

**Group Identification and Participation in Community-Led Adaptation Actions: The  
Mediating Role of Perceived Group Norms**

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### Abstract

The consequences of climate change pose a serious threat to people's lives worldwide, leading to an increased need for collective adaptation measures. The present correlational study investigates the psychological mechanisms underlying participation in collective sustainability efforts. It specifically assesses the mediating role of perceived group norms in the relationship between group identification and the intention to participate in community-led adaptation actions. The study extends previous research by focusing on adaptation rather than mitigation initiatives. An online survey was conducted among residents ( $N=97$ ) of Oosterparkwijk, Groningen, in the Netherlands and participation intention was assessed using the example initiative *NK Tegelwippen*, which encourages the replacement of tiles with greenery in household gardens. The findings revealed an indirect mediation effect of perceived group norms on the relationship between group identification and participation intention. While group identification does not seem to affect participation intention directly, it is related to perceived group norms regarding participation, which, in turn, are positively linked to participation intention. Therefore, group identification may indirectly influence participation through perceived group norms. Given the urgent need for collective adaptation efforts, these findings have practical implications for developing strategies to increase engagement in community-led sustainability initiatives.

*Keywords:* group identification, perceived group norms, participation intention, community-led adaptation initiatives, collective sustainability actions, climate change

## **Group Identification and Participation in Community-Led Adaptation Actions: The Mediating Role of Perceived Group Norms**

Between 2030 and 2050, an additional 250,000 yearly deaths are expected because of climate change (World Health Organization, 2023). Flooding, heat waves, and food shortages are only some examples of the far-reaching impact the world is facing in the wake of climate change (European Commission, n.d., IPCC, 2023). While some shifts in weather patterns are natural, human behavior seems to be one of the primary catalysts for climate change due to the high emission of greenhouse gases into the atmosphere (IPCC, 2023; United Nations, n.d.). Anthropogenic climate change already affects every corner of this planet, making both mitigation and adaptation measures critically important (European Environment Agency, 2023; IPCC, 2023). While mitigation actions aim to decrease greenhouse gas emissions, adaptation measures intend to diminish or even avert existing threats (European Environment Agency, 2023; IPCC, 2023).

Adaptation involves responding to actual or anticipated climate-related threats and their impact by modifying ecological, economic, and social structures and processes (UNFCCC, n.d.). Examples range from building early warning systems (UNFCCC, n.d.) to greening private gardens in order to decrease the risk of heat waves and flooding (Baker et al., 2018). Even with a substantial decrease in emissions, the repercussions of climate change will persist, significantly affecting people's lives (European Environment Agency, 2024; NASA, n.d.). Adaptation, therefore, plays a critical role in reducing threats caused by climate change (IPCC, 2023). The current study addresses a theoretical gap by concentrating on adaptation initiatives, as previous research has predominantly focused on mitigation strategies (Xue et al., 2021), while adaptation efforts are hindered by knowledge gaps (IPCC, 2023).

In recent years, a growing number of adaptation initiatives have been launched at local, national, and international scales (IPCC, 2023). Such initiatives can be divided into top-down and bottom-up approaches (Eicken et al., 2021; Jans, 2021). While top-down initiatives,

usually directed by governments or larger organizations, introduce regulations and policies for addressing climate change, bottom-up initiatives, also referred to as community initiatives, emphasize the role of communities and non-state actors in driving change and encouraging more sustainable behavior in larger groups (Eicken et al., 2021; Jans, 2021). This study focuses on bottom-up adaptation measures implemented at the community level.

Communities are considered a crucial component in developing a more sustainable future by creating opportunities for participating in sustainability transitions (Seyfang & Smith, 2007). They offer a favorable setting for promoting pro-environmental behavior (Middlemiss, 2011), which aims to reduce one's negative influence on the environment (Tian & Liu, 2022). Since past research has primarily focused on the psychological factors underlying individual pro-environmental behavior (Díaz et al., 2020; Ham et al., 2015; Han et al., 2019; Swaim et al., 2013), the current research will focus on factors that lead people to participate in collective sustainability actions.

Collective action is connected to the way in which people perceive social groups (Barth et al., 2021). When individuals consider a group or community as important and feel a sense of belonging and identification with it, they may be more inclined to participate in collective actions associated with that group (Barth et al., 2021). Thus, group identification might be necessary for collective actions to occur (Fritsche et al., 2018). More specifically, group identification and norms have been shown to be related to collective action, as group norms may offer behavioral guidance to members, motivating them to engage in perceived group normative behavior, such as participation in collective action (Barth et al., 2021; Fritsche et al., 2018; Verkooijen et al., 2007).

The present study aims to answer the research question of whether perceived group norms mediate the relationship between group identification and the intention to participate in community-led adaptation actions. The results of this research could prove beneficial for

fostering participation in communal adaptation initiatives, shedding light on effective ways to utilize perceived group norms to increase participation.

### **Group Identification and Participation in Community-Led Adaptation Actions**

The level of identification with an ingroup has been suggested to dictate how much group membership affects behavior (Leach et al., 2008). Group identification describes the process of “member identification with an interacting group” (Henry et al., 1999, p. 561). While *group identity* refers to the unique collective identity of a group, the term *group identification* specifically denotes a process at the individual level (Henry et al., 1999). Being closely linked to the concept of group identification, Social Identity Theory (SIT; Ellemers & Haslam, 2012; Fritsche et al., 2018; Henry et al., 1999; Tajfel, 1981; Tajfel & Turner, 1979) posits that people not only define themselves in terms of their individual attributes but also by their belongingness to various social groups. The Social Identity Model of Collective Action (SIMCA) further proposes that identifying with a group may lead individuals to become “collective actors” (Fritsche et al., 2018, p. 246) by embracing the group’s goals and behaviors as their own (Fritsche et al., 2018).

