Gender Representation in Energy Initiatives: The Role of Injunctive Norms as a Mediator

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Abstract

This study examines the role of injunctive norms as a mediator for the relationship between gender and participation in energy initiatives. Based on the role injunctive norms play in human behaviour, it was expected that women were less likely to participate in energy initiatives because they are less affected by injunctive norms in this context. A total of 151 participants that were not yet affiliated with an energy initiative filled out a survey measuring the variables intention to participate in energy initiatives, gender, and injunctive norms. Results of this study suggest that gender did not have an effect on the intention to participate in energy initiatives. The findings also suggest that a mediation of the effect of gender on the intention to participate in energy initiatives with injunctive norms as a mediator is not supported. However, injunctive norms do have a significant effect on the intention to participate in themselves. One of the limitations of this study was that a small and fairly homogenous sample was recruited through snowball sampling. Implications regarding strategies at the community level aiming to leverage injunctive norms to normalise participation in energy initiatives are discussed. Future research should examine more variables and more diverse populations to further examine the role gender plays in the energy transition.

Keywords: energy initiatives, gender, injunctive norms, participation intention

Gender Representation in Energy Initiatives: The Role of Injunctive Norms as a Mediator

The current trend of climate change poses a threat to our earth and our future generations, as it could become catastrophic (Kemp et al., 2022). Without intervention, the rising global temperature will lead to more heat-related illness and death. Rising temperatures may also cause glaciers and polar ice caps to melt at faster rates, causing a rise in sea levels (Leal Filho et al., 2022). Consumption of fossil fuels significantly contributes to these problems. Various efforts to cut back on excessive use of fossil fuels have been increasing in recent years (Gielen et al., 2017). These efforts aim for a global energy transition towards renewable energy sources to reach net-zero emissions.

One strategy to promote renewable energy sources that is gaining traction involves the establishment of local energy initiatives, the number of which has grown significantly over the past years (Neves et al., 2024). Local energy initiatives can be defined as neighbourhoods that invest in sustainable energy sources together and subsequently benefit from their own generated energy (Sloot et al., 2018). Through energy initiatives, residents enable themselves to take control by generating, consuming and selling renewable energy (Kühnbach et al., 2022).

Literature review

While participation in energy initiatives is growing, the existing literature reports that such initiatives are predominantly male-dominated (Yildiz et al., 2015). However, research also indicates that women are generally more concerned about climate change and are more likely to adopt sustainable behaviours than men (Łapniewska, 2019; Mehmetoglu, 2010). This gender imbalance raises the question of what factors are influencing participation in energy initiatives and what barriers are preventing women engaging with energy initiatives, many of which remain unknown.

The current study suggests that analysing people who already participate in energy initiatives is insufficient. Participation is the result of a decision-making process that begins with the intention to participate (Ajzen, 1991). Therefore, studying the intention to participate rather than actual participation patterns should allow for examination of barriers to participation before behaviour takes place, offering an insight into what factors influence the differences between gender in participation in energy initiatives. If women were to report a lower intention to participate in energy initiatives, then that may suggest societal or psychological barriers before actual engagement. Conversely, if women were to report equal or higher intentions to participate in energy initiatives, structural barriers may be playing a more dominant role. Thus, the current study examines both men and women who are not yet members of energy initiatives.

There is a need for further research to uncover the mechanisms that lead to gendered participation patterns, and understand the idea that women are less suited for roles within energy initiatives, not because of interest or environmental concern, but rather due to the misalignment of these roles within the societal image (Fraune, 2015). Stereotypes of predominant male involvement in energy initiatives cause the formation of social environments in which participation in energy initiatives is encouraged. Because men are more commonly associated with being engaged in these initiatives, they are also more likely to be a part of social environments where participation in energy initiatives is encouraged and supported (Fraune, 2015). Subsequently, women may have fewer ways of access to get involved with energy initiatives, preventing the idea of participation from coming up naturally.

Building on the idea that social environments may influence the intention to participate in energy initiatives, the current study focuses on the role of injunctive norms, as a mediator for the effect of gender on participation in energy initiatives, of which little research

has focused on explaining the difference between men and women. Examining the difference in the roles injunctive norms play on the intention to participate in energy initiatives between men and women may be crucial to understand the reasons that energy initiatives are primarily male-dominated.

