To join or not to join: how does an environmental identity and need for achievement influence intention to join an energy community?

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Abstract

The importance of reducing the adverse effects of climate change is striking, with various solutions being proposed. One such solution is the creation of energy communities, citizen led groups focusing on production and consumption of renewable energy sources. The current study aimed to analyse whether environmental identity of individuals influenced their intention to join an energy community, and whether their need for achievement moderated the relationship. The need for achievement was derived from McClelland's theory of needs (McClelland, 1985). Environmental identity was manipulated with the Ease of Retrieval task, based on the work of Schwarz et al., (1991). The study employed an experimental design, manipulating the identity using an ease of retrieval task with recall of two or 12 past environmental behaviours. Ease of retrieval was found to be unsuccessful in manipulating identity, meanwhile environmental identity and need for achievement alone could positively predict intention to join an energy community. However, no moderating effect of the need for achievement was found. The findings could be explained by the nature of environmental identity, specificity of the ease of retrieval task, independent effect of need for achievement and small sample size. Future research should employ a different manipulation technique, as well as other measures for need for achievement, and employ a larger sample.

Introduction

In the beginning of 2025, President Donald J. Trump has signed an executive order to withdraw the US from the Paris Agreement of 2015 ("Parliament to debate US withdrawal from WHO and Paris Agreement | 10-02-2025 | News | European Parliament," 2025). This decision has made international headlines, with many climate activists worrying what this could mean for the future of the environment. The Paris Agreement of 2015 is an agreement among 196 nations to reduce the rise in global temperatures and mitigate the effects of climate change ("Paris Agreement | UNFCCC," n.d.). The nations aim to do so through a reduction in greenhouse gas emissions, which many do through reducing fossil fuel consumption ("UN climate change conference: World agrees to transition away from fossil fuels and reduce global emissions by 43% by 2030," n.d.).

According to the report of the International Energy Agency (IEA, 2025), one country which is largely on track in reducing their use of non-renewable energy sources is the Netherlands. The Netherlands has been increasingly implementing the use of renewable energy across sectors; however, majority of Dutch energy still comes from fossil fuels (IEA, 2025). Specifically, within the housing sector, most energy is derived from fossil fuels (IEA, 2025). As the IEA (2025) suggested there needs to be more involvement from citizens to successfully reduce fossil fuel consumption, and subsequently carbon emissions. Therefore, it is important to involve citizens within the energy transition (Vernay & Sebi, 2020).

To facilitate this involvement, energy communities can be created and encouraged within the Netherlands and other countries. Energy communities are voluntary, citizen-led communities which focus on producing and consuming renewable energy (Bauwens, 2016; Sloot et al., 2018; Vernay & Sebi, 2020). Energy communities are in charge of creating their own energy supply, which is done through renewable energy sources (Sloot et al., 2018). Dioba et al., (2024), as well as Van der Werff and Steg (2016), have found that energy

communities can help reduce carbon dioxide emissions, increase the efficiency of the energy supply, reduce electricity prices, and overall increase renewable energy consumption. Therefore, they can play a large role in the energy transition, especially for the Netherlands, where the sustainability goals are not fully reached.

Despite the seemingly large effectiveness of ECs, they have yet to reach full potential (Vernay & Sebi, 2020). There are various factors which can have an effect on one's intention to join an EC. Some previously examined considerations include practical barriers, such as legal requirements, government support, and economic factors such as funding, and feasibility (Dioba et al., 2024). An underexamined factor however is how individual's level of environmental identity can affect their intention to join an energy community.Furthermore, the moderating effect of personality factors such as motivational needs has also been underexamined. Despite lack of research, these factors can serve as potential predictors of intention to join an energy community.

Theoretical framework

Environmental identity

Environmental identity has been previously examined in the context of other environmentally conscious behaviours; environmental identity can be defined as the extent to which one views themselves as someone who acts in a sustainable and environmentally friendly manner (Van der Werff et al., 2013). Previous research has found that an individuals' identity can serve as a strong behavioural predictor, and has been found to be linked to behaviours such as recycling (Nigbur et al., 2010). When an individual holds a specific identity, they internalise the values and important aspects of that identity within themselves. This internalisation encourages them to behave in a manner which aligns with the values of their identity (Jans, 2020). Furthermore, the stronger the identity is held within the

individual, the more likely they are to behave in ways consistent with that identity (Eby et al., 2019).

Environmental identity then has a similar effect on behaviour, encouraging behaviours which align to the values of this identity. As a result, strong environmental identity can be said to encourage a range of environmentally friendly behaviours (Van der Werff et al., 2013). Environmentally friendly behaviours can be defined as any behaviour which seeks to protect and support the environment (Mikuła et al., 2021). Van der Werff et al., (2013) have found that the strength of environmental identity had a positive effect on the uptake of various environmentally friendly behaviours. Some of these behaviours included recycling, food choices (such as reducing the consumption of meat), and environmental activism (Van der Werff et al., 2013). Similarly, Wang et al., (2021) have found that the stronger the individual's environmental identity was, the more strongly it predicted engaging in various environmentally friendly behaviours. Overall, the strength of environmental identity can serve as a good predictor of the uptake of a variety of environmentally friendly behaviours.

Intention to join an energy community

Despite the strong predictive power of environmental identity on environmentally friendly behaviours, research has been lacking on whether environmental identity can serve as a predictor of joining an energy community. Membership in this case is defined as whether or not one is involved within the energy community (Sloot et al., 2018). Similarly, the intention to become a member is thus the intention to be involved within an energy community. The involvement would then imply behaving in a sustainable manner, aligning with the goals of the group (Sloot et al., 2018). Based on Van der Werff et al., (2013) and Wang et al., (2021), it can be argued that the strength of environmental identity can serve as a good predictor of intention to join an energy community. This is due to the fact that the

energy community itself can be regarded as an environmentally friendly behaviour; previous research has argued that there are different types of environmental behaviour, and one such type is non-activist activities within the public sphere (Stern, 2000, as cited in Mikuła et al., 2021). Behaviours which underlie non-activist measures include joining and being part of environmental organisations, which can influence environmental behaviour through public policy (Stern, 2000, as cited in Mikuła et al., 2021). An energy community is therefore by definition a non-activist measure, as it aims to encourage the uptake of renewable energy sources through creation of an independent energy sourcing community; therefore, it is also an environmentally friendly behaviour. Overall, environmental identity and its strength can be seen as having a positive impact on intention to join an energy community, as it is an environmentally friendly behaviour which aligns with the values of the identity.