The extent to which one identifies with a group may play a key role in one’s willingness to participate in collective action (van Zomeren et al., 2008). In previous research, those who identified more strongly with their ingroup were shown to view this group as more environmentally friendly, resulting in higher intentions to engage in pro-environmental behaviors (Masson et al., 2016). Furthermore, Sloot et al. (2018) investigated community energy initiative involvement and found that identifying more strongly with the initiative heightened individuals’ communal sustainable energy intentions. This corresponds with Heath et al.’s (2017) findings, suggesting that stronger community identification may indirectly relate to an increased willingness to contribute to the community. Thus, research indicates that group identification could substantially facilitate collective actions (Fritsche et al., 2018) and might be even more strongly linked to collective pro-environmental efforts compared to

individual pro-environmental behavior (Barth et al., 2021). The abovementioned findings support the development of the following hypothesis for this study:

*Hypothesis 1 (H1):* Group identification is positively related to the intention to participate in community-led adaptation actions.

### **Group Identification and Perceived Group Norms**

According to Social Identity Theory, individuals generate a mental prototype of the social group they identify with (Fritsche et al., 2018; Terry et al., 1999), which consists of perceived group norms, including the “attitudes and behaviors associated with a ‘typical’ ingroup member” (Masson et al., 2016, p. 186). Strong group identification may lead individuals to behave and think in line with this perceived prototype (Barth et al., 2021; Rathbone et al., 2023) and to internalize the norms of the group (Liu et al., 2019). An individual may also be motivated to increase their similarity to other members of the group by aligning their behavior with the perceived group norms (Verkooijen et al., 2007).

Such perceived group norms have been the subject of varied definitions, sometimes solely including other group members’ behavior (descriptive norms; Cialdini et al., 1990; Pillutla & Chen, 1999), and other times additionally encompassing perceived expectations from other members (injunctive norms; Rees & Bamberg, 2014). The present study defines perceived group norms as an individual’s perception of the behavioral norms within their social group. This includes the perception of other members’ behavior (Pillutla & Chen, 1999; Terry et al., 1999), as well as the perceived behavioral expectations from other group members (Rees & Bamberg, 2014). Based on the abovementioned theoretical implications, the present study proposes the following hypothesis:

*Hypothesis 2 (H2):* Group identification is positively related to perceived group norms.

### **Perceived Group Norms and Participation in Community-Led Adaptation Actions**

Previous research found perceived descriptive norms to predict engagement in pro-environmental behavior (Elgaaied-Gambier et al., 2018; Ham et al., 2015). Ham et al. (2015) investigated the effect of subjective descriptive norms on the intention to purchase green food and found them to significantly predict purchasing intentions. Another study by Smith et al. (2021) examined collective action participation, exploring how participation frequency within people's close social networks affects their involvement in social movements. They revealed that perceived descriptive norms within one's social network may influence participation intentions. One possible explanation for the effect of perceived behavioral norms on participation in collective action is the descriptive norm effect, which describes an individual's tendency to behave in a specific way, knowing that the majority of others behave this way (Pryor et al., 2019). For instance, when high-energy households discover lower consumption in their neighborhood, they may decrease their usage to match the norm (Schultz et al., 2007). Thus, the behavior we observe from others may influence our own actions.

People's intentions to engage in a specific behavior may, however, not only be influenced by descriptive norms but also by subjective norms, as proposed by the Theory of Planned Behavior (Terry et al., 1999). Subjective norms describe an individual's perception of the social pressure to perform a particular action (Ajzen, 1985). Some research has shown a significant effect of subjective norms on pro-environmental behavior intentions (Chan et al., 2019; Wang et al., 2023), while others found it to be a relatively weak predictor of intentions (Ham et al., 2015; Terry & Hogg, 1996; Terry et al., 1999). Ham et al. (2015) attribute this weak effect to the narrow definition of subjective norms, leading them to develop a modified version, also incorporating descriptive norms. The present study will, thus, include both the perceived behaviors of fellow group members (i.e., descriptive norms; Cialdini et al., 1990; Rimal & Real, 2005), as well as their perceived expectations (i.e., injunctive norms; Rees & Bamberg, 2014). Based on the previous findings, this study proposes the following hypothesis:



*Hypothesis 3 (H3):* Perceived group norms are positively related to the intention to participate in community-led adaptation actions.

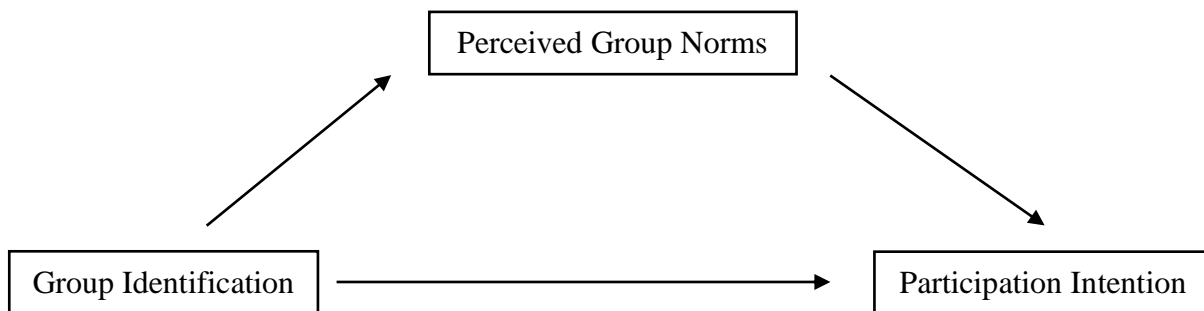
### **The Mediating Role of Perceived Group Norms**

Perceived behavioral norms have been shown to influence an individual's likelihood of participating in social movements (Smith et al., 2021). Social categorization theory is often used to explain this effect (Pryor et al., 2019). Accordingly, people's self-identity is connected to their ingroup, and individuals aim to uphold their ingroup identity by assimilating attributes of the salient social group and conforming to ingroup norms (Hogg et al., 2004). The stronger the group identification, the more likely an individual is to be influenced by the group's norms (Pryor et al., 2019).

