the items, the Cronbach's alpha was calculated ($\alpha = .64$).

In order to check whether the Point of reference was noticed, two items were used (on a 5-point Likert-scale; 1 = strongly disagree, 5 = strongly agree): *"The newsletter was stressing the consequences for the value of my house and the amount of my energy bill."* and *"The newsletter was stressing the consequences for my living environment and that of residents of earthquake zones"*. By reversed scoring one of the items, a Cronbach's alpha was calculated ($\alpha = .79$).

An analysis of variance was used to test whether Outcome frame and Point of reference were successfully manipulated. Regarding the outcome frame manipulation, participants experienced more positive outcomes in the gain condition (M = 4.24) compared to participants assigned to the loss condition (M= 3.41) ($F(1, 168) = 34.17$ $p < .001$). Furthermore, participants experienced more negative outcomes in the loss condition (M = 3.56) compared to participants assigned to the gain condition (M = 2.17) ($F(1, 168) = 74.89$, $p. < .001$). Regarding the manipulation of Point of reference, participants perceived that the outcomes affected the environment more in the environment condition (M = 3.91) compared to participants assigned to the self condition (M = 2.00) ($F(1, 168) = 139.16$, $p. < .001$). Furthermore, participants perceived that the outcomes affected themselves more personally in the self condition (M = 3.89) compared to participants assigned to the environment condition (M = 2.13) ($F(1, 168) = 145.96$, $p. < .001$). These results of this analysis show that both Outcome frame and Point of reference were successfully manipulated.

Dispositional regulatory focus

Dispositional Regulatory Focus was measured using an adapted version of the 11-item Regulatory Focus Questionnaire [RFQ] (Higgins et al., 2001), which can be found in Appendix B. The RFQ operationalizes Dispositional Regulatory Focus as a history of failure and success with strategies related to prevention and promotion. The original scale consists of 6 items measuring the sub construct 'promotion focus' (e.g. "*I feel like I have made progress toward being successful in my life*") and 5 items measuring the sub construct 'prevention focus' (e.g. "*Growing up, did you ever act in ways that your*

parents thought were objectionable?"*).* The items were translated to Dutch and transformed to fit a 5-point Likert-scale (1 = strongly disagree, 5 = strongly agree).

A principle component analysis extracted four different components. The 5 prevention focus items all loaded on the same component (Cronbach's α = .83). The promotion items however, loaded on three different components, indicating a lack of coherence between these items. Since a score for promotion focus is an important prerequisite to calculate regulatory predominance, it was examined whether combining two or more items would lead to a reliable promotion scale. However, none of the combinations produced a reliable promotion scale. Therefore, a single promotion item ("*I feel like I have made progress toward being successful in my life*") was selected to calculate regulatory predominance.

The reasoning for selecting this particular item was twofold. Firstly, of all the promotion items, this item scored the highest negative loading on the component that extracts all prevention items, indicating that participants that report higher scores on the prevention items, report lower scores on this item. Secondly, in the study of Higgins et al. (2001) this particular item showed the highest loading of all items that loaded on the component that extracted the promotion items.

To create an index of Regulatory predominance, the mean score on the prevention scale was subtracted from the score on the single promotion item. This resulted in a single continuous measure, with negative or lower numbers indicating predominant prevention focus and positive or higher numbers indicating predominant promotion focus. In the main analysis Regulatory predominance was treated as a continuous measure. However, to make the results easier to interpret, the (estimated marginal) means are based on a median split. Hereafter, Regulatory predominance will be referred to as Regulatory focus.

Message effectiveness

Message effectiveness consisted of five separate measurements. Attitude towards investment in the sustainability of one's house was measured using a adopted version of Dillard, Shen and Vail's (2007) 5-item measurement for Attitude towards message advocacy, consisting of 5-point semantic differential measures. The word pairs used were: very favorable/very unfavorable, very desirable/very undesirable, very unattractive/very attractive, very unwise /very wise and positive/negative (Cronbach's α = .82).

The behavioral intentions were measured using an adapted version of a three-item semantic differential scale used by Segev et al. (2015). On a 5-point scale, participants reported whether it was very unlikely/very likely, very impossible/very possible, and very improbable/very probable that they would perform the stated behavior. Behavioral intention was disaggregated into Short-term intention to invest in insulation (Cronbach's α = .95), Long-term intention to invest in insulation (Cronbach's α = .98), Short-term intention to invest in an alternative heating system (Cronbach's α = .95) and Long-term intention to invest in an alternative heating system (Cronbach's α = .98).

Covariates

In order to address individual differences in pre-existing attitudes towards concepts related to investment in sustainable energy technology, Environmental concern was measured using Kilbourne and Pickett's (2007) six-item scale. On a 5-point Likert (1 = strongly disagree, 5 = strongly agree), participants scored items like *"I am very concerned about the environment"* and *"Humans are severely abusing the environment"* (Cronbach's α = .77).

As it can be expected that homeowners who already live in a sustainable house with proper insulation and a sustainable alternative heating system, are less likely to report high investment intentions, individual differences in the current level of sustainability of the house were taken into account. Participants had to indicate the quality of insulation in their home on a 7-point semantic differential scale, 1 indicating 'very bad insulation' and 7 indicating 'very good insulation'. To assess whether participants already made use of an alternative heating system, they had to report whether they use natural gas for heating their house (dichotomous variable: yes/no).

Demographical measures

Besides Age and Level of education, other demographical measures which were expected to be relevant in the context of adopting sustainable energy solutions for houses, were added to the survey. Therefore, the questionnaire contained questions about Type of house (recoded into: apartment, detached house, corner house, town house or semi-detached house) Family composition (recoded into: single, single with children, cohabitants, cohabitants with children) and Postal code.

3.3 Participants

The online experiment was conducted among N = 170 homeowners throughout the Netherlands, using convenience sampling and snowball sampling as strategies for data collection. In order to meet the inclusion criteria for the study, participants had to be (co)owner of the house they live in, and at least 18 years old. The average age of the participants is 44,33 years (SD = 12,654). The distribution of gender is 49.4 percent male versus 60.6 percent female. Table 2 shows the distribution of age, gender, educational level, family composition and type of house across conditions. An analysis of variance shows that Age (F(3, 166) = 1,031, p > .05), Gender (X^2 (3) = 4,649, p > .05), Educational level (X^2 (3) = 0.847, p > .05), Family composition (X^2 (12) = 12.447, p > .05) and Type of house (X^2 (9) = 9.969, p > .05) are all equally distributed across the four conditions.

3.4 Research procedure

The participants were asked to fill out an online questionnaire about 'natural-gas free living' (see Appendix C for the Dutch version of the questionnaire). After participants gave their consent, they completed questions about demographic characteristics, followed by the RFQ. After this, participants read a scenario that instructed the participants to imagine that they received a communal newsletter

about the issue of disconnecting private houses from the gas grid. After they read the scenario, participants were randomly assigned to one of the four newsletters. After reading the newsletter, they were questioned about their attitude and behavioral intentions towards investment in the sustainability of their home. This research has been approved by the Ethical Committee of the BMS Faculty of the University of Twente (see Appendix D).