Ease of retrieval

Due to the importance that environmental identity has on engaging in environmentally friendly behaviour, it is important to enhance this identity of individuals. Environmental identity can be enhanced through understanding its antecedents. Van der Werff et al., (2013) have found biospheric values and previous environmental behaviours to be predictive of enhancing the salience of environmental identity of individuals. Particularly, what Van der Werff et al., (2013) highlighted is the impact past environmental behaviours have had on the environmental identity; by encouraging people to believe they have performed environmental behaviours in the past, their environmental identity grew stronger. Following on the from the study of Van der Werff et al., (2013), it can be reasonably assumed that by reminding individuals of their environmental behaviours their environmental identity can be manipulated. Although past behaviours themselves cannot be changed, the perception individuals have of their past behaviours can be. The perception of past behaviour can be manipulated using the ease of retrieval task (Schwarz et al., 1991). Ease of retrieval is a task

which was tested by Schwarz et al., (1991), who asked participants to recall either six or 12 instances of assertive behaviours; the findings showed that recalling more behaviours was difficult for participants. This perceived difficulty then led participants to consider themselves as less assertive, as they could not easily recall examples of assertive behaviours (Schwarz et al., 1991).

The ease of retrieval technique was seldom used to manipulate identity of participants; however, this technique may be effective in the manipulation. The ease of retrieval technique can change the perception individuals have of their past behaviours; finding recall of behaviours as difficult can indicate lack of performance of these behaviours, similarly to how it influenced perceived self-assertiveness in the study of Schwarz et al., (1991). Furthermore, previous research has highlighted the influence past behaviours had on environmental identity, later predicting behaviour (Van der Werff et al., 2013). It is thus hypothesised that recalling more behaviours and experiencing difficulty in recall is indicative of a weaker environmental identity, as the instances of behaviours related to that identity were harder to retrieve, compared with experiencing the recall as easy, which would strengthen participants' environmental identity. The perceived experience of ease of recall would indicate to participants that they engaged in environmentally friendly behaviours more, thus they must possess a strong environmental identity.

Need for Achievement

Despite the identity of a person being a good predictor of behaviour, other factors can strengthen the link between environmental identity and intention for an individual to join an energy community. Behaviour is largely predicted by individual factors, with one such factor being individual motivational needs (Rybnicek et al., 2017). Individual needs are part of the Theory of Needs of McClelland, 1985. The Theory of Needs, initially developed within the context of a workplace, posits that every individual has three motivating needs: need for

achievement, need for power, and need for affiliation (McClelland, 1985). These needs highlight what motivates an individual intrinsically, which rewards are most stimulating for them, and ultimately their behaviour (Rybnicek et al., 2017). In particular, the need which is most predominant within an individual is likely to be the one influencing their behaviour (McClelland, 1985).

Within the context of energy communities, a need that could be of particular importance in influencing intention to join an energy community is the need for achievement. The need for achievement is defined as a need to successfully complete tasks through personal effort (McClelland, 1985). Individuals who score high on this need tend to be more committed to their goals, like working on challenging tasks and tend to complete them efficiently, and care more about the success of their group when working a common goal or task (Jha, 2010). Individuals high in need for achievement are intrinsically motivated by this need, finding fulfilment in successful task completion, which conversely motivates them to continue working (Atkinson, 1964, as cited in Jha, 2010).

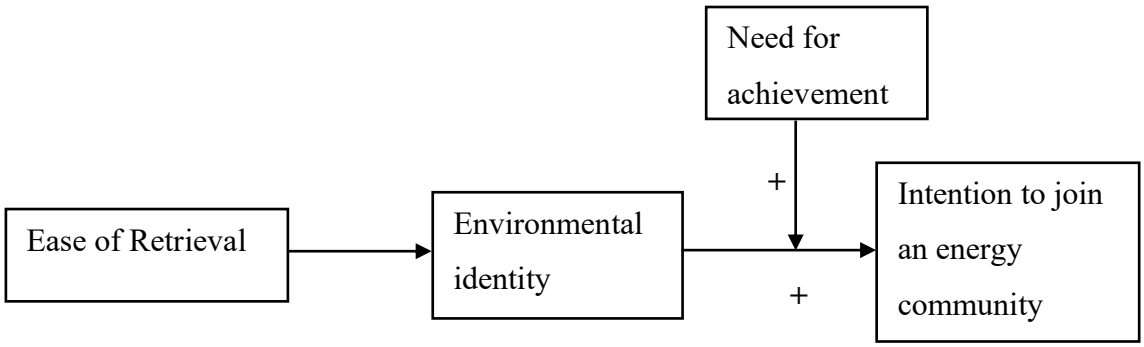
The internal need for achievement encourages individuals to seek out tasks that help satisfy their intrinsic need. Energy communities and their goal-oriented nature can provide individuals with such tasks. By joining an energy community, individuals can engage in group-based tasks, which allows them to achieve more than they could alone, similar to the concept of group efficacy (Bandura, 2006, as cited in Cuadrado et al., 2021; Sloot et al., 2019). Similarly, individuals with a strong environmental identity are motivated to engage in environmentally friendly behaviours; these behaviours similarly satisfy the individuals' identity. Such internally motivating factors have been previously found to serve as good predictors of environmentally friendly behaviours (Tabernero & Hernández, 2010). Thus, it can be argued that individuals with a strong environmental identity would be more inclined to join an energy community as it would allow them to perform behaviours aligned with their

identity. The need for achievement would in turn moderate the likelihood of this relationship; individuals with a higher need for achievement and strong environmental identity would be more inclined to join an energy community as it would allow them to achieve something related to their identity. On the other hand, having a lower need for achievement and environmental identity may disengage individuals from being part of an energy community, as they do not hold a strong desire to achieve anything within the community, since it does not relate to their internal need or identity.

Therefore, it is hypothesised that holding a strong environmental identity and high need for achievement will strongly encourage one to join an energy community, compared to holding a weaker environmental identity and low need for achievement. A conceptual model has been designed for a graphic representation of the proposed relationship (Figure 1).

Figure 1

Conceptual model of the relationship between environmental identity and intention to join an energy community, given the moderating variable of the need for achievement.