Since perceived group norms and adherence to them are closely related to Social Identity Theory and group identification (Barth et al., 2021; Fritsche et al., 2018; Masson et al., 2016; Rathbone et al., 2023; Terry et al., 1999), Rees and Bamberg (2014) aimed at investigating the relationship between social identity, perceived social norms and the intention to participate in a neighborhood sustainability initiative. Their analysis revealed that perceived participation norms may mediate the effect of social identity on participation intention. The current study follows this idea by investigating the mediating effect of perceived group norms on the relationship between group identification and participation in community-led adaptation initiatives. While Rees and Bamberg (2014) use the concept of social identity as their independent variable, the present study utilizes the concept of group identification.

Hence, to better understand the determinants of participation in collective sustainability efforts, this research will investigate the mediating role of perceived group norms in the dynamic link between group identification and participation intention (see Figure 1). This leads to the following hypothesis:

*Hypothesis 4 (H4):* Perceived group norms mediate the relationship between group identification and the intention to participate in community-led adaptation actions.

**Figure 1***Visualization of Model*

## Methods

### Participants

Initially, 124 participants took part in the survey, of which 27 had to be excluded due to either failing the attention check or not completing the questionnaire. The final sample, thus, consisted of 97 participants. All participants were residents of Oosterparkwijk in Groningen, the Netherlands. This neighborhood was selected due to its varied socioeconomic background, allowing for a more diverse sample. It was also chosen because it contains numerous households with gardens. Demographic data was not gathered, as it was not relevant to this study. Since the measured constructs were more related to cognitive or social processes than to demographic information, testing the hypotheses did not require any demographic information.

### Design and Procedure

The current study was undertaken by five third-year psychology students from the University of Groningen, as part of their bachelor thesis project. A correlational design was chosen to explore the relationships between group identification, perceived group norms, and participation intention. A selective sample was recruited within the neighborhood Oosterparkwijk in Groningen, the Netherlands. The gathered data was quantitative in nature and was collected by visiting households within the neighborhood. The researchers presented the study to the residents, asked for consent, and provided a QR code directing the

participants to an online Qualtrics questionnaire. Taking part in the survey was voluntary and anonymous. All items and scales were translated from English to Dutch, making the questionnaire available in both languages. Upon consenting to participate and selecting a language, participants were introduced to an initiative. As the study aims to investigate the psychological factors underlying participation in community-led adaptation actions, the initiative “NK Tegelwippen” (NK Tegelwippen, n.d.) was chosen to assess the variables of interest. This initiative encourages citizens to exchange pavement tiles in their gardens for greenery to help cool urban areas and decrease the risk of flooding (NK Tegelwippen, n.d.). The initiative was presented through a brief text (see Appendix B) explaining its workings and benefits, accompanied by a photograph depicting two people replacing tiles. The text aimed to ensure that participants understood the initiative, which was important for them to consider whether they would be willing to participate. The picture helped visualize the initiative’s idea, assisting participants to imagine themselves in such an activity. After reading about NK Tegelwippen, participants were invited to answer questions concerning the scales of interest. The focal variables of this research paper are group identification, perceived group norms, and participation intention. As the researchers were partly interested in different variables, the survey encompassed not only the variables outlined in this paper but also incorporated the following concepts: entitativity, social norms, efficacy, sense of community responsibility, and perceived discrimination. An attention check was included in the questionnaire to screen out unengaged participants and maintain the quality of the data (Shamon & Berning, 2020). At the end of the questionnaire, a link to the website of the initiative was provided.

## **Measures**

### ***Group Identification***

To measure group identification – the independent variable – a one-item scale from Postmes et al. (2013) was used (see Table C1). To fit the current research, “the people in my

neighborhood” was inserted in the bracket “target group” (Postmes et al., 2013, p. 602) of the original item. Participants were asked to indicate the extent to which they agreed with the following statement: “I identify with the people in my neighbourhood”. Answers were rated on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*).

### ***Perceived Group Norms***

Instead of focusing on perceived group norms in general, the present study aims to specifically investigate the influence of perceived group norms regarding participation. The mediating variable in the current research is, thus, the perceived group norm to participate in a community-led adaptation initiative. This variable was measured using a scale derived from Rees and Bamberg (2014). The scale comprised two items measuring perceived descriptive and injunctive participation norms (see Table C2). Both items were adapted to fit the content of this research. Adaptations included removing the term “that are personally important to you” (Rees & Bamberg, 2014, p. 469) and substituting “group” (Rees & Bamberg, 2014, p. 469) with “initiative”. Furthermore, the two items were displayed in a matrix and were rephrased as propositions rather than questions. Participants were requested to indicate their level of agreement with the following two statements: “People in my neighborhood expect that I participate in such an initiative” (injunctive norms) and “People in my neighborhood would participate themselves in such an initiative” (descriptive norms). Responses were rated on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). Cronbach’s alpha for these two items was  $\alpha=.61$ .

