Social Identity Influences on Risk Perception, Efficacy Beliefs and Behavioural Intention

Master Thesis

Christina Broermann s1674676
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First supervisor: Dr. Ir. P.W. de Vries
Second supervisor: Dr. M. Stel
Department of Psychology of Conflict Risk and Safety
Faculty of Behavioural Management and Social Sciences
University of Twente

Abstract

To improve risk communication and motivate citizens to adopt recommended behaviour to reduce risk for themselves, increasing risk perception and efficacy beliefs are important. An often used model to explain why citizens adapt or ignore recommended behaviour is the Extended Parallel Processing Model. This model however does not take the salient social identity into account even though, according to literature, this can influence efficacy beliefs, risk perception and behaviour. An experiment with 194 participants was conducted, where the salient social identity was manipulated. Self-efficacy, group efficacy, risk perception, attitude, uncertainty and behavioural intention were measured. In addition to that, past experiences and verbal persuasion were measured because these variables play a crucial role in the development of efficacy beliefs. It was expected that self-efficacy and group efficacy mediate the relationship between social identity and the intention to perform protective behavior. Furthermore, it was expected that risk perception moderates the effect of social identity on efficacy beliefs. Results show that self-efficacy is a mediator for the relation between social identity and behavioural intention. The effect of this mediation however depends on the level of risk perception. At an above average level of risk perception, the effect of social identity on self-efficacy beliefs becomes negative. This effect was not found for group efficacy. Past experiences and verbal persuasion did not predict efficacy levels in this study. The identity manipulation did not work as intended. The results therefore have limited informative value.

Introduction

When the government or other organizations want to inform about possible risks that pose a threat to the health of citizens, they often make use of warning messages and interventions which contain important information and instructions on how to respond to certain types of risks or emergencies (crisis.nl; warnung.bund.de; www.gov.uk/government/publications /personal-flood-plan). These messages or interventions contain important information and instructions on how to reduce certain types of risks such as diseases or prepare for emergencies such as extreme weather or earthquakes. Frameworks such as the Extended Parallel Processing Model are used in a variety of contexts to predict how people react to messages that contain information about risk. This model focuses on aspects such as an individual's risk perception and efficacy beliefs. However, citizens often ignore risk information because they either believe that the risk is not relevant for them or they feel unable to reduce or prevent possible harm (Seebauer & Babcicky, 2018).

Choices that people take after receiving risk-related information can be heavily influenced by their peer group or influenced by the social identity that is currently salient, for example having a social identity as a senior citizen, immigrant or resident of a particular neighbourhood. The influence of social identity is not included in the framework of the Extended Parallel Processing Model (Witte, 1992), even though it could be an important contributor to efficacy beliefs.

According to Oyserman, Fryberg, and Yoder (2007) and Cole and Fellows (2008), members of ethnic minorities for example, are more likely to ignore health-related messages if the unhealthy behaviour is seen as part of their social identity or when their trust in authorities is low. An example that the authors mention in their study is that racial-ethnic minorities have less intention to eat healthy, get enough sleep and exercise regularly and at the same time view these activities as typical "white middle class" behaviour.

Studies in the field of health have also shown that social identity plays an important role in adopting healthy behaviours such as to stop smoking or going to regular medical checkups (Phua, 2014; Harwood & Sparks, 2003). Furthermore, peer feedback influences our risk perception as claimed by Schmiege, Klein, and Bryan (2009). This can even lead to more trust in the opinion of peers who may have a lower or higher risk perception than the actual risk that is communicated by experts. Especially when two sources of expert information

communicate different information, the uncertainty leads people to trust more in the opinion of their peers (Schmiege et al., 2009; Blok, Jensen, & Kaltoft, 2008).

It is important to understand that the social identity, which is salient, influences how we perceive the risk and how we act on it because choices about risk-related topics are often not taken in isolation but within a social setting (Bougheas, Nieboer &, Sefton, 2013).

Studies in the health field suggest that social identity influences risk perception, self-efficacy and group efficacy. The effectiveness of risk communication could therefore be increased by addressing the specific social identity of the target audience and increase the feeling of "being in a group" to get people to an adequate level of risk perception and enhance protective behaviour.

This leads to the following research question:

To what extent does the salient social identity influence risk perception and efficacy beliefs, which in turn influence the intention to perform self-protective behaviour?

Theoretical framework

Risk communication. In order to motivate citizens to perform protective behaviour, risk communication must address risk perception and efficacy beliefs in combination with concrete instructions on how to deal with the risk. The goal of risk communication is to make the general public aware of relevant risks and convince them to adopt risk reducing or risk preventing behaviour (Reynolds & Seeger, 2005).

Risk communication includes warning people before a potential risk can actually happen but also during or after to give advice on how to protect oneself from possible harm. Risk communication messages should not only contain basic information on what can happen or has happened, but also understandable advice on how to prevent harm or how to minimize harm as much as possible. It is important that the receiver of the risk communication message is aware of the severity and understands the instructions to prevent or minimize harm. Therefore, fear appeal messages are used to evoke a necessary level of risk perception.

As already mentioned, the Extended Parallel Processing Model describes how health or safety related messages are processed. According to this model, it is essential that people have a sufficient level of risk perception so they understand that they are or will be exposed to possible harm. At the same time, it is important that people also have a sufficient level of

efficacy beliefs (Witte, 1992). This means that they feel capable of performing self-protective behaviour and also feel confident that this behaviour will be effective in preventing or minimizing harm.

Extended Parallel Processing Model. The Extended Parallel Processing Model (EPPM) can be used to explain how people process and respond to fear appeal messages. It integrates theories such as the Protection Motivation Theory (Maddux & Rogers, 1983) and the Parallel Process Model (Witte, 1992). The EPPM has been used and tested in many studies about health related topics.