Current study

The aim of the current study was to analyse the relationship between the strength of one's environmental identity and intention to join an energy community, when accounting for the individual need for achievement. The study used an experimental design, manipulating the environmental identity through the ease of retrieval task. Participants were asked to recall

past environmental behaviours related to their energy consumption. The intention to join an energy community was subsequently measured. The study aimed to analyse two main hypotheses:

H1. Ease of retrieval has a positive effect on individual environmental identity.

H2. Need for achievement positively moderates the relationship between ease of retrieval and the intention to join an energy community.

Methods[1]

Participants and Design

The study used an experimental, between-groups design. The study compared intention to join an energy community through manipulating individual's level of environmental identity using the ease of retrieval technique; two independent groups were compared, easy group (recall of two behaviours) and difficult group (recall of 12 behaviours). The study design involved measure of three motivating needs as moderating factors, including the need for affiliation, need for power, and the need for achievement. Although all three needs were measured, the current study focused only on the analysis of the need for achievement as the moderator.

Prior to the data collection ethical approval was obtained by the Ethics Committee of the Behavioural, Management, and Social Sciences Faculty at the University of Twente (Application Number 250694). Participants were recruited through snowball and convenience sampling. A convenience sample was obtained by recruiting participants via the Sona system of the University of Twente. For the participation in the study, participants received 0.5 Sona credits. Snowball sampling procedure was used during the process of data collection by sharing the questionnaire via social media applications (such as Instagram, WhatsApp, and LinkedIn). Participants were further asked to share the questionnaire to others in order to obtain data.

Initially, 138 participants were recruited, out of which 108 have fully completed the study. One participant was omitted as they failed to complete the three attention checks within the survey successfully (i.e., respond to at least one out of three attention questions

[1] The wording of the Method section closely overlaps with the theses of two other students. This is due to close collaboration with the students on the study experiment. This was done on recommendation and permission of the first supervisor.

correctly). Thus, an overall sample of 107 people was obtained. Within the sample, 76 participants were female, 31 participants were male. The age range of the sample was from 17 to 64 and a mean age of 24. Participants were from the Netherlands (n=12), Germany (n=56) or other countries (n=39). 66 participants have a high school diploma, 27 have a bachelor's degree, 4 have a master's degree, 5 have a PhD and 3 have another education as their highest degree completed. A frequency table was constructed for the variables of gender, nationality and education level. The frequency table can be found in Table 1.

Table 1

Frequency table for ordinal variables of gender, nationality and education.

Variable	Characteristic	Frequency	Percentage (%)
Gender	Male	31	28.97
	Female	76	71.02
Education	None	2	1.87
	High-school diploma	66	61.68
	Bachelor diploma	27	25.23
	Master diploma	4	3.73
	PhD	5	4.67
	Other	3	2.80
Nationality	Dutch	12	11.21
	German	56	52.34
	Other	39	36.45

Out of the sample, 54 participants were subjected to the difficult condition of the study, and 53 participants to the easy condition. A power analysis was conducted in R, setting the statistical power at 120, which was not satisfied. Participants had to be omitted prior to analysis due to incomplete attention checks, removal of consent, or not completing the survey fully.

Procedure

Prior to starting the study, participants were informed about the purpose and duration of the study, their right to anonymity and their right to withdraw. Once informed consent was obtained, the participants could start with the study. First, demographic data of the participants were obtained. The information collected included age, gender, nationality, and education level.

Participants were then asked to complete the motivational needs questionnaire (see Materials). Upon completion, participants were randomly allocated to one out of two conditions, easy versus difficult, to complete the ease of retrieval task. Participants in the easy condition were asked to recall two past environmental behaviours related to their energy consumption. In the difficult condition, participants had to retrieve 12 environmental behaviours. After completion, they were asked to complete the manipulation check, indicating the perceived difficulty of retrieval (see Materials).

This section was followed by the questionnaire about environmental identity (see Materials). Upon completion, the participants received an explanation of what energy communities are (full explanation of the task can be found in Appendix C). The explanation was followed by the last set of questions measuring the intention to join an energy community. After completing the last set of questions, participants were debriefed on the full purpose of the study, to assess the relationship between environmental identity and intentions to join an energy community. they were informed that the ease of retrieval task was used to manipulate their environmental identity. Upon the debrief, participants were asked if they still consent to the use of their data and thanked for their participation in the study. Afterward they were awarded 0.5 Sona credits if they did the study via the Sona system.

Materials

A Qualtrics questionnaire was used for data collection; the questionnaire included three scales and the ease of retrieval task and manipulation check.

Measures

Motivational Needs. The first scale was measuring the motivational needs of participants, using the Motivational Needs Questionnaire, adapted from Neill (2009). The original questionnaire included 11 statement questions, with three answer options each. Each answer option corresponded to one of the three needs based on the model of McClelland (1985). For the purpose of the current study, the answer options were adapted as statement questions measuring the level of agreement. This was done to get a better idea of the level of each need per individual and to gain an idea of the high and low scorers. Each statement was to be ranked on a 7-point Likert scale, with 1 indicating least agreement ("Strongly disagree"), 4 indicating neutral response ("Neither agree nor disagree"), and 7 indicating the highest level of agreement ("Strongly agree"). The following statements show two examples: "When doing a job, I need feedback" or "After starting a task, I am uncomfortable until it is finished". The full list of questions can be found in Appendix B. The reliability of the scale was high ($\alpha = 0.79$). Barlett's test of sphericity supports the finding that the items of the scale are significantly correlated (χ^2 (428) = 115.27, $p < .001$).

Ease of retrieval. The ease of retrieval technique was used by asking participants to recall either two or 12 instances of pro-environmental behaviour. Based on prior research, the recall of two behaviours should be perceived as easier by participants, meanwhile recall of 12 behaviours as difficult (Schwarz et al., 1991). Therefore, participants who recalled two behaviours belong to the easy condition, while those recalling 12 behaviours belong to the difficult condition. Participants were randomly assigned to one of two conditions, receiving an explanation of the task and asking them to recall either two or 12 instances of pro-environmental behaviour. The ease of retrieval task can be found in Appendix C.

Manipulation check. After the ease of retrieval task, participants were given a manipulation check question. The manipulation check was used to measure whether the easy condition was perceived as easier than the difficult condition. The check was done using one item, "I found it hard to recall the times when I engaged in environmentally friendly behaviour in the last two weeks." to be ranked on a 7-point Likert scale; 1 indicating "Strongly disagree", 4 indicating "Neither agree nor disagree" and 7 indicating "Strongly agree".