Table 2

Distribution of age, gender, educational level, family composition and type of house across conditions

	Condition			
Characteristic	Gain/Self (n = 43)	Gain/Env (n = 42)	Loss/Self (n = 44)	Loss/Env (n = 41)
Age[a], *M* (*SD*)	41.5 (11.76)	44.8 (11.55)	45.1 (14.57)	46.0 (12.42)
Gender[b]				
Male	30.2	52.4	36.4	39.0
Female	69.8	47.7	63.6	61.0
Educational level[b]				
Primary/secondary	25.6	26.2	20.5	19.5
Higher education	74.4	73.8	79.5	80.5
Family composition[b]				
Single	9.3	9.5	11.4	12.2
Single with children	11.6	4.8	2.3	2.4
Cohabitants	37.2	47.6	59.1	39.0
Cohabitants with children	41.9	38.1	27.3	46.3
Type of house[b]				
Apartment	11.5	7.1	4.5	9.8
Detached house	14.0	31.0	34.1	31.7
Corner house	11.6	9.5	11.4	9.8
Town house	32.6	21.4	27.3	19.5
Semi-detached house	30.2	31.0	22.7	29.3

Note. Env = Environment.
[a]In years.
[b]As a Percentage of the condition sample.

4. Results

This research aims to gain insights into how message framing can be successfully applied in the context of public communication about the energy transition. The framing techniques that are of interest in the research are outcome framing and the framing of the point of reference. Furthermore, it is examined whether the receiver's regulatory focus interacts with these framing types. In this section, the results of the research are discussed.

4.1 Descriptive statistics of the dependent variables

The overall means on the dependent variables Attitude towards investment in the sustainability of one's house, Short-term intention to invest in insulation, Long-term intention to invest in insulation, Short-term intention to investment an alternative heating system and Long-term intention to invest in an alternative heating system are shown in Table 3. It shows that overall participants' attitudes are more positive compared to their behavioral intentions. Furthermore, it appears that participants' Long-term investment intentions are generally higher than their Short-term investment intentions.

Table 3

Overall mean scores on the dependent variables

Dependent variable	*N*	*M*	*SD*
Attitude	170	3.84	0.64
SI_I	170	3.02	1.17
LI_I	170	3.55	1.33
SI_A	170	2.78	1.15
LI_A	170	3.55	1.13

Note. Attitude = Attitude towards investment in sustainability; STI-I = Short-term intention to invest in insulation; LTI = Long-term intention to invest in insulation; STI-A = Short-term intention to invest in an alternative heating system; LTI-A = Long-term intention to invest in an alternative heating system.

The mean scores on the dependent variables for each of the conditions are shown in Table 4. Across conditions, only small differences are shown on Attitude towards investment in sustainability, Long-term intention to invest in insulation and Long-term intention to invest in an alternative heating system. The differences of mean scores on Short-term intention to invest in insulation and Short-term intention to invest in an alternative heating system appear to be larger across conditions. Analyses of variance should reveal whether the differences observed are statistically significant.

Table 4

Mean scores on the dependent variables across conditions

	Dependent variable									
	Attitude		SI_I		LI_I		SI_A		LI_A	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Gain/Self	3.87	0.71	2.92	1.21	3.62	1.11	2.60	1.15	3.51	1.06
Gain/Env	3.88	0.56	3.24	1.14	3.58	1.18	2.97	1.19	3.70	1.10
Loss/Self	3.79	0.68	2.87	1.21	3.55	1.16	3.03	1.05	3.62	1.16
Loss/Env	3.80	0.59	3.06	1.08	3.47	1.09	2.51	1.16	3.36	1.17

Note. Env = Environment; Attitude = Attitude towards investment in sustainability; SI_I = Short-term intention to invest in insulation; LI_I = Long-term intention to invest in insulation; SI_A = Short-term intention to invest in an alternative heating system; LI_A = Long-term intention to invest in an alternative heating system.

Table 5

Results of ANOVA for the effects of the independent variables on the dependent variables

	ANOVA				
	Dependent variables				
Independent variable	Attitude	SI_I	LI_I	SI_A	LI_A
	F-value	*F-value*	*F-value*	*F-value*	*F-value*
Environmental concern	4.83*	0.75	0.72	2.82	3.77
Insulation grade	3.42	14.23***	5.48*	2.18	5.96*
Gas connection yes/no	3.61	0.49	0.29	2.26	12.39***
Outcome frame	0.72	0.90	0.48	0.00	0.85
Point of reference	0.44	1.02	0.26	0.47	0.99
Regulatory focus	0.61	0.82	0.75	0.39	4.28**
Outcome frame * Point of reference	0.08	0.06	0.00	4.67*	0.99
Outcome frame * Regulatory focus	0.18	4.40*	0.98	0.12	0.20
Point of reference * Regulatory focus	2.39	0.18	0.18	0.10	3.36
Outcome frame * Point of reference * Regulatory focus	0.00	2.11	1.03	0.02	0.31

Note. Attitude = Attitude towards investment in sustainability; SI_I = Short-term intention to invest in insulation; LI_I = Long-term intention to invest in insulation; SI_A = Short-term intention to invest in an alternative heating system; LI_A = Long-term intention to invest in an alternative heating system.
* $p < .05$. ** $p < .01$. *** $p < .001$.

4.2 Main effects

An ANOVA was performed for each of the dependent variables, in which Point of reference and Outcome frame were the independent variables. Regulatory focus (because of its continuous nature), Environmental concern, Insulation grade and whether homeowners had a gas connection where included in the model as covariates. Table 5 shows the results for the effects of the independent variables on the different dependent variables. Research question 1 was drawn up to examine which outcome frame (gain versus loss) is the most effective in positively affecting homeowners' attitude towards investment in sustainability, and their intention to adopt sustainable household technology and invest in good insulation for their homes. These behavioral intentions are divided into four different kinds of intentions: Short-term intention to invest in insulation, Long-term intention to invest in insulation, Short-term intention to invest in an alternative heating system and Long-term intention to invest in an alternative heating system. It becomes evident that the outcome frame of a message does not affect any of the dependent variables.

Furthermore, it was hypothesized that a self-focused message affects Attitude towards investment in sustainability (H1a), Short-term intention to investment in insulation (H1b), Long-term intention to investment in insulation (H2c), Short-term intention to investment in energy (H1d) and Long-term intention to investment in energy (H1e) more positively than an environment-focused message. However, the results show that the point of reference in a message does not affect any of the dependent variables. Therefore, hypotheses 1a, 1b, 1c, 1d and 1e are not confirmed.

Although no hypotheses were formulated for the main effect of Regulatory focus on message effectiveness, the results show an effect of Regulatory focus on Long-term intention to invest in an alternative heating system ($F(5, 159) = 8.500$, $p < .01$). Post hoc comparisons using Bonferroni correction indicated that the mean score for Long-term intention to invest in an alternative heating system is significantly higher for homeowners with a predominant promotion focus, compared to homeowners with a predominant prevention focus ($M_{promotion} = 3.76$; $M_{prevention} = 3.31$, $F(1, 165) = 8.397$. $p < .01$, $\eta p^2 = 0.046$).

4.3 Interaction effects

4.3.1. Point of reference and Outcome framing

It was hypothesized that message effectiveness is higher when a message is presented in a loss frame combined with a reference to the self, compared to a loss frame combined with a reference to the environment and vice versa (H2a, H2b, H2c, H2d and H2e). The results reveal an interaction effect of Point of reference and Outcome frame on Short-term intention to invest in an alternative heating system ($F(1,162) = 5.534$, $p < .05$, $\eta p^2 = 0.029$), which could also be detected by looking at Figure 2. A simple effects analysis shows that Short-term intention to invest in an alternative heating system is significantly higher in the self/loss condition, compared to the self/gain condition ($M_{self/loss} = 3.03$; $M_{self/gain} = 2.61$,

F(1, 166) = 4.230. p < .05). Conversely, Short-term intention to invest in an alternative heating system is higher in the environment/gain condition compared to the environment/loss condition. However, the mean difference is not significant.