According to this model, processing and responding to fear appeal messages can go in two directions. The receiver either engages in danger control, for example by performing protective behaviour, or fear control by not performing protective behaviour. According to Witte (1996), danger control is a cognitive process that leads people to think of possible strategies to avoid a threat. Fear control on the other hand is an emotional process that is caused by high levels of fear and the belief that the recommended behavior cannot be performed or that the behavior is ineffective in avoiding threat. Fear control prevents danger control responses. Perceived severity, susceptibility of the risk, the individual level of self-efficacy and response-efficacy influence perceived efficacy and perceived threat, which determines whether the receiver engages in danger control or fear control (Rintamaki & Yang, 2014). When perceived threat and perceived efficacy levels are high, the receiver will likely engage in protective behaviour (danger control). When perceived threat is high while perceived efficacy remains low, the receiver will engage in fear control processes which means that he or she will show a defensive motivation that includes defensive avoidance, reactance or denial (Witte & Allen, 2000).

Rintamaki and Yang (2014) also propose the addition of the factor “response costs” to the EPPM model. Response cost describes possible drawbacks of the protective behaviour that has to be performed that influences the decision of the receiver to engage in protective behaviour or not. Even when efficacy beliefs and perceived threat have a sufficient level, high response cost can prevent the receiver from performing protective behaviour (Rintamaki & Yang, 2014). Furthermore, group influences such as the current salient social identity are not included in this model.

The influence of social identity is not mentioned in the EEPM model even though it plays an important role in the context of risk communication. Therefore, adding this factor to the model might be a way of improving risk communication.

Social Identity Theory. Social identity can be defined as " [...] part of an individual's self-concept which derives from his knowledge of his membership of a social group (or groups) together with the emotional significance attached to that membership" (Tajfel, 1974). Someone's social identity is based on a social categorization, which is an automatic process of classifying people based on categories such as age, gender or nationality (Tajfel & Turner, 1979). Once this has happened, we often think of others in stereotypical ways.

We also categorize ourselves and accept socially shared generalizations about these categories (Turner, Oakes, Haslam, & McGarty, 1994). When people categorize themselves, they often conform to the shared thoughts, feelings and behaviour of their ingroup, even if these perceptions are not their own (Hogg & Reid, 2006). When people perceive themselves to be a member of a certain group, they are motivated to reach agreement with the rest of the group and adapt their behaviour (Haslam, Jetten, Postmes, & Haslam, 2009).

Identification with different groups is an essential part of forming a social identity and provides orientation for self-reference (Tajfel & Turner, 1979).
Therefore, people strive to maintain a positive social identity. This can be achieved by comparison with a relevant out-group. Furthermore, people add high value to positive evaluations from ingroup members (Phua, 2014). According to Festinger's theory of social comparison, circumstances that evoke confusion and uncertainty lead to negative emotions such as anxiety and a high need for information. To resolve these negative emotions and fill the need for more information to reduce uncertainty, people tend to affiliate more with a group and compare themselves to others (Festinger, 1954). This is very relevant for the context of risk communication, because many risks that have a low familiarity create higher levels of uncertainty among the general public (Reynolds & Seeger, 2005).

According to Cooper and Rege (2011), individuals are also more likely to change their decisions if they differ from the majority choice of other group members. This could mean that even if an individual perceives the risk to him or herself as high and would perform self-protective behaviour, he or she can be prevented from doing so when the social identity is very important to that person or after comparing with other group members who decide to ignore the recommendations to prevent harm.

Efficacy Beliefs. As mentioned above, the salient social identity can influence beliefs and behavior of an individual. In the EPPM model, confidence in the recommended behavior is crucial for the motivation to perform danger control instead of fear control. Confidence in being able to cope with a situation is often described with the term "efficacy", which is an important factor when looking at risk communication and risk management. Efficacy can be described as the belief of someone's capability to perform a certain task and reach a positive outcome. Efficacy exists on a personal level (self-efficacy) and on group level (group efficacy). The latter can be described as one's collective belief that group-related problems can be solved by collective effort (Bandura 1997) .

Self-efficacy develops through verbal persuasion, emotional arousal and is based on past performance and similar experiences (Bandura, 1997). Seeing others being successful with their actions, being persuaded enhances efficacy (Bandura, 1997). Other group members can therefore have a significant influence on the self-efficacy of an individual and the group efficacy.

According to Gibson (1999) and Tasa, Taggar, and Seijts (2007) group efficacy develops in a different way than self-efficacy does. Group efficacy develops through group interaction. When members collectively exchange information about the task and their previous experiences with a similar situation, collective efficacy beliefs can be increased. If this is also the case for risk factors such as flooding or individual health risks is questionable because pro-environment behaviour must be adapted by a lot of people to have an actual effect in contrast to risk reducing behaviour such as stop smoking or prepare own house for flooding.

High identification with a social group increases social support which in turn raises self-efficacy beliefs (Chiu, Huang, Cheng, & Sun, 2015). In the context of risk communication, it is possible that group members have stronger efficacy beliefs when they identify strongly with their group. However, it is also possible that a strong relationship with the group leads to less efficacy beliefs because members do not share information and experiences with each other or they convince others that adapting protective behaviour will not be effective. Influencing the factors, for example group interaction, that have an effect on efficacy beliefs so that levels of self and group efficacy are high can be an important addition to risk communication.

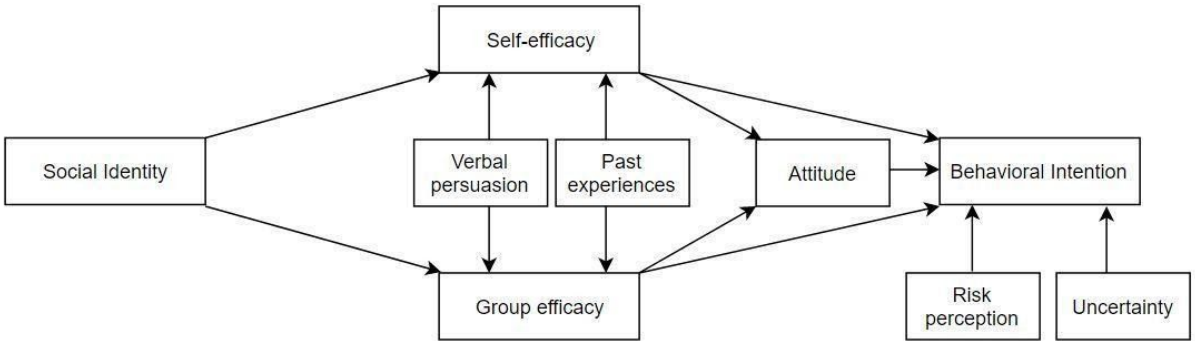

Figure 1. Model connecting social identity to efficacy beliefs and the intention to adapt behaviour influenced by verbal persuasion, past experiences, attitude, risk perception and uncertainty.