Environmental identity. Upon completing the manipulation check, participants were asked to complete 12 questions measuring their environmental identity. The scale was adapted from the Revised Environmental Identity Scale of Clayton et al., (2021) and Van der Werff et al., (2013). Some scale items were rephrased to be better indicative of individuals' identity rather than behaviours. The responses were based on a 7-point Likert scale, with 1 indicating least agreement ("Strongly disagree"), 4 indicating a neutral response ("Neither agree nor disagree") and 7 indicating highest level of agreement ("Strongly agree"). Examples of the items are: "Behaving responsibly toward nature and living a sustainable lifestyle is important to who I am" and "I am the type of person who saves energy". The full list of questions can be found in Appendix D. The reliability of the scale was high ($\alpha = .83$). Barlett's test of sphericity supports the finding that the items of the scale are significantly correlated (χ^2 (78) = 478.07, $p < .001$).

Intention to join an energy community. Lastly, the scale measuring the intention to join an energy community was adapted from the study of Sloot et al., (2019). The study of Sloot et al., (2019) measured specifically the intention to join the Buurkracht initiative in a sample of Dutch households, for the purpose of the current study, questions were adapted to fit the overall intention to join any energy community. The scale included statements to be ranked by a 7-point Likert scale, with 1 indicating total disagreement ("Strongly disagree"),

and 7 indicating total agreement (“Strongly agree”). Statements included “I would like to know more about the energy community initiatives in my neighbourhood”, “I am interested in the energy community initiatives”. Full list of questions can be found in Appendix E.

Data Analysis

The data was converted into a CSV. file from Qualtrics, after which it was transferred to RStudio Version 2024.12.1+563. The full R script can be found in Appendix F.

Prior to the data analysis the file was screened for missing values, non-consent, and unsuccessful completion of the attention checks. Participants who did not give their consent before and/or afterwards were excluded. Additionally, people who failed to complete the three attention checks were removed.

The data was first converted to numeric, after which the average scores per participants for the need for achievement, environmental identity, and intention to join an energy community were calculated. Furthermore, the average score for the manipulation check was calculated. Upon that, the demographic variables were calculated to find the average age, nationality and education level of the sample.

An independent sample studentised t-test was conducted to compare the means between two groups, namely the participants in the easy versus difficult conditions. Cohen’s d was calculated to see the effect size between the two groups.

Parametric assumptions of linearity, normality and homoscedasticity were tested prior to the inferential analyses. Linearity was tested using a plot of residuals against fitted values of the model used for further analyses. Assumption of normality was assessed using the histogram of residuals and the Shapiro-Wilk test. Lastly, the Breusch-Pagan test was conducted for homoscedasticity.

A hierarchical regression model was calculated to test the effect of Ease of Retrieval (EoR) task and its interaction with the Need for Achievement moderator on the Intention to

Join an Energy Community. The model was constructed using a linear model of EoR and Need for Achievement as two independent predictors, and EoR, Need for Achievement and their interaction as predictors of Intention to Join an Energy Community. Analysis of Variance (ANOVA) was further conducted to analyse the difference in the models when accounting for all predictor variables. Similarly, a hierarchical regression was conducted with the Manipulation Check question, to analyse whether the perceived difficulty had an effect on Intention to Join. A hierarchical regression model was used for the analysis, with Manipulation Check used as an independent predictor instead of EoR. If the Ease of Retrieval was found to be ineffective in manipulating the Environmental Identity, the same hierarchical regression model, but with Environmental Identity instead of EoR, was calculated. An ANOVA model was used to analyse the difference between the models when accounting for all predictor variables.

Results

Parametric assumptions

Assumptions of linearity, normality and homoscedasticity were tested using linear model with Ease of Retrieval or Environmental Identity, Need for Achievement and their interactions as a predictor of Intention to Join an Energy Community. Based on the parametric tests, the assumptions of normality and homoscedasticity are violated, with slight violations to the assumption of linearity. However, parametric tests have been conducted, as according to Schielzeth et al., (2020), the violation of assumptions in random effect distributions have minor consequences on linear modelling.

Correlation matrix

A correlation matrix was created to visualise the correlation between the need for achievement, environmental identity, and intention to join an energy community with age. The correlation matrix was created to understand the overall link between the main variables of interest and to see whether the variables overall correlate with each other. The correlation matrix can be found in Table 2.

Table 2

Correlation matrix between age, predictor, and moderating variables.[a]

Variables	M	SD	1	2	3
1. Age	24.31	7.71			
2. Joining	4.26	1.22	.27*		
3. EI	4.39	0.96	.19	0.58***	
4. nAch	5.19	0.57	-.11	0.21*	0.21*

[a] N=107; * = p < .05, ** = p < .01, *** = p < .001

Effect of the Ease of Retrieval Manipulation Check

Significant differences in the scores on the manipulation check were found (t (105) = -4.71, p < .01, d = -0.910). Participants who were in the easy condition perceived the task as

easier as opposed to participants in the difficult condition (M = 3.06, SD = 1.80 versus M = 4.66, SD = 1.73). Therefore, recalling more examples of pro-environmental behaviour was perceived as more difficult as opposed to recalling less examples of behaviour.

The manipulation did not have a significant effect on the Environmental Identity of participants (t (105) = -0.99, p = .33, d = -0.191). Therefore, the recall of previous environmental behaviours did not have an influence on the environmental identity of participants.

Effect of Ease of Retrieval and Need for Achievement on Intention to Join

First hypothesis was tested using a hierarchical regression. In the first block Ease of Retrieval and Need for Achievement were included as predictors, and Intention to Join an Energy Community as the outcome. The second block included the interaction between Ease of Retrieval and Need for Achievement as the predictor.

The EoR had no significant effect on the Intention to Join an Energy Community (b = -0.06, t (103) = -0.25, p = .81, CI: [-0.57 ; -0.44]). Need for Achievement alone had a significant effect on Intention to Join an Energy Community (b = -0.54, t (103) = 2.50, p < .05, CI: [0.11 ; 0.96]). Thus, participants with a higher need for achievement felt more inclined to become part of an energy community, unrelated to the ease of retrieval task. However, the interaction variable did not have a significant effect on the Intention to Join an Energy Community (b = -0.02, t (103) = -1.48, p = .14, CI: [-0.04 ; 0.01]). Thus, the need for achievement of participants did not moderate the negative relationship between EoR and intention to join an energy community.