Therefore, it could be stated that hypothesis 2d is partly confirmed, as Short-term intention to invest in an alternative heating system increases when a loss frame is combined with a reference to the self, compared to the combination of a loss frame with a reference to the environment. Since the mean difference between the environment/gain condition and the environment/loss condition is not significant, that part of hypothesis 2d is not confirmed. Furthermore, it should be noted that Short-term intention to invest in an alternative heating system is only a fraction of behavioral intention. The interaction between Point of reference and Outcome frame does not account for remaining dependent variables. Hence, hypothesis 2a, 2b, 2c and 2e are not confirmed.

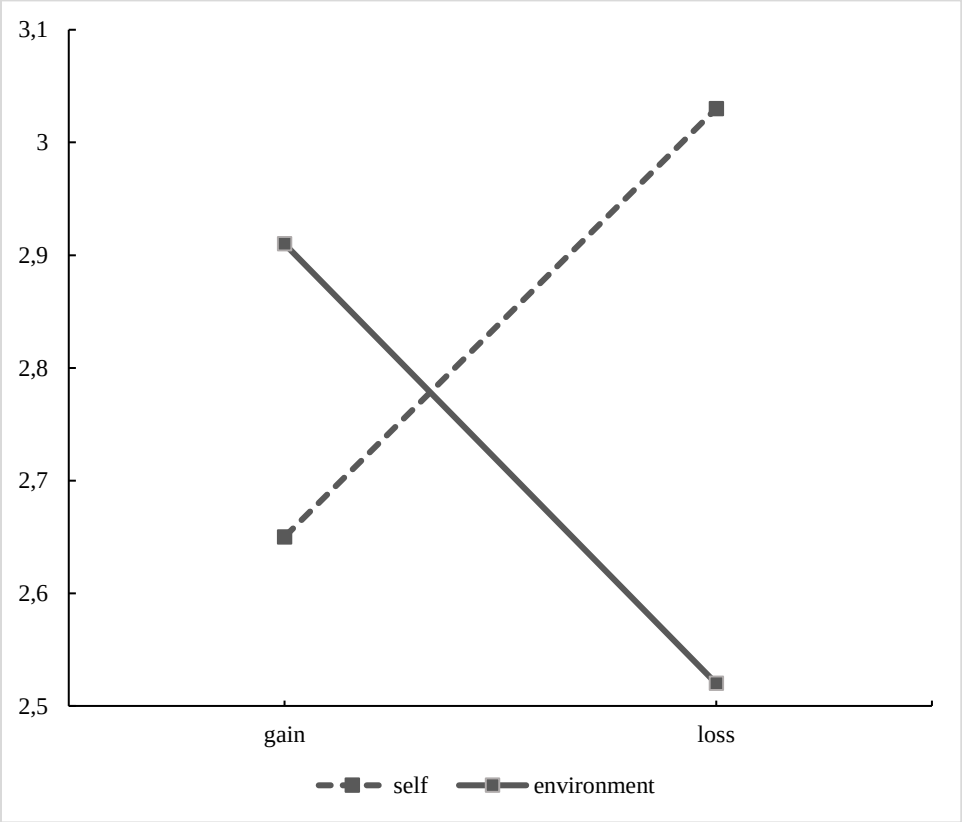

Figure 2. Interaction effect of Point of reference and Outcome frame on Short-term intention to invest in an alternative heating system.

4.3.2. Regulatory focus and Outcome framing

It was hypothesized that message effectiveness is higher when the Outcome frame used in a message is congruent with a recipient's Regulatory focus (H3a, H3b, H3c, H3d and H3e). The results reveal an

interaction effect of Regulatory focus and Outcome frame on Short-term intention to invest in insulation ($F(1,163) = 4.921$, $p < .05$, $\eta p^2 = 0.027$), which could also be detected by looking at Figure 3 A simple effects analysis shows that Short-term intention to invest in insulation is significantly higher when the message is presented in a gain frame to someone with a promotion focus, compared to someone with a prevention focus ($M_{gain/promotion} = 3.33$; $M_{gain/prevention} = 2.79$, $F(1, 166) = 4.824$. $p < .05$). Conversely, Short-term intention to invest in insulation is significantly higher when the message is presented in a loss frame to someone with a prevention focus, compared to someone with a promotion focus ($M_{loss/prevention} = 3.20$; $M_{loss/promotion} = 2.71$, $F(1, 166) = 3.910$. $p = .05$).

Therefore, it could be stated that hypothesis 3b is confirmed, as Short-term intention to invest in insulation increases when the Outcome frame in a message is congruent with a recipient's regulatory focus, compared to when Outcome frame and Regulatory focus are incongruent. Furthermore, it should be noted that Short-term intention to invest in insulation is only a fraction of behavioral intention. The interaction between Regulatory focus and Outcome frame does not account for remaining dependent variables. Hence, hypothesis 2a, 2b, 2c and 2e are not confirmed.

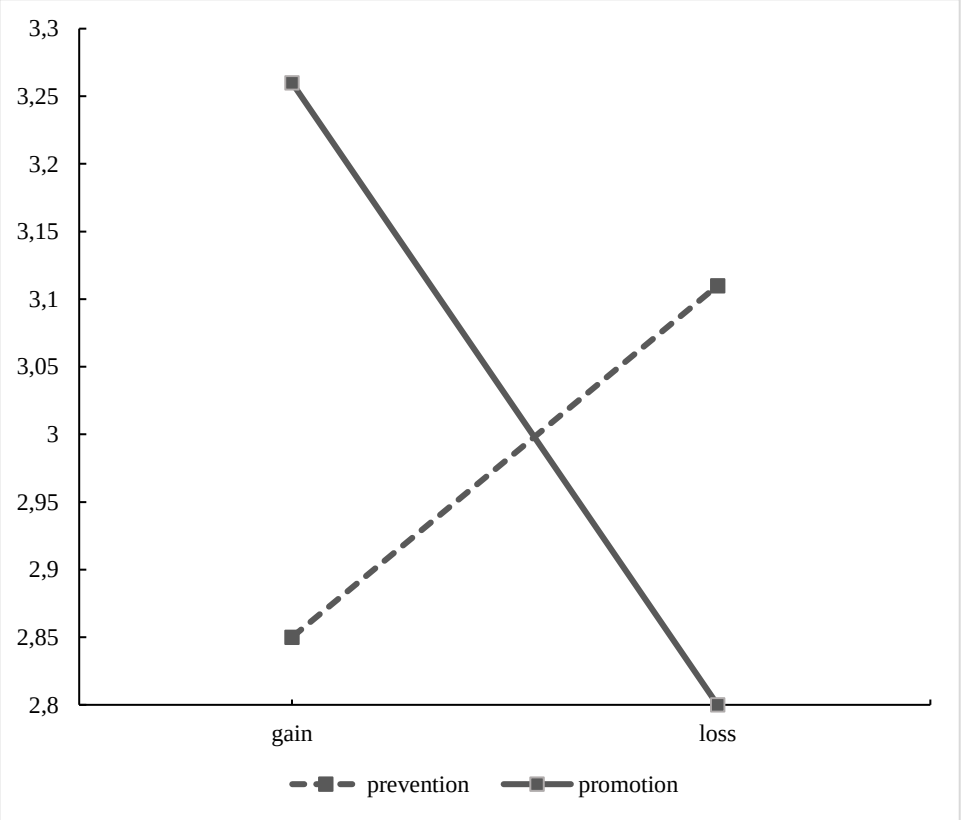

Figure 3. Interaction effect of Regulatory focus and Outcome frame on Short-term intention to invest in insulation.