The current study

To answer the above mentioned research question: "To what extent does the salient social identity influence risk perception, efficacy beliefs which in turn influence the intention to perform self-protective behaviour?", a study design with different levels of social identification was chosen. The context of climate change was chosen since this is a topic that is relevant to everyone and everyone is familiar with. To make different social identities salient, three levels of social identity were chosen. The first one is a more locally oriented social identity. The second one is a more nationally oriented identity the third one where no social identity manipulation takes place. It is expected that people identify stronger with their group in the locally oriented identity group than with the nationally oriented one. These social identities were chosen because they are clearly distinguishable. In this study, the behaviour for the context of climate change is the decision to vote for building wind turbines. Since the study uses a vignette to introduce the topic and the identity manipulation, the actual behaviour cannot be measured so instead the behavioural intention and attitude towards wind turbines and voting are measured. Because efficacy beliefs are also influenced by past experiences and verbal persuasion, participants are asked to indicate how much experience with that topic they had prior to this study and how often others expressed a positive opinion about wind turbines when the participant spoke to someone from their home country or home town. The level of risk perception and uncertainty about the effects of climate change are also measured in addition to the other variables.

It is expected that when the social identity is manipulated and people are reminded that they belong to a certain group, they will feel more confident in performing the behavior and therefore they show higher levels of self-efficacy and group efficacy beliefs.

There should be a difference between the local identity and the national identity because it is expected that people with a more nationally oriented identity focus more on the environmental and economical benefits of building wind turbines because they do think about negative consequences such as the change in the landscape or noise that could affect them if wind turbines in their country would be build close to where they live. Therefore the acceptance of wind turbines would differ between these two groups.

H1a: Participants in the "National Identity" and "Local Identity" group score significantly higher on self-efficacy and group efficacy than participants in the control group.

H1b: Participants in the "National Identity" group score significantly higher on self-efficacy and group efficacy than participants in the "Local Identity"group.

Because experiences with the same or a similar situation in the past and verbal persuasion from other group members are a major influence on the development of efficacy beliefs, it is expected that these two variables predict efficacy beliefs.

H2: A high level of past experiences and frequent exposure to verbal persuasion (positive opinions towards wind turbines) predict high levels of self-efficacy and group efficacy.

Because identifying with a group influences efficacy beliefs, it is expected that social identity influences efficacy beliefs which in turn influence behavioral intention.

H3: The effect of social identity on behavioural intention is mediated by self-efficacy and group efficacy and moderated by risk perception.

A high level of risk perception is necessary to be motivated to perform recommended behavior in order to reduce risk. When enough information is provided and the recommended behavior is clear, uncertainty about the risk should be lower and therefore, the intention to perform the recommended behavior should be higher.

H4: High levels of risk perception and low uncertainty predict a higher intention to vote in favor of wind turbines.

Method

Participants and Design

In total, 194 participants filled in the survey. The sample consists of 54 men and 140 women between the ages 18 and 67 (M = 23.43 SD = 8.33). 147 German, 24 Dutch and 23 participants with another nationality participated. The vast majority of participants reported VWO/Abitur or a high school diploma as their highest level of education (136) followed by 27 with a bachelor diploma. The data of participants who did not fully complete the survey were deleted. About 100 participants were recruited via convenience sampling through the test subject pool of the University of Twente and the remaining participants were also recruited via convenience sampling directly through the researcher and by snowball sampling.

All participants were randomly assigned to one of three groups (65 assigned to national identity, 64 to local identity and 65 to the control group).

For this experiment, a one factor between-subjects design with three levels was chosen with the independent variable social identity, which is manipulated to be either more national or local or not manipulated and the dependent variables self-efficacy, group efficacy. uncertainty, risk-perception, behavioural intention, verbal persuasion and past experiences.

Procedure

Participants were able to access the online survey via a link and received a brief introduction text about the study purpose and what participants were expected to do (see Appendix A). The true study purpose however was not revealed to the participants. Instead, the purpose was described as efficacy beliefs on the reduction of CO^2 emissions.

Participants were able to choose to take the survey in either English or German. After agreeing to the informed consent, participants were asked to answer questions about demographic variables. After that, each participant was randomly assigned to either the national identity group, the local identity group or the control group. Participants in the national identity group were asked in which country they grew up or lived for the longest time and participants in the local identity group were asked to name the city or village they grew up in or lived for the longest time. The control group did not include receiving these questions.

Each group was then presented with a text that first briefly introduced the topic of climate change. It included the social identity manipulation and mentioned possible negative

consequences and the risk that can result from it if CO^2 emissions are not reduced in the future (see Appendix B). In order to reduce the emissions, the construction of wind turbines is planned. The intention of behaviour is introduced with an upcoming voting where the participant can take part in to either vote in favor or against the plan to build wind turbines in his or her home country or home town.

The difference between the three experimental groups lied in the use of either "your home country plans to build [...]" or "your home town or village plans to build [...]". The answer on the question where the participant grew up is inserted as piped text. In the control group, the country and place of the planned wind turbines is not specifically mentioned.