### ***Participation Intention***

Participation intention – the dependent variable – was assessed using a self-developed four-item scale. The aim of the self-developed scale was to include various kinds of participation behaviors, ranging from low to high levels of engagement. Participants were presented with an example of a community-led adaptation initiative and were asked, based on this initiative, to rate the likelihood of exhibiting a particular behavior outlined in the four

items. Example items include “Based on this initiative, to what extent would you be likely to participate in this initiative?” and “Based on this initiative, to what extent would you be likely to enrol for this initiative?” (see Table C3 for the whole scale). Participants rated the likelihood on a 7-point Likert scale (1 = *extremely unlikely* to 7 = *extremely likely*). With a Cronbach’s alpha of  $\alpha=.87$ , the scale held good reliability.

## Results

### Preliminary Analysis

Two regression analyses and one mediation analysis were conducted using JASP to test the relationships between group identification, perceived group norms, and participation intention. An alpha level of .05 was used to determine statistical significance. Before starting the main analysis, the assumptions of linear regression were checked. First, a visual inspection of the Q-Q Plot of the standardized residuals (see Figure D1) was performed to assess normality. As the residuals followed an approximately straight line, indicating a normal distribution, this assumption appeared to be met. Next, a residual scatterplot (see Figure D2) was used to check for homoscedasticity and linearity. The visual inspection revealed an approximately random and equal distribution of residuals around a horizontal line, therefore indicating homoscedasticity, as well as linearity. Thus, the assumption had been met.

Furthermore, the Variance Inflation Factor was calculated to assess multicollinearity. The resulting value of 1.11 (<4), with a tolerance score of 0.9 (>0.2), indicated no signs of multicollinearity between the predictors and hence no evidence for violation. Lastly, to check for independence, a Durbin-Watson test was conducted, which resulted in a score of 1.78, thereby indicating a positive autocorrelation and, thus, independence of observations. Hence, the assumption had not been violated. By generating a boxplot for each variable of interest, one outlier in the data could be detected, which was a single participant who indicated a one on both items of the perceived group norms scale. In contrast, most other participants indicated higher numbers. The outlier was included in further analyses, as data points that are

accurate but just lie far from the others may reflect a legitimate response from a participant and can contain valuable information (Aguinis et al., 2013).

After checking for violations of the assumptions of linear regression and identifying outliers, the descriptive statistics of the variables and their correlations were calculated (see Table 1). As illustrated, group identification significantly and positively correlated with perceived group norms ( $r(95) = .32, p < .01$ ). Furthermore, there was a significant positive association between perceived group norms and participation intention ( $r(95) = .35, p < .001$ ). Participation, on the other hand, was not significantly correlated with group identification ( $r(95) = .17, p = .105$ ). Since there was no significant correlation found between group identification and participation intention, no further analyses on this relationship were conducted, and Hypothesis 1 could not be supported.

### Main Analysis

The main analysis included two simple linear regression analyses to test the relationships between group identification and perceived group norms, as well as the association between perceived group norms and participation intention. A mediation analysis was conducted using structural equation modeling (SEM) to test the mediating role of perceived group norms in the relationship between group identification and participation

**Table 1**

*Descriptive Statistics of Independent, Mediator, and Dependent Variables, and Correlations Between Variables*

Variable	<i>N</i>	<i>M(SD)</i>	1	2	3
1. Group Identification	97	4.34 (1.58)	–		
2. Perceived Group Norms	97	4.13 (0.99)	.320**	–	
3. Participation Intention	97	4.39 (1.28)	.166	.350***	–

*Note:* Range Likert Scales = 1-7; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

intention. All statistical analyses were performed using JASP for Mac.

Regarding Hypothesis 2, a simple linear regression was used to test if group identification significantly predicted perceived group norms. The overall linear regression has been shown to be statistically significant ( $F(1,95) = 10.80, p = .001$ ). Group identification explained 10% of the variation in perceived group norms ( $R^2 = .10$ ), and it significantly predicted perceived group norms ( $\beta = .32, p = .001$ ). These results support Hypothesis 2.

Another linear regression was performed to determine whether perceived group norms significantly predicted participation intention, thereby testing Hypothesis 3. The results revealed a statistically significant regression ( $F(1,95) = 13.24, p < .001$ ) and demonstrated that perceived group norms explained approximately 12% of the variability of participation intention ( $R^2 = .12$ ). Hence, perceived group norms appeared to significantly predict participation intention ( $\beta = .35, p < .001$ ). This lends support in favor of Hypothesis 3.

Testing Hypothesis 4, a mediation analysis was performed using structural equation modeling (SEM) to assess the mediating role of perceived group norms in the relationship between group identification and participation intention. The results (see Table 2) revealed a non-significant total effect of group identification on participation intention ( $\beta = .11, p = .098$ ). Accordingly, the effect of group identification on participation was not statistically

**Table 2**

*Results of SEM Mediation Analysis*

Effect	$\beta$	$p$	95% CI	
			<i>LL</i>	<i>UL</i>
Direct Effect	.04	.550	-.11	.16
Indirect Effect	.07	.019*	.02	.15
Total Effect	.11	.098	-.03	.23

Note:  $N = 97$ . *LL* = lower limit; *UL* = upper limit. CI = 95%; \*  $p < .05$ ;