Individuals tend not to make decisions in isolation as their choices are guided by social norms. (Jans et al., forthcoming). In the context of the current study, one's intention to participate in energy initiatives is influenced by their social circles. That is to say the extent to which one's peers are engaged in, involved in or approve of energy initiatives impacts one's own engagement. Social norms refer to informal rules guiding behaviour by indicating what is socially approved (Bicchieri, 2005). They can be personal or collective, formal or informal, and can be distinguished into two types, descriptive and injunctive norms. The first type of social norms, descriptive norms, refer to one's perception of what other people actually do. Behaviour influenced by descriptive social norms is about doing what one perceives others are doing more so than doing what one perceives other people will think is right (Cialdini, 2007). While descriptive norms can influence behaviour, they do not by definition create a sense of needing to change or expectation to engage in certain behaviours.

The second type of social norms, injunctive norms, refer to what people believe they should do based on the perception of social approval or disapproval. Individuals conform to injunctive norms when they believe that people who are important to them, such as friends and family, would approve of their actions (Cialdini, 2007). What one perceives other people would approve of strongly influences behavioural patterns. In contrast to descriptive norms, injunctive norms can motivate participation in energy initiatives by aligning involvement with the environment with social behaviour. For example, people may participate in an energy initiative when they perceive that their peers approve of such actions to sustainability (Keizer, 2014).

Injunctive norms conceptually align with what are called subjective norms in the Theory of Planned Behaviour by Ajzen (1991). Subjective norms reflect perceived social pressure to engage in a behaviour. This focus on social approval and expectations overlaps with injunctive norms (Cialdini, 2007). Prior research has found that subjective norms strongly predict pro-environmental behaviours (Farrow et al., 2017) and as such, the relevance of injunctive norms in the current study is highlighted. In the context of energy initiatives, this means that subjective norms, and injunctive norms by extension may have a strong influence on whether individuals feel compelled to participate. (Farrow et al., 2017).

Injunctive norms actively shape behaviour by indicating what individuals should do to gain approval of people that are important to them (Cialdini, 2007). Even if individuals have not considered participating in energy initiatives, they may be more likely to do so when they perceive social approval, suggesting injunctive norms serve as a particularly motivational force in the context of energy initiatives (Cialdini, 2007).

Prior research indicates that men are more likely to receive social approval for participation in male-dominated fields like energy initiatives, and women may experience less social encouragement and lower perceived expectations to engage (Fraune, 2005). These different injunctive norms may contribute to the observed discrepancy in the intention to participate in energy initiatives, reinforcing their relevance as a mediating factor.

Based on this theoretical reasoning, the following hypotheses have been constructed:

1. H1: Gender influences intention to participate in energy initiatives, with men being more likely to participate compared to women.
2. H2: Gender influences the perception of injunctive norms, such that men experience stronger injunctive norms regarding participation than women for participation in energy initiatives than women.

3. H3: The stronger the experienced injunctive norms regarding participation in energy initiatives, the more likely individuals are to participate.

4. H4: The relationship between gender and participation intention in energy communities is mediated by injunctive norms.

Method

Participants

Out of 291 respondents 151 participants were included in the research study in total. Reasons to eliminate respondents from the analysis included incomplete survey responses, failing both attention checks, being under the age of 18, or living with their parents or guardians. The participants were made up of 87 women (57,6%) and 64 men (42,4%). The age of the participants ranged from 18 to 81 years old ($M = 0.42$, $SD = 0.49$). An a priori power analysis based on a linear multiple regression showed that 122 participants were needed to reach a medium effect size ($f = 0.2$) and a power of 0.80%. With a total of 151 participants, that criterion was met.

Procedure

This research has been carried out by means of a correlational design. A survey was used to investigate the explanatory role of injunctive social norms in the relationship between gender and the intention to participate in local energy initiatives. Respondents have been asked to participate in this study by filling out an online survey in Dutch hosted on Qualtrics (Qualtrics, Provo, UT). Participants were recruited for this study from 31 October 2024 until 13 November 2024. A convenience sample was used through snowball sampling. The participants were recruited via social media and contacts of the five students conducting this research study. A flyer with a QR code leading to the aforementioned survey has been sent to all participants, see Appendix A. All participants provided informed consent before starting the online survey. The duration of the survey was between ten and fifteen minutes.

Participants had the option to submit their email address for the opportunity to win a €20,- bol.com gift card as an incentive for their participation via a separate form.

Measuring Instruments

For a detailed summary of the utilised survey items regarding the three variables in this study, see Appendix B.

Attention Checks

Two items were used as attention checks to ensure all participants fill out the survey with the required level of concentration. In one item, participants were asked to select 'Completely disagree'. In the other, they were asked to select 'Completely agree'.