After reading the information text with the social identity manipulation, participants answered questions about self-efficacy and group efficacy beliefs, their level of risk perception and uncertainty, if they had talked about wind turbines with people of their country or home town and if so, if people did voice a positive opinion about that topic. Participants were then asked about their attitude towards wind turbines and intention to vote in favor of them. To check if the identity manipulation was successful, the participants were asked to indicate how much they identify with their group. After answering all question items, participants were thanked for their participation and received a short debriefing text which explained the true purpose of this study.

Measures

To measure the dependent variables uncertainty, risk perception, self-efficacy, group-efficacy and behavioural intention and the independent variables past experiences and verbal persuasion, several scales were used. All items except for the manipulation check (IOS) scale were measured on a 5-point Likert scale.

Self-efficacy and group efficacy scale. The levels of self-efficacy and group efficacy were each measured with five items. Possible answers ranged from "strongly disagree" to "strongly agree". Both scales are derived from the risk behaviour diagnosis scale (Witte, Meyer, & Martell, 2001) and were adapted to the context of CO^2 emissions and climate change (see Appendix C). Self-efficacy was measured with items that measure the extent to which the individual participant feels capable of voting in favor of wind turbines. Examples of these items are "I am able to vote in favor of wind turbines to prevent or minimize dangers of climate change" and "I am confident that voting in favor of wind turbines prevents or

minimizes the dangers of climate change." This scale has a high internal consistency of cronbach's alpha and guttman's lambda 2 ($\alpha = .84$, $\lambda^2 = .84$).

The items measuring group efficacy were almost identical to the self-efficacy items, but instead of "I am able to" or "I am confident", the pronoun 'I' was replaced by "we" or "my group" and were phrased for example as "Together with my group, we are able to vote in favor of wind turbines to prevent or minimize the dangers of climate change." (see Appendix C). Group efficacy also has a high internal consistency ($\alpha = .85$, $\lambda^2 = .85$) and was also measured with 5 items.

Risk perception scale. The risk perception scale is also derived from the risk behaviour diagnosis scale (Witte et al., 2001) and consists of a susceptibility and severity subscale with three items with answers ranging from "strongly disagree" to "strongly agree" each. The items measure if the participant feels that he or she thinks climate change is a general risk, that he or she will directly experience the consequences of climate change, that it is a serious threat, that it can be harmful and the possible risks are severe (see Appendix C). This scale has an alpha value of $\alpha = .81$ and a lambda 2 value of $\lambda^2 = .83$.

Uncertainty Scale. Uncertainty was measured with four items with possible answers ranging from "strongly disagree" to "strongly agree". Cronbach's alpha and Guttman's lambda 2 values are ($\alpha = .46$, $\lambda^2 = .54$) This scale is based on the "Intolerance of Uncertainty Scale" by Carleton, Norton, and Asmundson (2007) and was adapted to match the context of climate change. These items measure the extent to which the participant is unsure about what to expect due to climate change, if he or she thinks that wind turbines will effectively reduce CO^2 emissions and if he or she feels overwhelmed and upset about the possible effects of climate change (see Appendix C). Due to the low reliability of this scale, uncertainty was excluded from further analysis.

Previous experience. The amount of previous experience with the topic of wind turbines was measured with two items "How often have you been confronted with the topic of building wind turbines (in) [home country of home town/village were inserted as piped text or no piped text in the controlgroup]? (apart from this survey)" and "How often have you talked with people (in) [home country of home town/village were inserted as piped text] about that topic?" The answer options ranged from "never" to "very often". This scale has an internal consistency of $\alpha = .85$ and $\lambda^2 = .85$.

Verbal persuasion. Verbal persuasion was measured with only one item "How often did people (in) [home country of home town/village were inserted as piped text] express a positive opinion of wind turbines?". This item was also measured on a 5-Point Likert scale ranging from "never" to "very often". This question only had to be answered if participants indicated that they ever talked to others about this topic before.

Behavioural intention and attitude scale. The behavioural intention was also measured with only one item "After reading about the plans to build more wind turbines, how likely are you to vote in favor of these plans?". The possible answers ranged from "very unlikely" to "very likely".

Related to the behavioural attention is the attitude towards wind turbines. To measure this variable, a scale with four items was used that asked participants how willing they are to accept the noises, look in the landscape, the costs of wind turbines and how their general attitude towards wind turbines is. The attitude scale has an alpha value of $\alpha = .78$ and an lamda value of $\lambda^2 = .78$.

Identification (manipulation check). To check if the identity manipulation worked as intended, the "Inclusion of the Other in the Self" (IOS) by Aron, Aron, and Smollan (1992) was used. The IOS asks participants to assess their relationship with the relevant group by selecting one of the seven overlapping circles that best describes their relationship with that group. One circle stands for the self, the other for the group. Respondents chose the picture that answers the question "Which picture best describes your relationship with [the group]" (see Appendix C).

Results

For a general overview of the scores on the scales, the means and standard deviations were calculated first followed by correlations among all variables (see table 1). To test if past experiences and verbal persuasion predict self-efficacy and group efficacy (hypothesis 2), multiple linear regression was conducted. Hypotheses 1a, 1b, 3 and 4 are tested after that with a set of multiple linear regression analysis in a moderated mediation model.

Means, Standard Deviation and Correlations

The average level of self-efficacy was quite high ($M = 4.15$, $SD = 0.73$), while the scores on group efficacy were somewhat lower ($M = 3.84$, $SD = 0.76$). Participants also scored high on the level of risk perception ($M = 4.45$, $SD = 0.56$). The average experience with talking about

that topic to others was quite low (*M* = 2.42, *SD* = 0.98), but those who have experience with it, have also experienced being persuaded (*M* = 2.60), *SD* = 1.42) The intention to vote in favor of wind turbines was also quite high among participants (*M* = 4.08, *SD* = 0.80) while the attitude towards wind turbines was also very high (M = 4.08, SD = 0.68)
The identification with the relevant group (IOS) was rather low (M = 3.90, SD = 1.36).