Effects of Manipulation Check and Need for Achievement on Intention to Join

The Manipulation Check was used as an independent predictor to analyse whether the perceived difficulty had an effect on Intention to Join. Thus, the first hypothesis was tested with a hierarchical regression, with Manipulation Check and Need for Achievement as

predictors in the first block. The second block included the interaction between Manipulation Check and Need for Achievement as the predictor.

The Manipulation Check had a significantly negative effect on the Intention to Join an Energy Community (b = -1.08, t (103) = -2.09, p < .05, CI: [-2.11 ; -0.06]). This suggests that the difficulty of the EoR task made participants less inclined to join an energy community. However, Need for Achievement did not have a significant effect on Intention to Join an Energy Community (b = -0.27, t (103) = -0.62, p = .54, CI: [-1.14 ; 0.59]). Similarly, the interaction variable did not have a significant effect on the Intention to Join an Energy Community (b = 0.18, t (103) = 1.90, p = .06, CI: [-0.01 ; 0.38]). Thus, the need for achievement of participants did not moderate the negative relationship between EoR and intention to join an energy community.

Effects of Environmental Identity and Need for Achievement on Intention to Join

As the EoR did not have an influence on identity, the Environmental Identity was used as a predictor instead. Therefore, the second hypothesis was tested using a hierarchical regression with Environmental Identity and Need for Achievement included as predictors in the first block. The second block included Environmental Identity, Need for Achievement, and their interaction as predictors.

Environmental Identity had a positive significant effect on the Intention to Join an Energy Community (b = 0.74, t (103) = 6.66, p <.01, CI: [0.52 ; 0.96]). Therefore, holding a stronger environmental identity corresponded with a higher intention to join an energy community. On the other hand, Need for Achievement did not have a significant effect on Joining an Energy Community (b = 0.13, t (103) = 0.82, p = -.49, CI: [-0.25 ; 0.50]). Similarly, the interaction between Environmental Identity and Need for Achievement did not hold a statistically significant effect (b = -0.01, t (103) = 0.82, p = .41, CI : [-0.01 ; 0.03]).

Therefore, need for achievement did not moderate the positive relationship between environmental identity and intention to join an energy community.

Discussion

The current study aimed to establish the influence that individual's environmental identity has on the intention to join an energy community. The first hypothesis looked at the success of ease of retrieval in manipulating environmental identity of participants. The findings of the current study show that the ease of retrieval task worked as intended, that is, participants in the difficult condition found the recall harder, while those in the easy found the task as easier. However, the task was ineffective at manipulating the strength of environmental identity in participants. Therefore, the current study could not find support for the first hypothesis.

The second hypothesis of whether the ease of retrieval task had a significant effect on the individual's intention to join an energy community, and whether the need for achievement played a moderating role in the relationship, was investigated. The findings of the current study show that the difficulty of the ease of retrieval task did not have an effect on the intention to join an energy community. Need for achievement did not moderate the relationship; however, when used as an independent variable need for achievement had a positive effect on intention to join/ Due to the manipulation being unsuccessful, the effect of environmental identity on intention to join an energy community; the strength of environmental identity predicted intention to become part of an energy community. However, need for achievement did not moderate the relationship.

Success of Ease of Retrieval and influence on Intention to Join an Energy Community

The ease of retrieval task successfully influenced the perceived difficulty of the recall of behaviour, in line with previous research (Schwarz et al., 1991). However, the perceived difficulty of the task did not have any effect on the strength of environmental identity of participants. Regardless of how many behaviours they had to recall, their environmental identity did not become stronger. Van den Hazel (2022) has found similar results, when using

the ease of retrieval task to manipulate the environmental identity no effect was found. The inability to influence identity by the manipulation technique could be attributed to the nature of environmental identity. Environmental identity may only be manipulated to a certain extent and may be specific to behaviours related to a certain identity, for instance, recalling recycling behaviours may make the identity of a recycler more salient (Balundé et al., 2019; Van der Werff et al., 2013). As the current ease of retrieval task did not specify which behaviours to recall, the identity related to energy consumption may not have been activated, and thus was not affected by the retrieval task.

The manipulation check, or the perceived difficulty of the task, had discouraged participants from joining an energy community. Participants who had to recall more behaviours were less inclined to join an energy community. The effectiveness of the task in influencing the intention to join an energy community could be attributed to the judgements participants made of whether energy communities aligned with their past behaviours; specifically, the difficulty or ease of recall could have served as an indication of whether energy communities would fit participants based on their past engagement in environmentally friendly behaviours. These judgements would be similar to how assertive participants in the study of Schwarz et al., (1991) rated themselves to be upon recalling past behaviours. Furthermore, the lack of specificity of which behaviours had to be recalled could have led to the task overriding environmental identity and influencing the intention to join directly. Thus, ease of retrieval may have directly influenced participants' intention to join an energy community while not affecting the environmental identity.

The influence of Environmental Identity on Intention to Join an Energy Community

Due to unsuccessful manipulation of identity by the ease of retrieval task, environmental identity was used as an independent predictor. The current study has found environmental identity to be positively correlated with the intention to join an energy

community. Holding a stronger environmental identity has led participants to consider joining an energy community more. The findings of the current study are in line with previous research and previous assumptions; stronger environmental identity influences individuals to act in a manner that is aligned with the values of the identity (Sloot et al., 2018; Van der Werff et al., 2013).

Furthermore, the current study has analysed the environmental identity in relation to a communal environmental behaviour. Much of previous research has analysed the effect environmental identity has on individual behaviours, linking it to behaviours such as waste reduction, preservation of water and energy, and diminishing carbon behaviours (Nigbur et al., 2010; Whitmarsh & O'Neill, 2010). The current findings however highlight a link between environmental identity and its effect on a communal environmental behaviour. Environmental identity may thus explain communal environmental behaviours as well as individual ones. However, environmental identity alone may not be the only explanation for the positive effect found by the current study. Previous research has highlighted that becoming involved within one's community had a significant role in influencing intention to join a local energy community (Sloot et al., 2019). Therefore, although environmental identity may explain partly the intention to join an energy community, other social factors, such as community involvement, may be important.

The effect of Need for Achievement on Intention to Join an Energy Community

The need for achievement was hypothesised to be a moderating factor in the relationship between environmental identity and the intention to join an energy community. The study however has not managed to find any support for the hypothesis, as the need for achievement did not have a moderating effect.