Intention to participate

Intention to participate was measured using four items that looked at the extent to which people want to be involved in an energy initiative based on previous research conducted by Sloot et al. (2018). A seven-point Likert scale was used to determine to what extent the participants agreed to each statement ranging from 'Completely disagree' to 'Completely agree'. An example of one of these items is: 'I would like to be involved in a local energy initiative.' (2 items; $\alpha = .61$).

Gender

Gender was measured in the survey by asking; 'What gender do you identify with?'. Participants were given the options (0) 'Female', (1), 'Male', (2) 'Other' and (3) 'I would rather not say'. For the purpose of statistical analysis, only responses from participants who identified as either 'Female' or 'Male' were included in this study. Participants who answered 'Other' or 'I would rather not say' were excluded due to their low frequency, which would otherwise prevent meaningful statistical comparisons.

Injunctive norms

The mediating variable, experienced injunctive norms, was measured using two items based on Fishbein & Ajzen (2010) adapted to assess the extent to which participants believed that important others would approve of their participation in local energy initiatives. Once more, a seven-point Likert scale was used, again ranging from 'Completely disagree' to 'Completely agree'. The two items were: 'I believe that most people who are important to me would approve of a local energy initiative' and 'I believe that most people who are important to me would approve of my participation in a local energy initiative.'

Socio-demographic data

Towards the end of the survey socio-demographic data was collected by asking participants various questions regarding their age, living situation and highest attained level of education. An example of one of these items is: 'Do you live with your parents/guardian?'.

Data analysis

To test the hypotheses, data were analysed using SPSS and PROCESS MACRO Model 4 (Version 28) to assess the mediation effects. Correlation analyses were conducted to explore the relationship between variables. For hypothesis testing, linear regression analyses were performed. To estimate the effects of the variables in the proposed mediator, the hypotheses were also tested using Model 4 within PROCESS MACRO, generating bias-corrected confidence intervals. Assumptions for regression analyses, including normality, homoscedasticity and absence of multicollinearity were checked before interpreting results.

Results

The first hypothesis was that gender influences the intention to participate in energy initiatives, with men being more likely to participate (H1). Results of this analysis, however, showed that the direct effect was insignificant ($B = 0.01$, $p = .962$). This suggests that gender does not directly influence intention to participate without considering for mediators.

The second hypothesis was that gender influences the perception of injunctive norms, such that men experience stronger injunctive norms regarding participation than women for participation in energy initiatives than women. Results indicated no significant relationship between gender and the experience of injunctive norms (B = -0.15, p = .372), suggesting gender does not play a role in determining the extent to which participants feel that participation in energy initiatives would be approved of.

Effect of experienced injunctive social norms on intention to participate

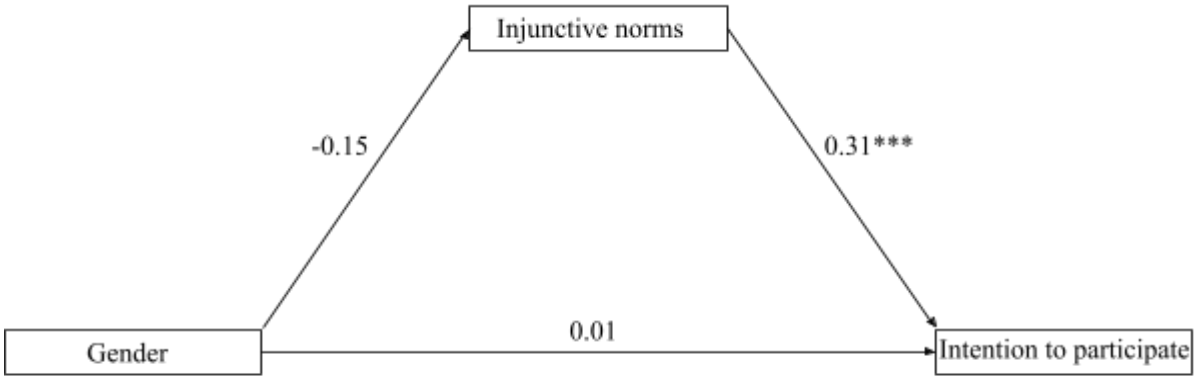
The third hypothesis stated that the stronger the experienced injunctive norms regarding participation in energy initiatives, the more likely individuals are to participate. Results showed a significant positive effect of the experience of injunctive norms on participation (B = 0.31, p < .001), which indicates that individuals who experience injunctive norms to a greater extent are more likely to have an intention of participating in energy initiatives.