Table 1
Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10
1. Gender										
2. Age	-.08									
3. Ver. Persuasion	.00	.07								
4. Experience	-.03	.26**	.62**							
5. Self-efficacy	.20**	-.08	-.01	.00						
6. Group efficacy	.18*	-.1	.06	.09	.63**					
7. Risk perception	.23**	-.05	.1	.09	.17*	.21**				
8. Behavioural Int.	.16*	-.08	.05	.08	.57**	.36**	.14			
9. Attitude	.07	.01	.21**	.17*	.43**	.23**	.19**	.59**		
10. Identification	.21**	.01	.11	.18*	.14	.20**	.12	.05	.03	

*** p < .001, ** p < .01; * p < .05
[a] N=194

Regression Analyses

To check whether past experiences and verbal persuasion predict the level of self-efficacy and group efficacy (hypothesis 2) or if these variables interact with the effect of social identity on self-efficacy and group efficacy, PROCESS macro for SPSS, model 2 was used. Because the variable "Social identity" is categorical, the variable was contrast coded into "Control vs. Identity manipulation" which compares the control group to the two groups where the social identity was manipulated. The second variable that is used for this analysis is "Local vs. National" which compares the more locally oriented identity to the more nationally oriented identity.

As shown in table 2, past experiences and verbal persuasion do not predict the level of self-efficacy or group efficacy. A moderating effect of past experiences and verbal persuasion on the effect of social identity on self-efficacy and group efficacy was also not found.

Therefore, past experiences and exposure to verbal persuasion did not influence efficacy beliefs and hypothesis 2 cannot be confirmed.

Table 2

Regression results for moderation

Predictor	**Effect on Self-efficacy**		**Effect on Group efficacy**	
	B	**t**	**B**	**t**
Control vs. Manipulation	0.05	0.13	-0.38	-0.98
Past experiences	-0.03	-0.17	0.11	0.63
Control vs Manipulation*Past experiences	0.39	1.51	0.34	1.24
Verbal persuasion	0.03	0.13	0.06	0.26
Control vs Manipulation*Verbal persuasion	-0.70	0.05	-0.39	-1.07
Local vs. National	0.07	0.20	-0.37	-1.10
Local vs. National*Past experiences	0.06	0.27	-0.06	-0.26
Local vs. National*Verbal Persuasion	0.18	0.61	0.03	0.09

Note. All continuous independent variables were mean centered prior to analysis. * p <.05 **p<.01.***p <.001

Moderated Mediation Effects on Behavioural Intention

To examine the proposed conceptual model, PROCESS macro for SPSS was used. Model 8 was chosen for a moderated mediation (see figure 2). To reduce the complexity of the model, attitude was not included in the analysis. As shown in the correlation matrix in table 1, the attitude towards wind turbines and the behavioural intention to vote in favor of them have a strong correlation and these two variables probably measure the same construct.

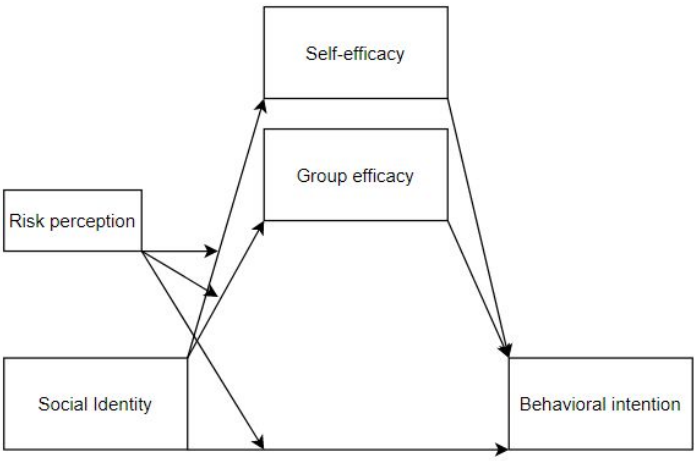

Figure 2 Moderated mediation effect model

Table 3 shows the regression results for model 8. When comparing the control group to the groups where social identity has been manipulated (control vs. identity manipulation), self-efficacy mediates the effect on behavioural intention while risk perception moderates the effect on self-efficacy. Risk perception does moderate the effect of the control vs. identity manipulation variable on self-efficacy. Furthermore, self-efficacy has a significant effect on behavioural intention. This is a full moderated mediation because the interaction of control vs. identity and risk perception on behavioural intention is not significant. When looking at the conditional effects of the control vs. identity manipulation variable on self-efficacy at different levels of risk perception, at 1 standard deviation below the mean level of risk perception, the effect is positive (B = 0.99, t(190) = 1.60, p = .11). At the mean level of risk perception, this effect decreases (B = 0.07, t(190) = 1.84, p = .85). At a 1 standard deviation above the mean level of risk perception, the effect on self-efficacy becomes negative (B = -0.85, t(190) = -1.69, p = .09). When risk perception is low among participants, the effect of social identity on self-efficacy is positive, but when risk perception is high, this effect becomes negative.

When group efficacy is the mediator in the model, the moderated mediation is not significant because the interaction of control vs. identity manipulation and risk perception on group efficacy is not significant and group efficacy does not have an effect on behavioural intention.

When comparing the national identity to the local identity, self-efficacy does not mediate behavioural intention which is moderated by risk perception. The same results apply to group efficacy as a mediator (see Table 3).

Hypothesis 3 can therefore only be partially confirmed since group efficacy is not a significant mediator in the model.

Hypothesis 1a and 1b can also not be confirmed because when comparing the more nationally oriented identification to the more locally oriented, the effect of social identity on self-efficacy and group efficacy is not significant.

Hypothesis 4, claiming that a high level of risk perception predicts a high level of behavioural intention, can also not be confirmed because risk perception alone has no significant effect on behavioural intention.