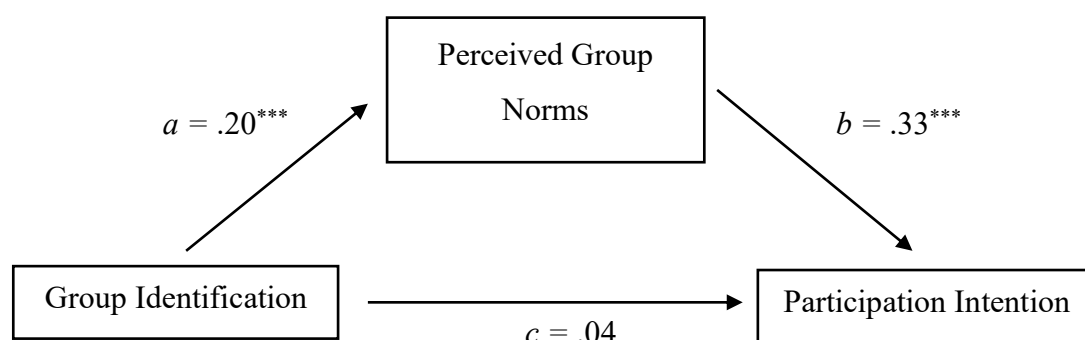
significant when considering both the direct and indirect effects. Furthermore, the direct effect of group identification on participation intention also appeared to be non-significant ( $\beta = .04$ ,  $p = .550$ ). However, the results showed a significant indirect effect of group identification on participation intention through perceived group norms ( $\beta = .07$ ,  $p = .019$ ), as the 95% bootstrap confidence interval of [.02; .15] did not include zero. Hence, group identification affected perceived group norms, which in turn influenced participation intention. By only revealing a significant indirect effect of group identification on participation intention through perceived group norms, the results indicate an indirect mediation effect of perceived group norms, thereby providing support for Hypothesis 4. See Figure 2 for the complete model.

### Supplementary Analyses

The main analysis revealed a non-significant correlation and non-significant direct effect of group identification on participation intention. However, since the participation intention scale included different types of participation, a supplementary analysis of the correlations between group identification and each participation item was conducted (see Table 3). Group identification did not appear to be significantly correlated with the first item of participation intention, namely the likelihood of participating ( $r(95) = .05$ ,  $p = .602$ ). Similarly, there also appeared to be no significant association between group identification

### Figure 2

*Standardized Path Coefficients for the Relationship Between Group Identification and Participation Intention Through Perceived Group Norms; \*\*\*  $p < .001$*





**Table 3**

*Descriptive Statistics of Participation Intention Items and Group Identification, and Correlations Between Variables*

Variable	<i>N</i>	<i>M(SD)</i>	1	2	3	4	5
1. Group Identification	97	4.34 (1.58)	–				
2. Participation 1 <sup>a</sup>	97	4.57 (1.63)	.054	–			
3. Participation 2 <sup>b</sup>	97	4.19 (1.68)	.164	.793***	–		
4. Participation 3 <sup>c</sup>	97	4.52 (1.47)	.098	.553***	.580***	–	
5. Participation 4 <sup>d</sup>	97	4.31 (1.25)	.274**	.636***	.595***	.600***	–

*Note:* Range Likert scales = 1-7; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

<sup>a</sup>The likelihood of participating in this initiative. <sup>b</sup>The likelihood of enrolling for this initiative. <sup>c</sup>The likelihood of seeking more information about this initiative. <sup>d</sup>The likelihood of investing resources in this initiative

and the likelihood of enrolling in this initiative ( $r(95) = .16, p = .108$ ) and no significant correlation with the third item, namely the likelihood of seeking more information about the initiative ( $r(95) = .10, p = .338$ ). However, group identification appeared to be significantly and positively correlated with the likelihood of investing resources in this initiative ( $r(95) = .27, p = .007$ ). An additional simple linear regression also revealed this relationship ( $F(1,95) = 7.73, p = .007$ ) and furthermore indicated that group identification accounted for approximately 8% of the variation in participants' likelihood of investing resources in the initiative ( $R^2 = .08$ ). Thus, group identification appeared to significantly predict the fourth item of the participation intention scale ( $\beta = .27, p = .007$ ). These findings provide partial support for Hypothesis 1.

Since the preliminary analysis detected an outlier in the mediating variable, a

sensitivity analysis was conducted to assess its impact on the mediation effect. With the outlier included, the mediation analysis revealed a significant indirect effect of group identification on participation intention through perceived group norms. However, after excluding the outlier, the indirect effect was no longer significant ( $\beta = .05, p = .053$ ). The direct effect remained non-significant ( $\beta = .03, p = .701$ ), and the same holds true for the total effect ( $\beta = .07, p = .263$ ). These results indicate that the mediation effect is sensitive to the presence of the identified outlier.

### **Discussion**

The objective of the current study was to gain a better understanding of the mechanisms driving participation in collective pro-environmental efforts. It specifically aimed to investigate the effect of group identification on the intention to participate in community-led adaptation actions through perceived group norms. This research contributes to the existing body of research by concentrating on adaptation initiatives instead of mitigation measures.

In line with existing literature and research on social identity, it was hypothesized that (1) group identification is positively related to the intention to participate in community-led adaptation actions. The findings did not support this hypothesis, indicating no significant relationship between group identification and participation intention. This contradicts existing literature and suggests that identifying with a social group may not make an individual more inclined to participate in initiatives within this group. Secondly, it was proposed that (2) group identification is positively related to perceived group norms, which was supported by the current findings. Thus, members who feel a sense of identification with a group may be more likely to perceive participation to be normative within this group. The results of the analysis further lent support for the hypothesis that (3) perceived group norms are positively related to the intention to participate in community-led adaptation actions. Hence, individuals may exhibit an increased willingness to engage in community-led adaptation initiatives when

believing such behavior to be normative within the group. Finally, it was hypothesized that (4) perceived group norms mediate the relationship between group identification and the intention to participate in community-led adaptation actions. The obtained results support this hypothesis by revealing an indirect mediation effect of perceived group norms on the relationship between group identification and participation intention. While group identification does not appear to relate to participation intention directly, it does seem to affect perceived group norms, which may, in turn, positively relate to individuals' intentions to engage in community-led adaptation initiatives.