Mediating role of injunctive social norms

The final hypothesis stated that the relationship between gender and participation intention in energy communities is mediated by injunctive norms. Results showed that the indirect effect of gender on intention to participate via the injunctive social norms was not significant (B = -0.05, 95% *CI* [-0.167, 0.056]). The direct effect was also not significant (B = 0.01, p = .962). This means that injunctive social norms do not mediate the relationship between gender and intention.

Figure 1

Mediation model



Note. This figure depicts the relationship between gender and the intention to participate in energy initiatives, mediated by injunctive norms. Values represent unstandardised regression coefficients.

*$p < .001$

Discussion

This study examined whether or not gender influences the intention to participate in energy initiatives. Contrary to what was expected, the results showed no significant direct effect of gender on participation intention. This contrasts prior research, which suggests that men are more likely to participate in energy initiatives due to differences in social environment, economic power and networks (Fraune, 2015; Łapniewska, 2019). The sample composition used in this study might partially explain this discrepancy. Prior studies indicate that gender differences in environmental behaviour vary greatly between age groups (Isaacowitz et al., 2021). The sample used in this study was made up of mostly younger respondents. Therefore, it is possible that shifting gender roles and differences in perceptions of energy initiatives played a role in reducing the differences that were expected. However, many respondents may due to their younger age not yet own their own homes, limiting their ability to participate meaningfully in energy initiatives, leading to responses that may not

reflect practical realities of participation in energy initiatives. Future research should focus on how age and owning a home or not have an effect on participation in energy initiatives.

Another explanation could be that men and women within our sample actually do share similar environmental values, reducing the expected gender gap in the intention to participate in energy initiatives. Prior research reports that while men tend to dominate technical energy environments, women more often lead in environmental engagement on a community level (Łapniewska, 2019). Thus, if women in the sample of this study perceived energy initiatives as a community initiative, this may have had an effect on the gender disparities.

Gender did not directly influence the intention to participate in energy initiatives, but injunctive norms did significantly predict participation intention. This is as expected, with previous research reporting that social approval influences environmental behaviours (Keizer, 2014; Farrow et al., 2017). However, injunctive norms did not significantly differ by gender. This suggests that men and women were equally influenced by social approval. This is contrary to what was expected in this study, since previous studies suggest men receive stronger social reinforcement in male-dominated fields (Fraune, 2015).

Because gender did not significantly influence injunctive norms, a mediation was not supported. This suggests that there are other factors that may better explain gender differences in the intention to participate in energy initiatives, such as economic constraints or policy barriers. Even though injunctive norms have been shown to play a role in predicting participation intention overall, they may not be key mechanisms behind the differences in gender. Future research should therefore investigate other mediators, such as financial barriers.

Limitations

Although this study provides valuable insights, it also has some important limitations. The relatively small sample taken may limit the generalisability of the results to larger populations. Recruitment primarily took place through snowball sampling within the networks of the five students behind this research which may have introduced selection bias and a homogenous sample. Using this method to recruit respondents gives rise to demographic groups with similar socioeconomic, educational, and environmental backgrounds, resulting in a skewed sample. Future research could benefit from focusing on sampling methods that aim to find a greater diversity in demographic.

Furthermore, the sample consisted only of people who were not yet participants of an energy initiative, and might not even be familiar with them yet. Although the definition of energy initiatives has been laid out as well as possible before the survey, some unfamiliarity on this specific topic could mean that responses were overly hypothetical, rather than indicating actual behaviour considerations. Participants may have had difficulty accurately considering their own intention to participate in energy initiatives. This could help explain the lack of significant gender differences in the intention to participate that was expected. Future research can address this by making sure that participants have greater a baseline understanding of energy initiatives, by for example introducing a visual educational component like an introductory video, before completing the survey.

Additionally, this study explicitly focused on the intention to participate in initiatives. While intention is a crucial first step in the decision making process (Ajzen, 1991), this may not in every case translate to actual participation. Other barriers that were not accounted for in this study, like financial constraints, may have overruled the intention to participate in some cases. Although this study's focus offers insight into engagement at an early stage, future research should explore the gap between intention and actual participation. Understanding

factors that facilitate or hinder the transition from intention to participate to actual participation could be essential to developing interventions that move beyond simply stated intentions and ensure inclusion in energy initiatives in a more meaningful way.

The items used to measure injunctive norms showed a slightly subpar reliability (α = .61), which may have affected the strength of its validity. With two items, the scale used in this research may not fully capture how social approval influences participation in energy initiatives. This limited scale may have failed to capture ways of social approval across different groups and in different contexts.