4.3.3. Reference point and Regulatory focus

It was hypothesized that message effectiveness would be higher if the message is self-referencing and presented to someone with a promotion focus, compared to someone with a prevention focus. Moreover, it was hypothesized that message effectiveness would be higher if the message is environment-referencing and presented to someone with a prevention focus, compared to someone with a promotion focus (H4a, H4b, H4c, H4d and H4e). However, the results provide no support for these hypotheses. Therefore, hypotheses 4a, 4b, 4c, 4d and 4e are not confirmed.

When testing the interaction term between Point of reference and Regulatory focus across the different levels of the covariates (Insulation grade, Gas connection and Environmental concern) no effects are shown either.

4.4 Multivariate test of effects

In addition to ANOVA's for the effects of the independent variables on the different dependent variables, a MANOVA was performed that controls for type I errors that might occur when multiple ANOVA's are conducted independently. Table 6 shows the results of MANOVA for the effects of the independent variables on the set of dependent variables. The results indicate that the effects of the independent ANOVA's dissolve when instead of the F-value for univariate effects, the F-value Wilks' Lambda for multivariate effects is tested for its significance.

Table 6

MANOVA results for the effects of the independent variables on the set of dependent variables

	MANOVA		
Independent variable	Wilks' Λ	*df*	F-value
Environmental concern	.953	5, 155	1.53
Insulation grade	.807	5, 155	7.42***
Gas connection (yes/no)	.842	5, 155	5.81***
Regulatory focus	.959	5, 155	1.31
Outcome frame	.983	5, 155	0.53
Point of reference	.963	5, 155	1.19
Outcome frame * Point of reference	.968	5, 155	1.02
Outcome frame * Regulatory focus	.966	5, 155	1.08
Point of reference * Regulatory focus	.950	5, 155	1.63
Outcome frame * Point of reference * Regulatory focus	.978	5, 155	0.71

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

4.5 The moderating effect of Type of house

An additional analysis was performed, to examine whether Type of house would moderate the effects of the independent variables on the dependent variables. Table 7 shows the MANOVA results after Type of house was added to the model. It becomes evident that by adding more information to the model, the multivariate effect of the interaction between Outcome frame and Regulatory focus on the dependent variables becomes statistically significant, Wilks' Lambda = 0.91, F (5, 148) = 2.85, $p < 0.05$.

When looking at the results of the independent ANOVA's in Table 8, the results show an interaction effect between Outcome Frame and Regulatory focus on Attitude towards investment in the sustainability of the house ($F(1, 152) = 5.77$. $p < .05$, $\eta p^2 = 0.037$), Short-term intention to invest in insulation ($F(1, 152) = 8.344$. $p < .01$, $\eta p^2 = 0.052$) and Short-term intention to invest in an alternative heating system ($F(1, 152) = 6.60$ $p < .05$, $\eta p^2 = 0.042$).

Furthermore, the results reveal a three-way-interaction between Outcome frame, Regulatory focus and Type of house (Wilks' Lambda = 0.92, F (5, 148) = 2.74, $p < 0.05$), which indicates that the effect of the interaction between Outcome frame and Regulatory focus varies across the levels of Type of house. By sorting and splitting the data based on Type of house, an MANOVA could be performed for all levels. Results show that the interaction effect only occurs at two categories: Apartment (Wilks' Lambda = 0.92, F (4, 1) = 6.83, $p < 0.05$) and Detached house (Wilks' Lambda = 0.70, F (5, 33) = 2.74, $p < 0.05$). Aside from Type of house, nor Age, Gender, Educational level or Family composition moderate the effects found in the current research.

Table 7

Results of MANOVA when Type of house is included in the model

Independent variable	MANOVA		
	Wilks' Λ	*df*	*F-value*
Environmental concern	0.982	5, 149	1.41
Insulation grade	0.807	5, 149	7.07***
Gas connection (yes/no)	0.835	5, 149	5.86***
Regulatory focus	0.975	5, 149	0.75
Type of house	0.986	5, 149	0.98
Outcome frame	0.982	5, 149	0.55
Point of reference	0.972	5, 149	0.84
Outcome frame * Point of reference	0.969	5, 149	0.95
Outcome frame * Regulatory focus	0.912	5, 149	2.85*
Point of reference * Regulatory focus	0.957	5, 149	1.35
Outcome frame * Point of reference * Type of house	0.969	5, 149	0.95

Outcome frame * Regulatory focus * Type of house	0.915	5, 149	2.74*
Point of reference * Regulatory focus * Type of house	0.971	5, 149	0.88

Note. $p^{*} < .05$. $^{*}p < .01$. $^{***}p < .001$.

Table 8

Results of ANOVA when Type of house is included in the model

	ANOVA				
	Dependent variables				
	Attitude	SI_I	LI_I	SI_A	LI_A
Independent variable	*F-value*	*F-value*	*F-value*	*F-value*	*F-value*
Environmental concern	3.96*	0.71	1.25	1.80	4.31*
Insulation grade	3.42	13.60***	3.97*	2.00	7.79**
Gas connection (yes/no)	3.62	0.32	0.31	1.60	12.93***
Regulatory focus	0.34	2.76	1.29	2.33	0.51
Type of house	0.38	0.74	0.36	0.04	0.06
Outcome frame	0.28	1.24	0.02	0.08	0.06
Point of reference	0.00	0.63	0.19	1.93	0.14
Outcome frame * Point of reference	0.16	0.58	0.94	0.82	4.60*
Outcome frame * Regulatory focus	5.77*	8.24**	2.06	6.59*	2.46
Point of reference * Regulatory focus	0.42	3.65	0.05	2.79	0.36
Outcome frame * Point of reference * Type of house	0.37	4.67	1.68	2.57	3.67
Outcome frame * Regulatory focus * Type of house	6.23*	5.47*	1.48	7.14**	3.93*
Point of reference * Regulatory focus * Type of house	0.10	3.38	0.27	2.93	0.03

Note. Attitude = Attitude towards investment in sustainability; SI_I = Short-term intention to invest in insulation; LI_I = Long-term intention to invest in insulation; SI_A = Short-term intention to invest in an alternative heating system; LI_A = Long-term intention to invest in an alternative heating system.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

4.6 Conclusion of the results

The results show that Outcome frame enhances Message effectiveness, but only in interaction with Point of reference (H2) and Regulatory focus (H3). Furthermore, it should be noticed that not all dependent variables that are conceptualized as a function of message effectiveness are affected by these interactions. Figure 4 depicts the model as it can be composed based upon the results. Note that the

direct effect of Regulatory focus on Message effectiveness was not anticipated. Finally, although the results show that Type of house moderated the interaction effected between Outcome frame and Regulatory focus, the covariate is not included in the model, since it does not change the nature of the relationship.