### **Theoretical Implications**

The findings of the current research advance and challenge existing knowledge about the effects of group identification. Existing literature and research mostly speak in favor of a positive association between group identification and participation in community-led sustainability initiatives. According to SIMCA, group identification might instigate individuals to transition into "collective actors" (Fritsche et al., 2018, p. 246). Indeed, previous studies have found that identifying with a group is associated with one's willingness to get involved with community initiatives and contribute to the community (Heath et al., 2017; Sloot et al., 2018). However, the current research contradicts previous findings, indicating no significant correlation between group identification and participation intention. These results imply that merely identifying with a social group may not be sufficient to drive participation in community initiatives, suggesting that the motivations underlying participation could be more complex than previously thought.

One potential explanation for these contradictory results is that the influence of group identification on participation intentions may vary across different types of participation behaviors. The supplementary analysis revealed variations in the relationships between group identification and the individual items of the participation intention scale. Of the four items, only one appeared to significantly correlate with group identification, namely investing

resources in the initiative. Participants may have interpreted this item as merely donating money, indicating a more passive form of participation. This leads to the speculation that group identification may only correlate with low levels of engagement, whereas higher levels might require more than simply identifying with a group. Conversely, it could also be argued that considering both money and time as a resource, this form of participation might be seen as a higher level of engagement and perhaps even the most community-based type of participation, as it involves providing resources to other members of the group. In contrast, seeking information and removing tiles may be perceived as a more individual behavior, less connected to other community members. Thus, it could be speculated that group identification may primarily influence behaviors that are more directly related to the community. This idea is supported by the fact that the chosen initiative, while based on community goals, such as a more climate-resistant neighborhood, targets behavior performed at the household level. Consequently, this behavior may be less evidently community-based than that in previous research (Rees & Bamberg, 2014). Individual factors could have, therefore, played a larger role in participation intention compared to social factors, possibly explaining the non-significant effect of group identification on participation intention.

Although group identification did not have a direct effect on participation intention, it did positively influence perceived group norms. This finding aligns with Social Identity Theory, which posits that those who identify strongly with a group are more likely to internalize that group's norms (Fritsche et al., 2018; Liu et al., 2019; Masson et al., 2016; Terry et al., 1999). Further, the findings of this study underpin the significant role of normative influences in encouraging collective behavior (Smith et al., 2021) by indicating that perceiving participation as normative may increase the likelihood of intending to participate in community actions. The current findings, therefore, align with previous research that found perceived norms to influence pro-environmental behavior (Elgaaied-Gambier et al., 2018; Ham et al., 2015). They also lend support for the proposal of Ham et al. (2015) to incorporate

descriptive norms into the concept of subjective norms in the Theory of Planned Behavior to find a stronger effect of subjective norms on behavioral intentions. The current study adds to the existing literature by revealing that perceived participation norms influence not only individuals' engagement in mitigation behavior but also their intention to participate in collective adaptation efforts.

Finally, the findings suggest the effect of group identification on participation intention to operate solely through its influence on perceived group norms. Hence, individuals who identify with a group may be more likely to perceive participation as normative and, in turn, may be more inclined to participate themselves. Therefore, although group identification might not directly facilitate engagement in collective action, it may still indirectly influence participation intention by affecting perceptions of group norms. Thus, Social Identity Theory may yet indirectly play a role in explaining the workings behind the intention to participate in collective environmental behavior. The present research was able to support the findings of Rees and Bamberg (2014), which reveal a mediation effect of perceived social norms in the relationship between sense of community and participation intention. Furthermore, the current study brought some novelty to the research field by revealing a mediating effect of perceived group norms in the context of adaptation initiatives instead of mitigation initiatives. The results thereby increase the generalizability of the discovered relationship to other types of initiatives. These findings provide empirical evidence for the critical role of perceived group norms in translating group identification into participation in community-led adaptation initiatives.

### **Practical Implications**

This study brings about possible practical implications that could prove beneficial in mobilizing people to participate in community-led adaptation initiatives. The current findings suggest that perceived group norms regarding participation may be linked to a higher likelihood of engaging in collective pro-environmental action. These insights could be

especially helpful for communication strategies of community-led adaptation initiatives. A suggestion for coordinators of these initiatives would be to share information about the participation of community members. By making involvement more visible, perceptions of participation norms may be enhanced, possibly motivating engagement in collective action. Since perceived group norms have been shown to be associated with group identification, strengthening individuals' identification with the group may affect the salience of perceived group norms. These, in turn, may increase the likelihood of participating in community initiatives. However, further research is needed to develop effective strategies that implement these findings. Given the urgency and importance of collectively adapting to the threats of climate change, it is crucial to develop methods to increase participation rates in community-led adaptation actions.

### **Strengths and Limitations**

An essential strength of the current research is its focus on collective adaptation measures. By choosing an adaptation initiative, this study enriches the field of research, as it highlights the importance of perceived group norms in the relationship between group identification and participation intention, not only in the context of collective mitigation efforts but also for community-led adaptation actions. Another notable strength lies in the self-developed participation intention scale, which has good reliability, and the supplementary analysis of the relationships between group identification and the distinct participation items. Including various types of participation behaviors in the scale and analyzing their associations with group identification individually, the current research was able to propose a more nuanced relationship between group identification and participation intention, which may vary depending on the type of behavior.

While the current results provide new insights into the research field, it is also important to recognize some limitations. First, the current study utilized a selective sample, which was not selected randomly and was recruited within a single neighborhood.