Although need for achievement has not been thoroughly studied as a moderator in relationships between identity and behaviour, there was reasonable evidence to suggest that it

could be a moderating factor. Need for achievement has been argued to moderate the relationship between environmental identity and intention to join in individuals with high need for achievement and strong environmental identity. The relationship was proposed due to the nature of energy communities allowing for fulfilment of both intrinsic motivating factors, individual need for achievement and environmental identity. However, no such relationship was found. On the contrary, a direct effect of need for achievement on the intention to join an energy community was found, unpredicted by the current study. Participants who had a stronger need for achievement seemed to be more inclined to become a part of an energy community.

Based on these findings, it could be argued that need for achievement may not be a moderator, but rather an independent predictor similar to environmental identity. Holding a higher need for achievement may have encouraged participants to become parts of energy communities due to their intrinsic drive for achieving successes (Jha, 2010). Participants with a stronger need for achievement may have perceived energy communities as an opportunity to fulfil their internal desire to achieve. However, this relationship was not related to environmental identity; regardless of the strength of the environmental identity participants with a higher need for achievement were still inclined to join an energy community. This effect could suggest that need for achievement may be an independent predictor in itself, and not have a moderating effect.

The lack of moderating effect could also be explained due to the way it was measured. The current study employed an explicit measure of the three motivational needs; that is, the needs were measured using a self-report questionnaire. Previous research has found the explicit measures had led to similar insignificant findings for the moderation effect (Wörtler et al., 2019). Wörtler et al., (2019) have analysed a similar moderating effect using a different needs model, namely that of Deci and Ryan (2000), which highlights three essential needs for

psychological functioning. One of the needs highlighted by Deci and Ryan (2000) is the need for competence, which suggests the need for individuals to interact well with one's environment and successfully achieve important goals and challenges. The need for competence is similar to the need for achievement from the model of McClelland (1985). However, what was found by Wörtler et al., (2019) is when using the needs from the model of Deci and Ryan (2000) as moderators and explicitly measuring them, the moderating effect was insignificant. The explicit measurement of the needs may not be sensitive enough, compared to a more implicit measure (Van Assche et al., 2018, as cited in Wörtler et al., 2019). Similarly, the explicit measure of the needs in the current study may have negatively impacted the success of the moderation.

Limitations and suggestions for future research

The current study has had limitations which impacted the findings. Firstly, the ease of retrieval technique was unsuccessful in manipulating the environmental identity of participants. As a result, environmental identity alone had to be used as a predictor for intention to join an energy community. The use of environmental identity as a predictor leads to a lack of confidence in the success of the findings, as no manipulation was conducted. Future research should aim towards employing a different experimental technique to manipulate the environmental identity. For instance, the use of a priming technique can be used to manipulate the environmental identity of participants; Hu et al., (2020) have used a priming technique to manipulate environmental identity of participants when analysing the reduction of energy consumption within organisational settings. Participants in the experimental condition received an excerpt linking excessive energy consumption to a disjunct group within their organisation, meanwhile control group received an excerpt about achieving sustainability through reducing energy consumption (Hu et al., 2020). The study hypothesised the priming of participants will shape their identity, by encouraging participants

in the experimental condition to link excessive energy consumption to a disjunct group. Hu et al., (2020) proposed that this link would encourage participants to reduce the frequency of these behaviours and act in accordance with the identity; Hu et al., (2020) have confirmed this expectation, the priming manipulated the identity as expected. Thus, a similar technique being employed within the context of the current study may be successful. Participants could be primed to view energy consumption as part of an out-group, or a disjunct group, further playing into the communal and group-involvement motives proposed by Sloot et al., (2019).

Secondly, the use of a self-report measure may have impacted the study findings. The use of an explicit, self-report measure may have affected the study results; the validity of the self-report measure in the current study can be questioned, as previous research has identified that self-report may be weakly associated with actual behaviour and may be too subjective (Kormos & Gifford, 2014). Therefore, the validity of the current findings is questionable. Although self-report may be the most convenient method of data collection, other measures may be used in concordance with self-report to gain more accuracy in the obtained results. For instance, involving the use of more objective measures such as using the energy meter readings from participants who rated themselves as more environmentally friendly and more inclined to join an energy community (Kormos & Gifford, 2014).

Lastly, the current sample was not large enough to satisfy the preset predictive power. A large number of participants had to be removed due to not fully completing the survey or not completing the attention check successfully. The removal of this data affected the predictive power of the findings of the current study, as well as the reliability and validity (Soysal et al., 2018). Future research should attempt to find a sample that at least satisfies the predictive power of the current study in order to ensure some generalisable conclusions can be made.

Conclusion

With the advent of environmental problems, solutions such as energy communities can be helpful to alleviate the negative effects of these problems. To gain better understanding of what influences intention to join an energy community the current study analysed the effect of identity and moderation of need for achievement in influencing the decision to join an energy community. Environmental identity was found to be a predictor of intention to join, however, no support was found for the moderating variable. Future research should employ a different manipulation technique and include measures other than the self-report measures used in the current study.

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Appendix A

AI statement

During the preparation of this work, I used ChatGPT to generate R codes to be used for the analyses of the data, specifically to calculate the descriptive statistics and evaluate the scales. I used a citation generator website, citefast.com, to be used to generate the reference list. After using ChatGPT and citefast.com, I thoroughly reviewed and edited the content as needed, taking full responsibility for the final outcome.

Appendix B

Motivational Needs Scale

1. When doing a job, I need feedback
2. I prefer to work alone and be my own boss
3. I am uncomfortable when forced to work alone
4. I go out of my way to make friends with new people
5. I enjoy a good argument
6. After starting a task, I am uncomfortable until it is finished
7. Status symbols are important to me
8. I am always getting involved with group projects
9. I work better when there is a deadline
10. I work best when there is some challenge involved
11. I would rather give orders than take them
12. I am sensitive to others, especially when they are angry
13. I am eager to be my own boss
14. I accept responsibility eagerly
15. I get personally involved with my superiors

Attention Check - Please select Disagree.