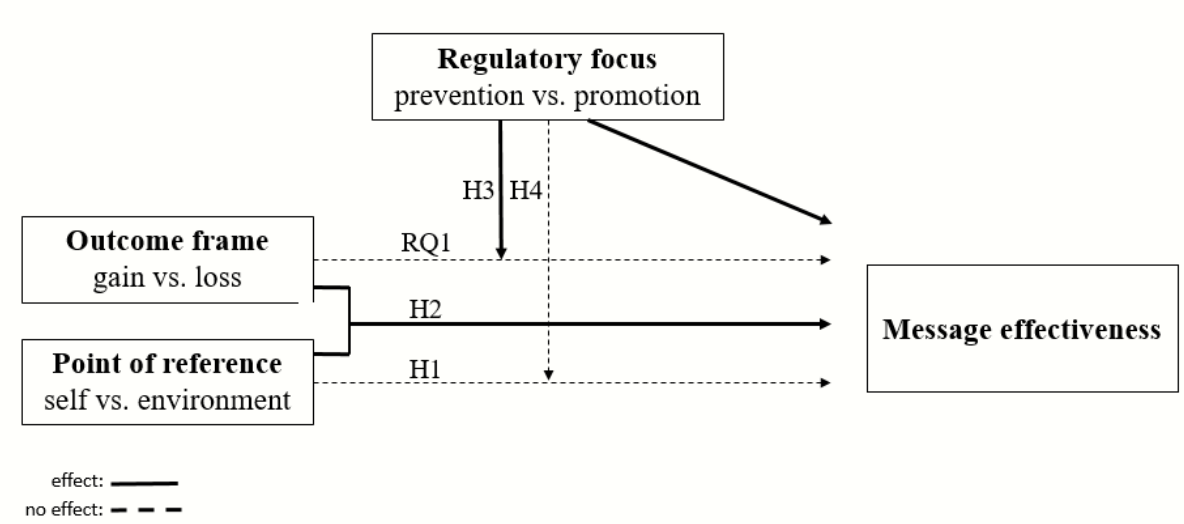

Figure 4. Final model based upon the results.

5. Discussion

The results provide support for the anticipated interaction effect between outcome framing and point of reference on message effectiveness. Short-term intention to invest in an alternative heating system is higher when the negative outcomes of not adhering to the advocated behavior are emphasized, but only if the negative outcomes are directed to the individual. Furthermore, the results provide support for the anticipated interaction effect of the outcome frame and regulatory focus on message effectiveness. Short-term intention to invest in insulation is higher when the outcome is framed in terms of gains of adhering to the behavior, to a recipient with a promotion focus, compared to a recipient with a prevention focus. The reversed is proven to be true as well: short-term intention to invest in insulation is higher when the outcome is framed in terms of losses when not adhering to the advocated behavior to a recipient with a prevention focus, compared to a recipient with a promotion focus. Finally, the results show that the effect of the interaction between outcome frame and regulatory depends on the type of house homeowners live in.

Below, these research findings are discussed in the light of past literature, after which the directions for further research are discussed, as well as the limitations of the current research. Finally, the main conclusion of the research is formulated.

5.1 Discussion of the findings

An important finding of the current research in the light of previous research is that neither the outcome frame of the message, nor the point of reference used affect message effectiveness directly. Interestingly, this does not correspond with the study of Segev et al. (2015), in which main effects were found for both outcome frame (a gain frame was found to be more effective than a loss frame) and point of reference (a reference to the self was found to be more effective than a reference to the environment) on responses to an advertisement for a green washing machine. This discrepancy in findings may be explained by a difference in uncertainties involved in the advocated behavior. It might be the case that the behavioral outcome of using a green washing machine might be more certain than the behavioral outcomes of investment in the sustainability of one's house. The outcome of the latter seems to be far more contingent on a great variety of factors, compared to buying a washing machine. Therefore, the independent effects of outcome frame and point of reference might be muted due to the complex nature of the context in which they are applied.

The interaction effects found in this research, however, are in line with past findings of previous research on the interactive nature of outcome framing effects within the context of pro-environmental communication. Both Loroz (2007) and Segev et al. (2015) found that loss/self messages are more effective than loss/environment messages. Additionally, they both found that gain/environment messages are more effective than gain/self messages. Similar with the current research, the difference in effectiveness between gain/environment and gain/self messages proved not to be significant in both

studies. Likewise, the significant interaction between outcome framing and regulatory focus supports past findings of Cesario et al. (2013) that the effectiveness of an outcome framed in terms of losses or gains, depends upon a recipient's predominant regulatory focus.

With regard to this study's dependent variables that serve as indicators of message effectiveness, two findings are noteworthy. The first finding in this regard is that, in contrast to what was hypothesized, no interaction effects were found of message framing on long-term intention to invest in insulation and long-term intention to invest in an alternative heating solution. A potential explanation is that long-term intentions in general, might be more difficult to influence with the use of message framing than short-term intentions. However, more research is needed in order to empirically support this assumption. Another explanation might be that homeowners are already more willing to invest in the long term, and that influencing these stronger behavioral intentions with message framing might be more difficult than influencing weaker intentions.

The second finding with regard to the dependent variables, is that different interaction effects are found on two different short-term intentions. Namely, the interaction between outcome framing and point of reference only appears to have an significant effect on short-term intention to invest in an alternative heating system, whereas the interaction between outcome framing and regulatory focus only appears to have a significant effect on short-term intention to invest in insulation. Based on this finding, it can be concluded that homeowners might perceive short-term investment in an alternative heating system and short-term investment in insulation differently. When examining what factor may have caused these different interaction effects on these specific behavioral responses, it might be possible that the answer lies within the associated risks involved in these behaviors. If one would assume that investment in an alternative heating system is more risky than investment in insulation, because the return on investment is less certain, insights of prospect theory may offer a possible explanation for the findings of the current study (Levin et al., 1998). This theory imposes that gain frames are more effective under conditions of low perceived risk, whereas loss frames are more effective under conditions of high. This might have contributed to the strength of the effects and might have caused these confounding findings.

Moreover, another interesting finding is that under the conditions of the original model, no interaction effects were found on attitude towards investment in the sustainability of one's house. Two possible explanations could be brought forward for this. The first explanation is that the interacting factors have an effect that goes beyond attitude, and influence the behavioral intention directly and rather unconsciously. This would correspond to the typology of Levin et al. (1998) in which it is stated that unlike attribute framing, outcome framing does not affect the evaluations of an item, but rather the impact of persuasion itself. The second explanation is based on the premise that the pre-existing attitudes

towards investment in the sustainability of one's house were already very positive. Influencing these by the use of message framing might be rather difficult.

Finally, the explanation for not finding any interaction between point of reference and regulatory focus, should be sought in the realm of how these factors have been operationalized. Whereas Aaker and Lee (2001), for example, situationally primed regulatory focus by either focusing on promotion benefits or prevention benefits of a product, the current research measured dispositional regulatory focus. As such, the interaction they have been testing bears more similarities with the operationalization of the interaction between outcome frame and point of reference in the current study. Interestingly, they found an interaction effect between benefits framing (promotion versus prevention) and point of reference in exactly the opposite direction compared to the current study. Namely, promotion/self is more effective than promotion/other, and prevention/others is more effective than prevention/self. Note that these contradicting results are likely caused by the fact that framing benefits, in terms of promotional information or preventative information (as defined by Aaker & Lee, 2001), are conceptually different from framing outcomes in terms of pleasure of adherence, or pain of non-adherence (as defined in the current research).