Implications

While gender did not significantly predict the intention to participate in energy initiatives, this does not mean that participation in itself is gender-neutral. High intention to participate may not always lead to action, and women may still face other barriers preventing their involvement. Therefore, there is a need for interventions to address gender diversity in energy initiatives specifically. Lower access to decision-making roles, and exclusion from networks in the energy sector can be addressed by interventions such as access to financial resources, educational programmes and targeted recruitment strategies to encourage women's participation in energy initiatives at levels other than purely community-based.

The findings also highlight the role of injunctive norms in environmental behaviour by emphasising the role of injunctive norms in shaping participation in energy initiatives. This indicates that social approval from important others such as family, peers and close friends acts as a significant motivator for participation in energy initiatives regardless of gender. An understanding of social influence is thus important for an initiative's organisers and policymakers to be able to design strategies incorporating these norms to encourage participation. Campaigns that emphasise social endorsement of energy initiatives could be particularly effective. For example, targeted interventions that showcase stories of successful

involvement and normalise participation in energy initiatives through influencers, local leaders, or peer networks may increase engagement. In other words, showcasing stories of successful involvement and highlighting social approval may get doubtful potential participants to get involved in energy initiatives.

The results of this study suggest that approval by important others heightens the likelihood of one's own participation. Therefore, encouraging that people who are already involved with energy initiatives take pride in it and advertise it mouth-to-mouth can get conversations about it going and culminate a growing image of energy initiatives leading to greater engagement. Much like recruitment worked for this research, snowball sampling, simply encouraging people that are already involved in energy initiatives may spark a ripple effect within communities and inspire others to participate.

Conclusion

This study has explored the role of injunctive norms as a mediator in the relationship between gender and the intention to participate in energy initiatives. While gender itself did not have an effect on the participation intention, injunctive norms were found to significantly predict it. These findings contrast prior research suggesting men and women experience different levels of social reinforcement (Fraune, 2015). Instead, the results of this study show that the effect injunctive norms have on the intention to participate in energy communities, although existent, does not appear to be gendered.

Furthermore, this study addressed the importance of social norms in the context of environmental behaviour. The findings highlight the role of perceived social approval in decision-making in environmental context (Cialdini, 2007) and have brought forward a discussion on practical implications for policy makers increasing diversity in energy initiatives.

In summary, while this study did not find differences between gender specifically, it contributes to the understanding of how approval from important others forms participation intentions in the context of energy initiatives. As the globe moves towards a sustainable future, recognising the relationship between social influence, structural barriers, and engagement in energy-related environmental initiatives will be crucial to creating diverse and impactful solutions to climate change.

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Appendix A

Flyer

Appendix B

Measures

Intention to Participate (Scale 1)

For all items measuring the intention to participate in local energy initiatives, respondents could answer on a seven-point Likert scale, ranging from *Helemaal mee oneens* (Completely disagree) to *Helemaal mee eens* (Completely agree).

1. *Ik wil graag meer informatie ontvangen over lokale energie-initiatieven* (I would like to receive more information about local energy initiatives)
2. *Ik zou graag een bijeenkomst bijwonen van een lokaal energie-initiatief* (I would like to attend a meeting of a local energy initiative)
3. *Ik ben geïnteresseerd om lid te worden van een lokaal energie-initiatief* (I am interested in becoming a member of a local energy initiative)
4. *Ik zou graag betrokken willen zijn bij een lokaal energie-initiatief* (I would like to be involved with a local energy initiative)

Injunctive Norms (Scale 2)

For all items measuring the injunctive norms, respondents could answer on a seven-point Likert scale, ranging from *Helemaal mee oneens* (Completely disagree) to *Helemaal mee eens* (Completely agree).

1. *Ik denk dat de meeste mensen die belangrijk voor mij zijn, een lokaal energie-initiatief zouden goedkeuren* (I think that most people that are important to me would approve of a local energy initiative)
5. *Ik denk dat de meeste mensen die belangrijk voor mij zijn, het zouden goedkeuren als ik zou deelnemen aan een lokaal energie-initiatief* (I think that most people that are important to me would approve if I participated in a local energy initiative)

Gender

For the item measuring gender, respondents could answer with one of four options, namely *Man* (Male), *Vrouw* (Female), *Anders, namelijk* (Other, namely), and *Zeg ik liever niet* (I would prefer not to say).

1. *Met welk gender identificeert u zich?* (What gender do you identify with?)