16. I include others in what I am doing
17. I prefer to be in charge of events
18. When given responsibility, I set measurable standards of high performance
19. I am concerned about my reputation or position
20. I desire to out-perform others
21. I am concerned about being liked and accepted
22. I enjoy and seek warm, friendly relationships

23. I get completely involved in a project

24. I want my ideas to be used

25. I desire unique accomplishments

26. I don’t like being left out of things

27. I enjoy influencing the direction of things

28. I think about consoling and helping others

29. I am verbally fluent

30. I am restless and innovative

Attention Check- Please select Neither agree nor disagree

31. I think about my goals and how to attain them

32. I think about ways to change people

33. I think about my feelings and the feelings of others

Appendix C

Ease of Retrieval task

The following section contains a small task. Please make sure to pay attention to the instructions provided and avoid any distractions when completing the task. If possible, please try to complete the task in one go.

Environmental problems have been on the rise, with issues such as climate change and global warming being considered a large threat. Environmental problems affect the quality of human life, nature, and wildlife. One large cause of these problems has been linked to human behaviour. As a result, people have started implementing more environmentally friendly behaviours in their lives. Such behaviours are called “pro-environmental behaviours”, defined as behaviour which serves to support and protect the environment.

Behaviours which are considered to be pro-environmental can vary from recycling, purchasing environmentally friendly products, and monitoring energy consumption. Other examples include reducing consumption of meat, using public transport, using reusable materials such as tupperware and reusable water bottles, and reducing the use of plastics. Overall, the main idea of pro-environmental behaviour is to behave in ways that reduce harm to the environment.

Knowing this, we now ask you to think of the times you have behaved in pro-environmental ways in the last two weeks. Please try to remember 2/12 times when you have behaved pro-environmentally and describe the specific behaviours you have done.

Appendix D

Environmental Identity Scale

1. Behaving responsibly toward nature and living a sustainable lifestyle is important to who I am
2. I am the type of person who always turns off electrical appliances
3. Biking to work or studies rather than going by car is important to who I am
4. I turn the heater off when leaving the room because it is important to me
5. Using energy-saving light bulbs is important to who I am
6. I am the type of person to buy organic products

   Attention check- Please select agree
7. I am the type of person to shower shortly to use less water
8. I am a member of an environmental organisation
9. I am a person who always actively searches for the most environmental-friendly products
10. I refuse plastic bags in clothing shops as it is important to me as a person
11. It is important to me to rarely eat meat
12. Saving energy is an important part of who I am
13. I am the type of person who saves energy

Appendix E

Intention to Join an Energy Community Scale

An energy community is a group of people, businesses, or organisations that come together to produce, share, and manage renewable energy, like solar or wind power. The goal is to reduce energy costs, increase sustainability, and help local communities become more energy-independent. Members of the community can generate energy themselves or share it from common resources, making it easier to access clean energy and support each other.

If you would take part in an energy community initiative, to what extent would the following reasons play a role for you?

1. Save money
2. Contribute to a better environment
3. Be involved in my neighbourhood

Please indicate to what extent you agree with the following statements I would like to know more about the energy community initiatives in my neighbourhood

1. I would like to know more about the energy community initiative in my neighbourhood
2. Joining an energy community is something that I am seriously considering in the future
3. I think that by joining an energy community I would contribute to sustainability and the environment
4. Joining an energy community is something that I am seriously planning in the future
5. I am interested in the energy community initiatives