5.2 Directions for further research

The current research found evidence that homeowners respond differently towards interacting message frames when different behaviors are addressed. Both investment in insulation and investment in an alternative heating system are considered to be important measures in order to make a house more sustainable and less dependent on natural gas. However, it becomes apparent that message frames have different effects when these different types of behaviors are advocated. Therefore, future studies should gain more insight in whether these types of behaviors are really perceived differently by homeowners, and if so: why? As a contribution to message framing theory in general, it might be important to examine to what extent the (perceived) riskiness of a behavior plays a role in how outcome framing, point of reference and regulatory focus interact. This could be studied, for instance, by experimentally manipulating the behavior that is advocated based on the risks involved in the behavior (low vs. high) and examine whether differences in framing effects arise between them.

Furthermore, it is expected that if the advocated behavior in persuasive appeals, in the context of the energy transition, is more specified in terms of what investments are really necessary for all the different types of situations homeowners might be in, the effectiveness of message frames will increase. By doing so, the homeowners are confronted with outcomes of behavior that are more vivid, specific and closer to reality. The finding that the effect of the interaction between point of reference and regulatory focus on message effectiveness depends on the type of house homeowners live in, can be considered support for the added value of targeting a specific audience with ditto information. Experiments, similar to the current research, should be conducted, with the difference being that the

behavior advocated in the persuasive appeal is more aligned with the specific needs of the different types of homeowner. In this way, it can be examined whether an even more personalized approach is indeed more effective.

5.3 Limitations of the research

When interpreting the results of this study, two methodological issues of the research should be taken into account. The first one is related to the construct validity of regulatory predominance. As has been mentioned in the method section, the calculation of regulatory predominance score differs from the conventional method suggested by Higgins et al. (2001). The reason for that is that, due to the translation and transformation of the RFQ, the subscale that measures recipients' promotion focus appeared not to be reliable. A single promotion item was selected to ensure that a predominance score could be calculated. However, by using just a single item, the reliability of the scale cannot truly be assessed. Therefore, one could argue that it is unclear whether the measure used is a valid indicator for regulatory predominance. Nonetheless, it could be argued that the interaction that was found to be statistically significant, together with the direction in which this interaction behaves in relation to message effectiveness, provides sufficient evidence for a valid operationalization of regulatory predominance.

The second methodological issue that should be addressed is related to the reliability of the manipulation check that was used for testing whether outcome framing was successfully manipulated. The two items used for that appeared to have a Cronbach's alpha of $\alpha = .64$, whereof the implied reliability not always happens to be accepted by all scholars (Van Griethuijsen et al., 2015). It could be argued that one could not be sure that the outcome frame was successfully manipulated, as long as the scale that assesses the extent to which it was successful, is not reliable. An explanation for the low reliability of the scale should be sought in the realm of the ambiguity of the item: "*The newsletter was stating the advantages of investing in the sustainability of my house"* (on a 5-point Likert-scale; 1 = strongly disagree, 5 = strongly agree). The potential problem with this item is that under the condition of an outcome framed in terms of losses, it could still be reasonable to agree with the item above. It is expected that some of the participants reported high scores on this item, even though they were in the loss condition, by arguing that the newsletter was indirectly stating advantages of adhering to the behavior, instead of the disadvantages of not adhering to the behavior. Similar to the issue of calculating regulatory focus predominance, it could be argued that the interactions that were found to be statically significant, together with the direction in which these interaction behave in relation to message effectives, provide sufficient evidence for a successful manipulation.

5.4 Conclusion

Overall, it can be concluded that, given the specific context in which the experiment took place, outcome framing effects exist by the virtue of other factors present or absent in a persuasive appeal. This research proves that the outcome frame on itself, used in a communal newsletter advocating investment in a natural-gas-free living, does not affect behavioral intentions directly, but only if the point of reference

of a message and recipients' regulatory focus are taken into consideration as well. It can therefore be concluded that, in order to maximize the likelihood that homeowners will invest in an alternative heating system at short notice, the persuasive appeal should contain a loss frame along with a reference to the self. Finally, this research has found no evidence for a third interaction term that was anticipated: that of point of reference and regulatory focus. It could be concluded that the effect of point of reference on message effectiveness of the persuasive appeal, does not depend upon the recipient's regulatory focus.

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Appendices

Appendix A – Overview of the stimulus material

Figure A1. Screen image of the Gain/Self newsletter.

Figure A2. Screen image of the Gain/Environment newsletter.

Figure A3. Screen image of the Loss/Self newsletter.

Figure A4. Screen image of the Loss/Environment newsletter

Appendix B – Regulatory Focus Questionnaire

Table B1

Translation and transformation of the Regulatory Focus Questionnaire (Higgins et al., 2001)

Construct	Item Higgins et al. (2001)	Current research[a]	Reversed scored item
Promotion focus	1. Compared to most people, are you typically unable to get what you want out of life? (1 = never or seldom, 5 = very often)	1. Ik haal minder uit het leven dan ik eigenlijk zou willen.	Yes
	3. How often have you accomplished things that got you "psyched" to work even harder? (1 = never or seldom, 5 = many times)	3. Als ik een doel bereikt heb ben ik daarna nog gemotiveerder om harder te werken.	Yes
	7. Do you often do well at different things that you try? (1 = never or seldom, 5 = very often)	7. Als ik nieuwe dingen probeer gaat me dat vrijwel altijd goed af.	No
	9. When it comes to achieving things that are important to me, I find that I don't perform as well as I ideally would like to do. (1 = never true, 5 = very often true)	9. Als ik iets doe was belangrijk voor me is, dan presteer ik vaak niet zo goed als ik zou willen.	Yes
	10. I feel like I have made progress toward being successful in my life. (1 = certainly false, 5 = certainly true)	10. Ik heb het idee dat ik steeds succesvoller word in het leven.	No
	11. I have found very few hobbies or activities in my life that capture my interest or motivate me to put effort into them. (1 = certainly false, 5 = certainly true)	11. Ik heb weinig hobby's of bezigheden die mij echt boeien of waar ik veel energie in wil steken.	Yes
Prevention focus	2. Growing up, would you ever "cross the line" by doing things that your parents would not tolerate? (1 = never or seldom, 5 = very often)	2. Als kind heb ik vaak de grenzen van mijn ouders overschreden.	Yes
	4. Did you get on your parents' nerves often when you were growing up? (1 = never or seldom, 5 = very often)	4. Als kind heb ik vaak mijn ouders op de zenuwen gewerkt.	Yes
	5. How often did you obey rules and regulations that were established by your parents? (1 = never or seldom, 5 = always)	5. Als kind was ik vrijwel altijd gehoorzaam aan mijn ouders.	No
	6. Growing up, did you ever act in ways that your parents thought were objectionable? (never or seldom, 5 = very often)	6. Als kind heb ik mij vaak gedragen op een manier die mijn ouders afkeurden.	Yes
	8. Not being careful enough has gotten me into trouble at times. (1 = never or seldom, 5 = very often)	8. Ik ben vaak in de problemen geraakt doordat ik niet voorzichtig genoeg was.	Yes

[a]All items could be scored on a 5-point Likert-scale; 1 = strongly disagree, 5 = strongly agree).