Table 3

Regression results for moderated mediation

Predictors	Effects on Self-efficacy		Effects on Group efficacy		Effect on Behavioural intention	
	B	t	B	t	B	t
Control vs. manipulation	0.07	0.18	-0.39	-0.99	0.07	1.02
Risk perception	0.13	1.46	0.2	1.88	0.01	0.63
Control vs. manipulation*risk perception	-0.27	-2.12*	-0.16	-0.94	0	0.18
National vs. Local	0.07	0.2	-0.14	-0.41	-0.01	-0.23
National vs. Local * Risk perception	0	-0.03	-0.01	0.08	0.01	0.3
Self-efficacy					0.13	4.71***
Group efficacy					0	-0.1

Note. All continuous independent variables were mean centered prior to analysis. * p <.05 **p<.01.***p <.001

Additional Analysis

To check whether the social identity manipulation had a significant effect on the identification with the group (IOS), a multiple regressions analysis was conducted. Results show that the difference between the control group compared to the groups including an

identity manipulation does not have a significant effect on the level of identification with the group (B = -0.07, $t(191)$ = -0.49, p = .62). The effect was also not significant for the difference between the locally oriented and nationally oriented groups (B = 0.16, $t(191)$ = 1.37, p = .17).

Because the identity manipulation was not successful, the variable identification was used in the moderated mediation model instead of the two contrast coded variables in an additional analysis.

The results in table 4 show that the relation between identification with the group and behavioural intention is not mediated by self-efficacy or group efficacy. Risk perception does have a significant effect on group efficacy and so does identification, but there is no significant moderation.

Self-efficacy does have a significant effect on behavioural intention.

Table 4

Regression results for additional analysis

Predictors	**Effects on Self-efficacy**		**Effects on Group efficacy**		**Effects on Behavioural Intention**	
	B	**t**	**B**	**t**	**B**	**t**
Identification	0.30	1.53	0.48	2.23*	-0.02	-0.50
Risk perception	0.16	1.45	0.21	2.04*	0.01	0.69
Identification*Risk perception	-0.06	-0.78	-0.04	-0.57	0.01	0.47
Self-efficacy					0.13	4.85***
Group efficacy					0	-0.12

Note. All continuous independent variables were mean centered prior to analysis. * p <.05 **p<.01.***p <.001

Discussion

This study aimed to examine the influence of social identity on efficacy beliefs as an addition to the extended parallel processing model. As shown in the first part of the results, verbal persuasion and past experiences did not predict self-efficacy and group efficacy. Furthermore, no effect of verbal persuasion and past experience on efficacy beliefs was found. As mentioned in the beginning, efficacy beliefs develop through verbal persuasion and past

experiences, so according to literature, the effect should have been significant (Bandura, 1997). It is possible that the effect of verbal persuasion on efficacy beliefs for example depends on who someone is talking to or who is persuading the person. In the survey, it was asked if people from their hometown or home country did express a positive opinion about wind turbines. This could have been people who have a big influence on someone's opinion (e.g. parents, siblings or close friends) or people who do not have a significant influence on someone's opinion (e.g. neighbours, acquaintances). Looking further into who expressed a positive opinion might make the relationship between verbal persuasion and efficacy beliefs more clear.

When comparing the two groups where participants were manipulated into either having a more nationally or a more locally oriented identity, self-efficacy is the intermediate factor between the relation of social identity and behavioural intention. It was shown that risk perception has an influence on the effect of social identity on self-efficacy. On a low level of risk perception, the effect of identifying with the group is positive on self-efficacy, even though it is small. The positive effect decreases when risk perception is on an average level. When there is a high level of risk perception among participants, the effect of identifying with a group is negative. This means that when risk perception is low, the identification with a relevant group becomes more important to increase self-efficacy beliefs. When risk perception is already high, the identification with the group can even decrease self-efficacy beliefs. It is possible that belonging to or identifying with a group increases confidence. Being more confident in general might also increase self-efficacy beliefs in this specific context.

In this study, self-efficacy was not the intermediate factor between social identity and the intention to vote in favor of wind turbines for the comparison between the more locally and more nationally oriented groups. It is possible that the difference between the two groups was not big enough.

There was also no effect found for group efficacy as a mediator between social identity and behavioural intention. The salient social identity did not have a significant effect on group efficacy. Furthermore, group efficacy did also not have a significant effect on behavioural intention. Based on these results, it seems like group efficacy does not play an important role in increasing the intention to vote in favor of wind turbines.

Because social identity did not have a direct effect on behavioural intention in this study, it can be concluded that in order to increase the intention to adapt self-protective measures, emphasizing the salient social identity is not sufficient. Communicating information that increases efficacy beliefs and risk perception are necessary to increase the likelihood that citizens will perform protective behaviour. Also, risk perception did not have a direct effect on the behavioural intention to vote in favor of wind turbines. There is also no correlation between these two variables. Simply increasing risk perception does not seem to be sufficient to get citizens to adopt self-protective behaviour. Risk perception only seems to moderate the effect of social identity on self-efficacy. Risk perception also correlates with group efficacy even though in the comparison between the control group and the groups with identity manipulations does not have an effect on group efficacy. The relationship between risk perception and group efficacy is there, but it is not linear. Also emphasizing that the risk is relevant and can have serious consequences is not enough to motivate citizens to perform protective behaviour.

The additional analysis showed that when looking at how much someone identifies with his or her group, the effect on group efficacy is significant. According to Van Zomeren, Leach, and Spears (2010), many studies suggest that the positive correlation between group efficacy and the level of group identification is clear but according to them in the literature it is not clear if the level of social identity increases group efficacy or vice versa. According to their study however, group efficacy leads to group identification. It is therefore not clear if the effectiveness of risk communication could therefore be improved by increasing the feeling of belonging to a certain group to increase group efficacy or vice versa. Even though group efficacy did not have a significant effect on behavioural intention in this study, this variable correlates with self-efficacy beliefs. So when increasing the feeling of belonging to a group to increase group efficacy, the effects on behavioural intention might still be positive. Group efficacy however might play a subordinate role here because most protective behaviours that are recommended in risk communication require individual action. Some protective measures only affect the individual (e.g. advise to drink less alcohol) where in this context self-efficacy beliefs would be much more relevant. But also in contexts where collective action is important (e.g. washing hands regularly during virus outbreaks and staying at home or as described in the vignette, voting in favor of building wind turbines) the individual still needs to perform that protective behaviour individually and can make decisions to do so

individually. Focusing more on self-efficacy beliefs in risk communication might therefore be more effective than focusing on both or group efficacy alone.