Appendix F

R-Studio Script

```
install.packages("tidyverse")
install.packages("broom")
install.packages("ggplot2")
install.packages("psychTools")
install.packages("psych")
install.packages("dplyr")
install.packages("tidyr")
install.packages("lmtest")
install.packages("rstatix")
install.packages("ggpubr")
install.packages("Hmisc")
install.packages("pwr")
library(lmtest)
library(tidyverse)
library(broom)
library(ggplot2)
library(psychTools)
library(psych)
library(dplyr)
library(tidyr)
library(rstatix)
library(ggpubr)
library(Hmisc)
library(pwr)
#sorting out the data set
#removing non consenting participants
BA_responses <- BA_responses[-c(81, 82, 83,
84, 85, 87, 91, 92, 94, 98, 99, 100, 101, 103,
104, 105, 106, 107, 109, 113, 116, 119, 125,
126, 128, 134, 136), ]
#removing those who did not pass the
attention check
BA_responses <- BA_responses %>%
  mutate(Attention_1 = ifelse(Q6_16_Attention
== "2", 1, 0),
         Attention_2 = ifelse(Q6_32_Attention
== "4", 1, 0),
         Attention_3 = ifelse(Q8_7_Attention ==
"6", 1, 0))
attentionsum<- c("Attention_1",
"Attention_2", "Attention_3")
BA_responses <- BA_responses %>%
  mutate(sum_attention = rowSums(select(.,
all_of(attentionsum))))
BA_responses <-
BA_responses[BA_responses$sum_attention
!= 0, ]
BA_responses <- BA_responses[-c(91, 92,
93), ]
#demographic variables
BA_responses <- BA_responses %>%
  mutate_at(c(1:7), as.numeric)
BA_responses <- BA_responses %>%
  mutate_at(c(9), as.numeric)
mean(BA_responses[["Q3_age"]])
sd(BA_responses$Q3_age)
##gender: 1=male 2=female
table(BA_responses$Q2_gender)
mean(BA_responses[["Q2_gender"]])
gender_counts <-
table(BA_responses$Q2_gender)
total_gcount <- sum(gender_counts)
percentage_gender <- (gender_counts /
total_gcount) * 100
print(percentage_gender)
##education: 1=no schooling 2=High school
diploma etc 3=Bachelor 4=Master 5=PhD
6=Other
table(BA_responses$Q5_education)
edu_counts <-
table(BA_responses$Q5_education)
total_ecount <- sum(edu_counts)
percentage_edu <- (edu_counts / total_ecount)
* 100
print(percentage_edu)
##nationality: 1=Netherlands 2=Germany
3=Others
table(BA_responses$Q4_nationality)
mean(BA_responses[["Q4_nationality"]])
table(BA_responses$Q4_nationality_other)
nat_counts <-
table(BA_responses$Q4_nationality)
total_ncount <- sum(nat_counts)
percentage_nat <- (nat_counts / total_ncount)
* 100
print(percentage_nat)
print(sd(BA_responses$Q2_gender))
print(sd(BA_responses$Q5_education))
print(sd(BA_responses$Q4_nationality))
#power analysis
pwr.anova.test(k=2,f=.25,sig.level=.05,power=
.8)
#combining the data set again by changing
values in groups to easy and hard
easy_condition <- select(BA_responses, -
Group2)
easy_condition <- easy_condition %>%
drop_na(Group1)
hard_condition <- select(BA_responses, -
Group1)
```

```
hard_condition <- hard_condition %>%
drop_na(Group2)
easy_condition$Group1 <- "Easy"
hard_condition$Group2 <- "Hard"
combined <- bind_rows(easy_condition,
hard_condition)
combined$conditione <-
ifelse(combined$group == "Easy NA", 1, 0)
#creating a new variable called group, with
both groups there
combined <- mutate(combined, group =
paste(Group1, Group2))
combined <- combined %>%
  mutate_at(c(46:69), as.numeric)
combined <- combined %>%
  mutate_at(c(1:7), as.numeric)
combined <- combined %>%
  mutate_at(c(9), as.numeric)
#correlation table
mean(combined[["identity"]])
mean(combined[["achievement"]])
mean(combined[["joining"]])
print(sd(combined$identity))
print(sd(combined$achievement))
print(sd(combined$joining))
correlationdata <- combined %>%
  select(Q3_age, joining, identity,
achievement)
cormatrix <- rcorr(as.matrix(correlationdata))
cormatrix

mean(combined$joining)
sd(combined$joining)
mean(combined$identity)
sd(combined$identity)
mean(combined$achievement)
sd(combined$achievement)
#calculating the t statistic for ease of retrieval
task
combined %>%
  group_by(group) %>%
  get_summary_stats(Q7_1_difficulty, type =
"mean_sd")
boxplot <- ggboxplot(
  combined, x = "group", y =
"Q7_1_difficulty",
  ylab = "Difficulty", xlab = "Groups", add =
"jitter")
print(boxplot)
combined %>%
  group_by(group) %>%
  identify_outliers(Q7_1_difficulty)
combined %>%
  group_by(group) %>%
  shapiro_test(Q7_1_difficulty)
ggqqplot(combined, x = "Q7_1_difficulty",
facet.by = "group")
combined %>% levene_test(Q7_1_difficulty ~
group)
stat.test <- combined %>%
  t_test(Q7_1_difficulty ~ group, var.equal =
TRUE) %>%
  add_significance()
stat.test
combined %>%  cohens_d(Q7_1_difficulty ~
group, var.equal = TRUE)
#calculating the t statistic for identity
identity <- c("Q8_1", "Q8_2", "Q8_3",
"Q8_4", "Q8_5", "Q8_6", "Q8_8", "Q8_9",
"Q8_10", "Q8_11", "Q8_12", "Q8_13",
"Q8_14")
combined <- combined%>%
  mutate(identity =
rowMeans(select(.,all_of(identity))))
combined %>%
  group_by(group) %>%
  get_summary_stats(identity, type =
"mean_sd")
boxplot2 <- ggboxplot(
  combined, x = "group", y = "identity",
  ylab = "Identity", xlab = "Groups", add =
"jitter")
print(boxplot2)
combined %>%
  group_by(group) %>%
  identify_outliers(identity)
combined %>%
  group_by(group) %>%
  shapiro_test(identity)
ggqqplot(combined, x = "identity", facet.by =
"group")
combined %>% levene_test(identity ~ group)
stat.test2 <- combined %>%
  t_test(identity ~ group, var.equal = TRUE)
%>%
  add_significance()
stat.test2
combined %>%  cohens_d(identity ~ group,
var.equal = TRUE)
#parametric assumptions
#linear relationship
plot(m3,1)
plot(m8,1)
#normality of residuals
hist(m3$residuals)
plot(m3, 2)
shapiro_test(residuals(m3))
hist(m8$residuals)
plot(m8, 2)
shapiro_test(residuals(m8))
```

```
#homoscedacity
plot(m8, 1)
bptest(m8, ~
joining*identity*achievement*interaction +
I(joining^2) + I(identity^2) +
I(achievement^2) + I(interaction^2), data =
combined)
bptest(m3, ~
joining*difficulty*achievement*interaction +
I(joining^2) + I(identity^2) +
I(achievement^2) + I(interaction^2), data =
combined)
#collinearity
correlation_idxjoin <- cor(combined$identity,
data$joining, method = 'pearson')
m3_corr <- cor(combined %>%
               select(joining, difficulty,
achievement, interaction),
             use = "pairwise.complete.obs")
m3_corr
m8_corr <- cor(combined %>%
               select(joining, identity,
achievement, interaction),
             use = "pairwise.complete.obs")
m8_corr
#hierarchical regression for difficulty
combined$joining <- rowMeans(combined[,
c("Q10_1_DV", "Q10_2_DV", "Q10_3_DV",
"Q10_4_DV", "Q10_5_DV")], na.rm =
TRUE)
combined$achievement <-
rowMeans(combined[, c("Q6_1_Ach",
"Q6_6_Ach", "Q6_9_Ach", "Q6_10_Ach",
"Q6_14_Ach", "Q6_19_Ach",
"Q6_21_Ach","Q6_24_Ach", "Q6_26_Ach",
"Q6_33_Ach")], na.rm = TRUE)
combined$interactionEOR <-
combined$conditione *
combined$achievement
m0 <- lm(joining ~ 1, data=combined)
m1 <- lm(joining ~ conditione,
data=combined)
m2 <- lm(joining ~ conditione + achievement,
data=combined)
m3 <- lm(joining ~ conditione + achievement
+ interaction, data=combined)
anova(m0)
anova(m1, m2, m3)
summary(m2)
summary(m3)
confint(m3, level=0.95)

#hierarchical regression for difficulty
manipulation check
combined$difficulty <- rowMeans(combined[,
c("Q7_1_difficulty")])
combined$interaction <- combined$difficulty
* combined$achievement
m4 <- lm(joining ~ 1, data=combined)
m5 <- lm(joining ~ difficulty, data=combined)
m6 <- lm(joining ~ difficulty + achievement,
data=combined)
m7 <- lm(joining ~ difficulty + achievement +
interaction, data=combined)
anova(m4)
anova(m5, m6, m7)
summary(m7)
confint(m7, level=0.95)
#hierarchical regression for identity
combined$interaction_ID <-
combined$identity * combined$achievement
m5 <- lm(joining ~ 1, data=combined)
m6 <- lm(joining ~ identity, data=combined)
m7 <- lm(joining ~ identity + achievement,
data=combined)
m8 <- lm(joining ~ identity + achievement +
interaction, data=combined)
anova(m5)
anova(m6, m7, m8)
summary(m7)
summary(m8)
confint(m8, level=0.95)
```