Appendix C – Full version of the online questionnaire

Beste deelnemer,

Hartelijk dank voor uw deelname aan dit onderzoek. Het onderzoek gaat over aardgasvrij wonen en richt zich op huiseigenaren. Het duurt ongeveer 15 minuten. Er zijn geen goede of foute antwoorden. Het gaat alleen om uw mening. Er zal vertrouwelijk met uw gegevens worden omgegaan en resultaten worden anoniem verwerkt. Daarnaast mag u zich altijd terugtrekken uit het onderzoek, zonder dat dit gevolgen heeft. Mocht u nog vragen of opmerkingen hebben over het onderzoek, neem dan contact op met Max Nab. Het onderzoek bestaat uit drie onderdelen: 1) beantwoorden van vragen, 2) lezen van een tekst en 3) beantwoorden van vragen over de tekst. Om het onderzoek te starten, klikt u op het pijltje rechts onderaan. Hiermee geeft u aan akkoord te gaan met de bovengenoemde voorwaarden en geeft u toestemming voor het gebruik van uw antwoorden.

Met vriendelijke groet,

m.j.nab@student.utwente.nl

Allereerst worden er enkele vragen over uzelf gesteld.

Welke situatie is op u van toepassing?

- ○ Ik woon in een koopwoning waar ik (mede)eigenaar van ben.
- ○ Ik woon NIET in een koopwoning waar ik (mede)eigenaar van ben.

Wat is uw geslacht?

- ○ Man
- ○ Vrouw

Wat is uw leeftijd?

_____

Wat is uw hoogst afgeronde opleiding?

- ○ Basisonderwijs/ lagere school
- ○ lbo/ vbo/ vmbo
- ○ Middelbaar beroepsonderwijs (mbo)
- ○ Hoger voortgezet onderwijs (havo of vwo)
- ○ Hoger beroepsonderwijs (hbo)
- ○ Wetenschappelijk onderwijs (universiteit)

Wat is uw gezinssamenstelling?

- ○ Alleenstaand
- ○ Alleenstaand met kind(eren)
- ○ Samenwonend zonder kind(eren)
- ○ Samenwonend met kind(eren)
- ○ Anders, namelijk: _____

In wat voor type woning woont u?

- ○ Appartement
- ○ Vrijstaande woning
- ○ Hoekwoning
- ○ Tussenwoning
- ○ Twee-onder-één-kap
- ○ Anders, namelijk: _____

Vul hieronder de vier cijfers van uw postcode in:

_____

De volgende stellingen gaan over hoe vaak, of in hoeverre zich bepaalde gebeurtenissen hebben voorgedaan in uw leven. Geef per stelling aan in hoeverre u het ermee eens of oneens bent.

	helemaal mee oneens	mee oneens	neutraal	mee eens	helemaal mee eens
Als kind heb ik vaak de grenzen van mijn ouders overschreden.	○	○	○	○	○
Als kind heb ik vaak mijn ouders op de zenuwen gewerkt.	○	○	○	○	○
Als kind heb ik mij vaak gedragen op een manier die mijn ouders afkeurden.	○	○	○	○	○
Als kind was ik vrijwel altijd gehoorzaam aan mijn ouders.	○	○	○	○	○
Ik heb het idee dat ik steeds succesvoller word in het leven.	○	○	○	○	○
Ik ben vaak in de problemen geraakt doordat ik niet voorzichtig genoeg was.	○	○	○	○	○
Als ik nieuwe dingen uitprobeer dan gaat me dat vrijwel altijd goed af.	○	○	○	○	○
Als ik een doel heb bereikt ben ik daarna nog gemotiveerder om harder te werken.	○	○	○	○	○
Als ik iets doe wat belangrijk voor me is, dan presteer ik vaak niet zo goed als ik zou willen.	○	○	○	○	○
Ik heb weinig hobby's of bezigheden die mij echt boeien of waar ik veel energie in wil steken.	○	○	○	○	○
Ik haal minder uit het leven dan ik eigenlijk zou willen.	○	○	○	○	○

U krijgt zo een tekst te lezen. Voordat u deze tekst leest is het belangrijk om u zo goed mogelijk te verplaatsen in het onderstaande scenario. Klik nadat u het scenario gelezen heeft op het pijltje om naar de brochuretekst te gaan.

Scenario

U ontvangt per post een nieuwsbrief van uw gemeente over aardgasvrij wonen. U bent zelf eigenaar van een woning en wilt graag weten wat dit voor huiseigenaren betekent. U leest vervolgens de nieuwsbrief.

Als u op het pijltje klikt verschijnt de nieuwsbrief. Lees de tekst zorgvuldig en beantwoord vervolgens de vragen over de tekst.

Vul onderstaande zin steeds aan met wat voor u het meeste van toepassing is na het lezen van de nieuwsbrief. Investeren in de verduurzaming van mijn woning is:

	1	2	3	4	5	
heel onvoordelig	○	○	○	○	○	heel voordelig
heel onwenselijk	○	○	○	○	○	heel wenselijk
heel onaantrekkelijk	○	○	○	○	○	heel aantrekkelijk
heel onverstandig	○	○	○	○	○	heel verstandig
negatief	○	○	○	○	○	positief

De onderstaande vragen gaan over uw intentie om de komende jaren te investeren in de isolatie van uw woning. Geef aan wat voor u het meest van toepassing is.

In hoeverre is het waarschijnlijk/mogelijk/aannemelijk dat u de komende 5 jaar gaat investeren in de isolatie van uw woning?

	1	2	3	4	5	
heel onwaarschijnlijk	○	○	○	○	○	heel waarschijnlijk
heel onmogelijk	○	○	○	○	○	heel goed mogelijk
heel onaannemelijk	○	○	○	○	○	heel aannemelijk

In hoeverre is het waarschijnlijk/mogelijk/aannemelijk dat u de komende 15 jaar gaat investeren in de isolatie van uw woning?

	1	2	3	4	5	
heel onwaarschijnlijk	○	○	○	○	○	heel waarschijnlijk
heel onmogelijk	○	○	○	○	○	heel goed mogelijk
heel onaannemelijk	○	○	○	○	○	heel aannemelijk

De onderstaande vragen gaan over uw intentie om de komende jaren te investeren in een alternatieve warmtevoorziening voor uw woning. Geef aan wat voor u het meest van toepassing is.

In hoeverre is het waarschijnlijk/mogelijk/aannemelijk dat u de komende 5 jaar gaat investeren in een alternatieve warmtevoorziening voor uw woning?

	1	2	3	4	5	
heel onwaarschijnlijk	○	○	○	○	○	heel waarschijnlijk
heel onmogelijk	○	○	○	○	○	heel goed mogelijk
heel onaannemelijk	○	○	○	○	○	heel aannemelijk

In hoeverre is het waarschijnlijk/mogelijk/aannemelijk dat de komende 15 jaar gaat investeren in een alternatieve warmtevoorziening voor uw woning?

	1	2	3	4	5	
heel onwaarschijnlijk	○	○	○	○	○	heel waarschijnlijk
heel onmogelijk	○	○	○	○	○	heel goed mogelijk
heel onaannemelijk	○	○	○	○	○	heel aannemelijk

De volgende stellingen gaan over de inhoud van de nieuwsbrief. Geef per stelling aan in hoeverre u het ermee eens of oneens bent.

	helemaal mee oneens	mee oneens	neutraal	mee eens	helemaal mee eens
In de nieuwsbrief stonden de minpunten van niet investeren in de verduurzaming van mijn woning.	○	○	○	○	○
In de nieuwsbrief stonden de pluspunten van wel investeren in de verduurzaming van mijn woning.	○	○	○	○	○
De nieuwsbrief benadrukte de gevolgen voor de waarde van mijn woning en de hoogte van mijn energierekening.	○	○	○	○	○
De nieuwsbrief benadrukte de gevolgen voor mijn leefomgeving en die van bewoners van aardbevingsgebieden.	○	○	○	○	○

De volgende vragen gaan over de duurzaamheid van uw woning.