Consequently, the findings apply to the current sample but may not necessarily generalize to the larger population and other communities (Liu et al., 2004; Martínez-Mesa et al., 2016). Neighborhoods may differ in multiple aspects, such as their socioeconomic inequality, which might affect resident's civic engagement and their intentions to support pro-environmental actions (Schröder & Neumayr, 2023). In the future, a random sampling technique may create a more representative sample, increasing the external validity of the findings (Morling, 2017, Chapter 7).

Second, the choice of the initiative and the scale used to measure group identification may have affected the findings on the relationship between group identification and participation intention. While the behavior targeted by the initiative is community-based and intended to benefit the neighborhood, it is not fully communal in nature, as it is performed at the household level. This may have introduced additional individual motives, potentially explaining the non-significant relationship between the two variables. This might also clarify why group identification only correlated with investing resources, as this behavior is more obviously connected to the community and likely driven by more collective motives. Selecting an initiative with actions more directly linked to collective efforts could provide greater insights into the relationship between group identification and participation intention and may clarify inconsistencies between the current and previous findings. Additionally, one could speculate that employing a multiple-item scale for group identification may also yield more consistent results. Although some propose a single item to be sufficient in operationalizing group identification (Postmes et al., 2013), others advocate using multiple items to capture the concept's complexity (Leach et al., 2008). In fact, previous research (Heath et al., 2017) did find a significant effect of group identification on participation when using multiple items, suggesting their value in assessing this relationship.

Lastly, the sensitivity analysis revealed that the indirect mediation effect of perceived group norms is sensitive to the presence of an outlier. Excluding this data point made the

indirect effect non-significant, indicating that the observed relationship is not robust across all data points. Yet, the outlier likely reflects an accurate data point, making its inclusion important for capturing the whole range of participants' responses (Aguinis et al., 2013). However, its strong influence on the results highlights the importance of using more robust statistical techniques in the future to decrease the sensitivity to outliers (Erceg-Hurn & Mirosevich, 2008). Moreover, a larger sample size could demonstrate that such a data point may not actually be an outlier by revealing more similar responses.

### **Future Research Directions**

In general, future research would benefit from further exploring whether the relationship between group identification and participation intention varies across different kinds of participation behaviors, as suggested by the supplementary analysis of this study. For example, it could be insightful to investigate how group identification affects participation intentions differently based on whether the participation behaviors are highly or minimally engaging or whether they are directly or indirectly connected to the community. Delving deeper into these differences would facilitate a more nuanced understanding of the relationship between the two variables. Additionally, to broaden the scope of the current study, future research could assess the relationships of group identification, perceived group norms, and participation intention in more diverse cultural settings. While the present study examined these links in an individualistic culture (Hofstede & Soeters, 2002), collectivistic cultures, which are often suggested to emphasize the importance of groups and their collective needs (Hu et al., 2015), may show different dynamics. Hence, it would be insightful to explore how the cultural context influences the interplay between group identification and participation and to determine if the observed mediation effect of perceived group norms can be applied to other cultural settings.

### **Conclusion**



The present research builds on the idea that norms play a central role in the relationship between group identification and collective behavior by assessing whether perceived group norms regarding participation mediate the effects of group identification on the intention to participate in community-led adaptation actions. While group identification does not seem to directly affect participation intention, the findings reveal that perceived group norms mediate this relationship, such that group identification is positively related to perceived group norms, which in turn positively affect the intention to participate. The results of this study provide important insights into the psychological factors underlying engagement in collective pro-environmental efforts. This research wants to encourage further investigations in this area to identify and develop strategies that could increase participation rates in community-led adaptation initiatives. Such efforts are crucial as they can significantly contribute to a more effective adaptation to climate change, thereby hopefully counteracting the threats that may yearly endanger the lives of 250,000 people (World Health Organization, 2023).

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## **Appendix A**

### **AI Prompts**

#### **First Prompt**

##### ***The Prompt Put Into ChatGPT3***

Please check the commas in this sentence: Being closely linked to the concept of group identification, Social Identity Theory (SIT; Ellemers & Haslam, 2012; Fritsche et al., 2018; Henry et al., 1999; Tajfel, 1981; Tajfel & Turner, 1979) posits that people not only define themselves in terms of their distinct individual attributes but also by their belongingness to various social groups, consequently deriving a sense of identity from their connection with these group.

##### ***The Obtained Output***

Sure, I can help with that. Your sentence is mostly correct, but it can be slightly improved for clarity and readability. Here is the revised version: Being closely linked to the concept of group identification, Social Identity Theory (SIT; Ellemers & Haslam, 2012; Fritsche et al., 2018; Henry et al., 1999; Tajfel, 1981; Tajfel & Turner, 1979) posits that people not only define themselves in terms of their distinct individual attributes, but also by their belongingness to various social groups, consequently deriving a sense of identity from their connection with the group. Changes made: Added a comma after "attributes" for better readability.

##### ***The Changes Made to the Output***

I added a comma after "attributes".

##### ***The Final Sentence***

Being closely linked to the concept of group identification, Social Identity Theory (SIT; Ellemers & Haslam, 2012; Fritsche et al., 2018; Henry et al., 1999; Tajfel, 1981; Tajfel & Turner, 1979) posits that people not only define themselves in terms of their distinct

individual attributes, but also by their belongingness to various social groups, consequently deriving a sense of identity from their connection with these group.

### **Second Prompt**

#### ***The Prompt Put Into ChatGPT3***

Please check for correctness of the grammar and spelling: The current study adds to the existing literature, by revealing that perceived participation norms influence not only individual's engagement in mitigation behavior but also their intention to participate in collective adaptation efforts.