Strong points of this study were the inclusion of many different variables that could have a direct or indirect effect on behavioural intention and testing for their interaction with each other and the very distinguishable different social identities that were manipulated. However, it is possible that the vignette was not a suitable method of manipulating the salient social identity, but the fact that the vast majority of participants were students with an average age of 23.43 could have been the main reason why the identity manipulation did not work. Most students probably do not live in their hometown or even home country anymore so they do not feel that closely connected to people still living there. The results might have been different for a participant sample with a wider range of age. Furthermore, instead of asking where the participant grew up should have been replaced by where the citizen currently lives. The decision to ask for where someone grew up was chosen because it was hypothesized that the connection to the hometown or home country would be stronger than to the country or town someone currently lives in because it was clear that the majority of participants would be selected through the test subject pool of the University of Twente.

The reason why the conditional effect of social identity on behavioural intention mediated by self-efficacy was significant but not for group efficacy could also be caused by the rather low identification with the relevant group.

The context of climate change might not have been the most suitable for the participant sample because most students already have a positive attitude towards measures to reduce CO^2 emissions (Poortinga, Spence, Whitmarch, Capstick, & Pidgeon, 2011). Another context where it can be expected that students have more varying opinions might have been better.

Unfortunately, the uncertainty scale had a very low reliability. This scale included items that measure the uncertainty about what to expect from climate change in general and uncertainty about the effectiveness of wind turbines to CO^2 emissions and items that measure if participants feel upset or overwhelmed. These items do not measure one construct, but several. The uncertainty about the effectiveness of wind turbines might also measure the attitude towards wind turbines while the general uncertainty about climate change might include information sufficiency rather than uncertainty.

For future research, this scale should be adapted to increase reliability

The results also show that self-efficacy and group efficacy influence each other. This correlation could also be caused by a third variable that influences both self-efficacy and group efficacy. Individual differences in the locus of control for example could affect how much someone believes he or she is in control to change something through their own efforts. A person with an internal locus of control would feel much more confident that he or she can actively take action to reduce risk and would therefore have a higher level of efficacy beliefs. Someone with a more external locus on control would feel more helpless in general and would therefore already have lower levels of efficacy beliefs.

Whether risk communication should focus more on the increase of self-efficacy or group efficacy dependents on the context of a risk and which behaviour should be adapted to reduce risk, but the results indicate that self-efficacy plays a more important role in increasing behavioural intention than group efficacy. To get valid indication if influencing the salient social identity by emphasizing the membership to a certain group is effective in increasing efficacy beliefs can only be done after improving the identity manipulation and measures of this study.

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Appendix A- Informed Consent

Welcome

This survey is about efficacy beliefs on the reduction of CO^2 emissions. You will be asked to give your opinion on a number of topics; please do not think too much about your answer, as there are no right or wrong answers, but please answer them as honestly as possible. This is a short questionnaire which will take about 10 minutes to complete.

It is important that you read and follow the instructions provided to you closely.

Your participation in this study is strictly voluntary and you may withdraw at any time without the need to give any reason. Your participation will be anonymous and all information will be kept confidential. The duration of this study is no more than 10 minutes.

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher, please contact the Secretary of the Ethics Committee of the Faculty of Behavioural, Management and Social Sciences at the University of Twente: Ethicscommittee-bms@utwente.nl.

If you request further information about the research, now or in the future, you may contact c.broermann@student.utwente.nl

Do you agree in participating in this survey?

Appendix B -Identity Manipulation

Identity Manipulation

National Identity

Please imagine yourself in the following situation:

Climate change is primarily a problem of too much carbon dioxide (CO^2) in the atmosphere. This carbon overload is caused mainly by burning fossil fuels like coal, oil and gas or cutting down and burning forests. If no or insufficient actions are taken to reduce CO^2 emissions, extreme temperatures and weather conditions such as droughts and flooding and an increased air pollution are expected. This can have negative consequences on agriculture, health and safety of people, because extreme weather can significantly reduce the crop yield, make places uninhabitable and cause damage to property, injuries or even death. In order to lower CO^2 emissions, the government of your home country ${q://QID22/ChoiceTextEntryValue} has decided to invest more money into renewable energy. Part of their plan is to build more wind parks in several parts of your home country. Your home country ${q://QID22/ChoiceTextEntryValue} could effectively reduce Co^2 emissions by a significant amount and contribute to the protection of the environment. The government of ${q://QID22/ChoiceTextEntryValue} wants to know more about its citizens' opinion so a voting will take place to decide if these plans will be implemented. All citizens can either vote in favor or against the plan to build new wind turbines.

Local Identity

Please imagine yourself in the following situation:

Climate change is primarily a problem of too much carbon dioxide (CO2) in the atmosphere. This carbon overload is caused mainly by burning fossil fuels like coal, oil and gas or cutting

down and burning forests. If no or insufficient actions are taken to reduce CO^2 emissions, extreme temperatures and weather conditions such as droughts and flooding and an increased air pollution are expected. This can have negative consequences on agriculture, health and safety of people, because extreme weather can significantly reduce the crop yield, make places uninhabitable and cause damage to property, injuries or even death. In order to lower CO^2 emissions, the local government of your home town ${q://QID23/ChoiceTextEntryValue} has decided to invest more money into renewable energy. Part of their plan is to build a wind park next to your home town. Your home town ${q://QID23/ChoiceTextEntryValue} could effectively reduce CO^2 emissions by a significant amount and contribute to the protection of the environment. The local government of ${q://QID23/ChoiceTextEntryValue} wants to know more about its citizens' opinion so a voting will take place to decide if these plans will be implemented. All citizens can either vote in favor or against the plan to build new wind turbines.