Geef aan in hoeverre uw woning op dit moment goed geïsoleerd is, waarbij 1 = heel slecht geïsoleerd en 7 = heel goed geïsoleerd.

	1	2	3	4	5	6	7	
heel slecht geïsoleerd	○	○	○	○	○	○	○	heel goed geïsoleerd

Maakt u gebruik van aardgas voor de verwarming van uw woning?

- ○ Ja
- ○ Nee

De volgende stelling gaan over uw betrokkenheid bij het milieu. Geef per stelling aan in hoeverre u het ermee eens of oneens bent.

	helemaal mee oneens	mee oneens	neutraal	mee eens	helemaal mee eens
Ik maak mij veel zorgen om het milieu.	○	○	○	○	○
Mensen maken ernstig misbruik van het milieu.	○	○	○	○	○
Ik zou mijn energieverbruik willen verlagen om te helpen het milieu te beschermen.	○	○	○	○	○
Ik wil graag bijdragen aan een beter milieu.	○	○	○	○	○
Regels die milieuvervuiling tegengaan zouden strenger moeten worden gehandhaafd	○	○	○	○	○

U bent bijna aangekomen bij het einde van het onderzoek. Vul hieronder uw e-mailadres in als u mee wilt doen met de verloting van 6 VVV-bonnen ter waarde van €25,-. De trekking vindt plaats op 1 juni 2019. Met de winnaars wordt contact gezocht via e-mail.

_____

Bedankt voor uw deelname. Klik op het pijltje om de vragenlijst te versturen. Daarna kunt u de pagina afsluiten. Als u nog een opmerking heeft over het onderzoek kunt u die hieronder kwijt. Voor vragen over het onderzoek kunt u een e-mail sturen naar m.j.nab@student.utwente.nl.

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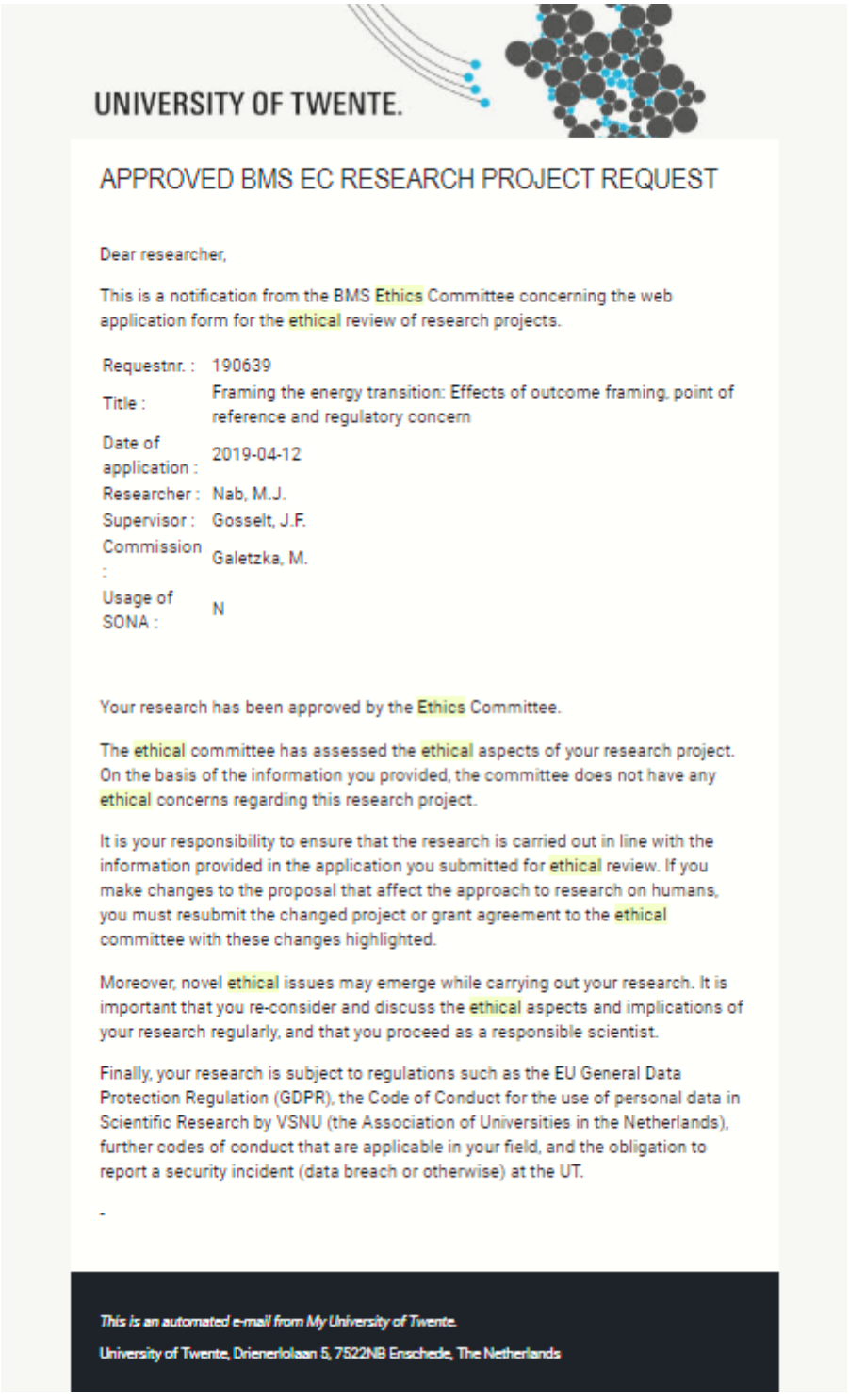
Appendix D – Approval Ethical Committee



UNIVERSITY OF TWENTE.

APPROVED BMS EC RESEARCH PROJECT REQUEST

Dear researcher,

This is a notification from the BMS Ethics Committee concerning the web application form for the ethical review of research projects.

Requestnr. :	190639
Title :	Framing the energy transition: Effects of outcome framing, point of reference and regulatory concern
Date of application :	2019-04-12
Researcher :	Nab, M.J.
Supervisor :	Gosselt, J.F.
Commission :	Galetzka, M.
Usage of SONA :	N

Your research has been approved by the Ethics Committee.

The ethical committee has assessed the ethical aspects of your research project. On the basis of the information you provided, the committee does not have any ethical concerns regarding this research project.

It is your responsibility to ensure that the research is carried out in line with the information provided in the application you submitted for ethical review. If you make changes to the proposal that affect the approach to research on humans, you must resubmit the changed project or grant agreement to the ethical committee with these changes highlighted.

Moreover, novel ethical issues may emerge while carrying out your research. It is important that you re-consider and discuss the ethical aspects and implications of your research regularly, and that you proceed as a responsible scientist.

Finally, your research is subject to regulations such as the EU General Data Protection Regulation (GDPR), the Code of Conduct for the use of personal data in Scientific Research by VSNU (the Association of Universities in the Netherlands), further codes of conduct that are applicable in your field, and the obligation to report a security incident (data breach or otherwise) at the UT.

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This is an automated e-mail from My University of Twente.

University of Twente, Drienerlolaan 5, 7522NB Enschede, The Netherlands