#### ***The Obtained Output***

The grammar and spelling in the sentence are mostly correct, but there is a minor issue with the possessive form. Here is the corrected version: The current study adds to the existing literature, by revealing that perceived participation norms influence not only individuals' engagement in mitigation behavior but also their intention to participate in collective adaptation efforts.

#### ***The Changes Made to the Output***

I changed "individual's" to "individuals".

#### ***The Final Sentence***

The current study adds to the existing literature by revealing that perceived participation norms influence not only individuals' engagement in mitigation behavior but also their intention to participate in collective adaptation efforts.

### **Third Prompt**

#### ***The Prompt Put Into ChatGPT3***

Please provide me with a synonym for "thus".

#### ***The Obtained Output***

Certainly! Here are some synonyms for "thus":

Therefore, Consequently, Accordingly, Hence, As a result, So, For this reason, In turn, That being the case, Because of this

### ***The Changes Made to the Output***

In one of my sentences, I changed the word “thus” to “accordingly”.

### ***The Final Sentence***

Accordingly, the effect of group identification on participation was not statistically significant when considering both the direct and indirect effects.

### **Fourth Prompt**

#### ***The Prompt Put Into ChatGPT3***

Which synonym can I use instead of environment in this sentence: They offer a favorable environment for promoting pro-environmental behavior (Middlemiss, 2011), which aims to reduce one's negative influence on the environment (Tian & Liu, 2022)

#### ***The Obtained Output***

You can use the word setting instead of environment in your sentence.

#### ***The Changes Made to the Output***

I changed “[...] a favorable environment [...]” to “[...] a favorable setting [...]”.

#### ***The Final Sentence***

They offer a favorable setting for promoting pro-environmental behavior (Middlemiss, 2011), which aims to reduce one’s negative influence on the environment (Tian & Liu, 2022).

## Appendix B

### Presentation of the Initiative NK Tegelwippen



The NK Tegelwippen is a national initiative dedicated to creating greener neighbourhoods by encouraging the removal of tiles from household gardens. Aimed at making the Netherlands more climate-proof. This is because greener gardens are more effective at reducing the risks of both flooding and heat waves, due to higher rates of water retention and cooling effects.

Since 2021 municipalities have competed annually on the amount of tiles removed from the gardens. Alongside your neighbours, you can join the initiative by replacing your tiles with greenery such as grass, plants and trees. Each tile you remove will be added to the ‘tilecounter’ of your municipality. Your participation will not only help your municipality compete, it will also help combat the local risks caused by climate change.

More useful information on how to participate and tips for greening can be found on their website. (Provided at the end of the questionnaire)

## Appendix C

### Measures

**Table C1**

*Group Identification Scale; adapted from Postmes et al. (2013)*

To what extent do you agree with the following statement?	1 – strongly disagree 7 – strongly agree						
“I identify with the people in my neighborhood”	1	2	3	4	5	6	7

*Note:* 7-point Likert Scale: 1 = Strongly disagree; 2 = Disagree; 3 = Somewhat disagree; 4 =

Neither agree nor disagree; 5 = Somewhat agree; 6 = Agree; 7 = Strongly agree.

**Table C2**

*Perceived Group Norms Scale; adapted from Rees & Bamberg (2014)*

To what extent do you agree with the following statement?	1 – strongly disagree 7 – strongly agree						
“People in my neighbourhood expect that I participate in such an initiative”	1	2	3	4	5	6	7
“People in my neighbourhood would participate themselves in such an initiative”	1	2	3	4	5	6	7

*Note:* 7-point Likert Scale: 1 = Strongly disagree; 2 = Disagree; 3 = Somewhat disagree; 4 =

Neither agree nor disagree; 5 = Somewhat agree; 6 = Agree; 7 = Strongly agree.

**Table C3***Participation Intention Scale; self-developed*

Based on this initiative, to what extent would you be likely to...	1 – extremely unlikely 7 – extremely likely						
“...participate in this initiative”	1	2	3	4	5	6	7
“...enrol for this initiative”	1	2	3	4	5	6	7
“...seek more information about this initiative”	1	2	3	4	5	6	7
“...invest resources in this initiative”	1	2	3	4	5	6	7

*Note:* 7-point Likert Scale: 1 = Extremely unlikely; 2 = Moderately unlikely; 3 = Slightly unlikely; 4 = Neither likely nor unlikely; 5 = Slightly likely; 6 = Moderately likely; 7 = Extremely likely.

Appendix D

Assumption Check Plots

Figure D1

*Q-Q Plot Standardized Residuals*

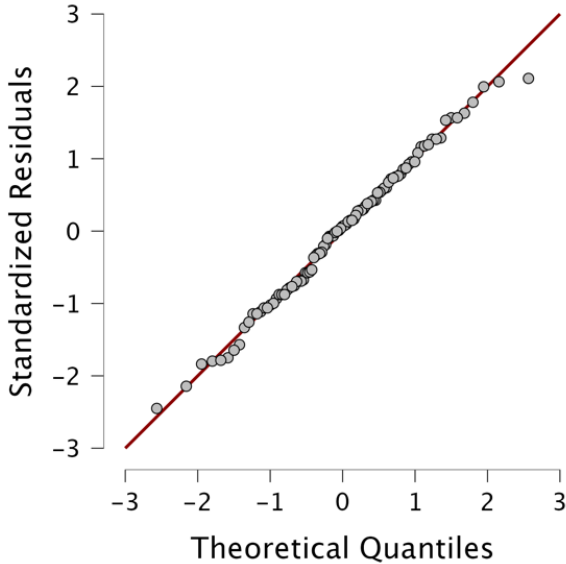


Figure D2

*Residual Scatterplot Displaying the Difference Between the Observed and Predicted Values of Participation*