Control group (no identity manipulation)

<u>Please imagine yourself in the following situation:</u>

Climate change is primarily a problem of too much carbon dioxide (CO2) in the atmosphere. This carbon overload is caused mainly by burning fossil fuels like coal, oil and gas or cutting down and burning forests. If no or insufficient actions are taken to reduce CO^2 emissions, extreme temperatures and weather conditions such as droughts and flooding and an increased air pollution are expected. This can have negative consequences on agriculture, health and safety of people, because extreme weather can significantly reduce the crop yield, make places uninhabitable and cause damage to property, injuries or even death. In order to lower CO^2 emissions, it was decided to invest more money into renewable energy. Part of the plan

is to build a wind park. This could effectively reduce Co^2 emissions by a significant amount and contribute to the protection of the environment. A voting will take place to decide if these plans will be implemented. All citizens can either vote in favor or against the plan to build new wind turbines.

Appendix C-Scales

Self-efficacy scale

1. I am able to vote in favor of wind turbines to prevent or minimize dangers of climate change.
2. It is easy for me to vote in favor of wind turbines to prevent or minimize dangers of climate change.
3. I can vote in favor of wind turbines to prevent or minimize dangers of climate change.
4. I am confident that voting in favor of wind turbines prevents or minimizes the dangers of climate change.
5. I can handle voting in favor of wind turbines to prevent or minimize dangers of climate change.

Group efficacy scale

Think of you and other citizens (in) ${q://QID22/ChoiceTextEntryValue}${q://QID23/ChoiceTextEntryValue} who can also vote in favor or against wind turbines. Please respond to each of the following items by choosing an answer on the given scale.

1. Together, we are able to vote in favor of wind turbines to prevent or minimize dangers of climate change.
2. For us, it is easy to vote in favor of wind turbines to prevent or minimize dangers of climate change.
3. We can vote in favor of wind turbines to prevent or minimize dangers of climate change.
4. We are confident that voting in favor of wind turbines to prevent or minimize dangers of climate change.

5. We can handle voting in favor of wind turbines to prevent or minimize dangers of climate change.

Risk perception scale

1. I am at risk for the dangers of climate change.

2. It is possible that I will experience the dangers of climate change.

3.I am susceptible to the dangers of climate change.

4. Climate change is a serious threat.

5.Climate change is harmful.

6. Climate change is a severe risk.

Uncertainty scale

1. I am not sure what to expect due to climate change.
2. I am not sure if building wind parks will be effective to reduce CO^2 emissions.
3. I feel overwhelmed by the (possible) effects of climate change.
4. The (possible) effects of climate change upset me greatly.

behavioural Intention

After reading about the plans to build more wind turbines, how likely are you to vote in favor of these plans?

Attitude

1. What is your general attitude towards wind turbines (in) ${q://QID22/ChoiceTextEntryValue}${q://QID23/ChoiceTextEntryValue}?
2. I would be willing to accept noises that wind turbines make.
3. I would be willing to accept the look in the landscape that would be changed by wind turbines.
4. I think the costs of building more wind turbines are worth it.

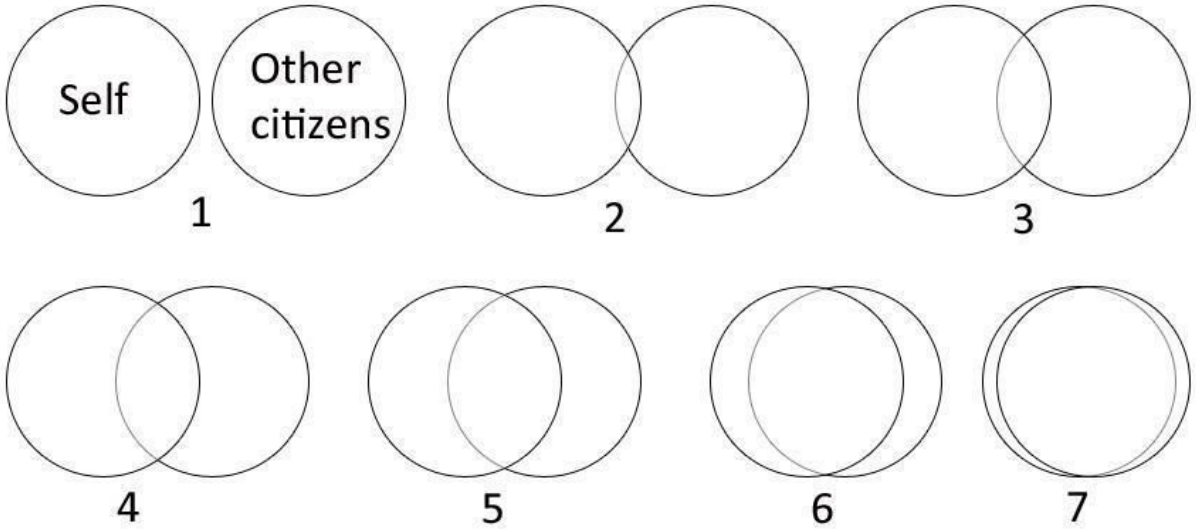
Past experiences

1. How often have you been confronted with the topic of building wind turbines (in) ${q://QID22/ChoiceTextEntryValue}${q://QID23/ChoiceTextEntryValue}? (apart from this survey)
2. How often have you talked with people (in) ${q://QID22/ChoiceTextEntryValue}${q://QID23/ChoiceTextEntryValue} about that topic?

Verbal persuasion

1. How often did people (in) ${q://QID22/ChoiceTextEntryValue}${q://QID23/ChoiceTextEntryValue} express a positive opinion of wind turbines?

Inclusion of the Other in the Self (IOS)



In the picture above you see seven pictures with two circles each. The left cirlce represents you, the right circle represents other citizens (in) ${q://QID22/ChoiceTextEntryValue}${q://QID23/ChoiceTextEntryValue} who can also vote in favor or against wind turbines. The two circles are overlapping more in each picture. More overlap means that you feel more as a part of that specific group.

1. Please indicate below which picture best describes how you feel.