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# A dual pathway to pro-environmental behavioural intention: Individual vs collective efficacy and their moderators

Mauro Bertolotti, Luca Guido Valla and Patrizia Catellani

*Efficacy beliefs are crucial in motivating pro-environmental behavioural intentions. However, past research on how individual and collective efficacy may lead to pro-environmental behaviour intention has been limited. In a study involving a representative sample (N = 500) of citizens of the Garda Lake area (Italy), we investigated how individual and collective efficacy were related to the intention to tackle climate change. We also tested whether perceived economic condition would moderate the effect of individual efficacy on intention and whether place identity would moderate the effect of collective efficacy on intention. As predicted, individual efficacy positively predicted the intention to tackle climate change and this link was stronger among those in a more affluent economic condition (i.e., the instrumental pathway). Collective efficacy also positively predicted the intention to tackle climate change and this link was stronger among participants with higher place identity (i.e., the expressive pathway). Discussion focusses on how pro-environmental behaviour can be promoted by appealing to citizens' individual or collective efficacy, depending on their material conditions and social identity.*

Climate change poses one of the biggest challenges in the modern world. Yet, much is still to be understood regarding the psychological processes underlying attitudes, intentions, and behaviours regarding this issue. Past research has found that the awareness of the existence and anthropogenic origin of climate change (see Poortinga et al., 2019 for a review) is closely associated with pro-environmental attitudes (Gifford & Nilsson, 2014) and support for climate change mitigation *at the collective level*, such as support for governmental policies (Bertolotti et al., 2021; Milfont et al., 2014). Such awareness, however, is much less associated with the intention to engage in specific behaviours aimed at tackling the issue *at the individual level*, such as the reduction of one's carbon footprint (e.g.,

Vainio & Paloniemi, 2013; Whitmarsh, 2009), or engagement in pro-environmental movements and campaigns (Haugestad et al., 2021; Roser-Renouf et al., 2014).

The attitude-(intention)-behaviour gap has been already observed in a range of different contexts and behaviours, and incorporated into theoretical models of

behavioural change (Ajzen, 1985). Nevertheless, certain unique characteristics of the climate change issue seem to exacerbate this gap. Individuals may be informed and concerned about climate change, but the sheer scale and magnitude of the necessary interventions (e.g., a reduction in greenhouse gas emissions in the range of billions of tons per year) may undermine their sense of personal control (Mayer & Smith, 2019) and efficacy (Jugert et al., 2016), leading them to believe that their contribution to the cause is negligible. Similarly, distrust in collective and institutional commitment to the issue may prevent people from joining pro-environmental action initiatives (Cuadrado et al., 2023; Reese & Junge, 2017). A lack of perceived individual and collective efficacy could therefore prevent many people from actively engaging in pro-environmental behaviour. Thus, identifying the potential factors promoting, or conversely hindering, citizens' perceived efficacy regarding the climate change issue is of crucial importance, as well as assessing the impact of both individual and collective efficacy on pro-environmental behaviour.

In the present research, we analysed data from a large survey conducted on a representative sample of Italian citizens of the Garda Lake area, focusing on the relationships among climate change beliefs, perceived (individual and collective) efficacy (Fernández-Ballesteros et al., 2002), and intentions to engage in pro-environmental behaviour. Our work builds on the idea of a dual pathway (Stürmer & Simon, 2004) leading to pro-environmental intention, one driven by a cost-benefit analysis of the expected outcomes of action (the instrumental pathway), and the other driven by the internalization of group-based social norms (the expressive pathway). As to the instrumental pathway, we investigated the link between individual efficacy, namely the perceived ability to engage in individual pro-environmental behaviours and contribute to the desired outcome of climate change mitigation (Hanss et al., 2016; Kellstedt et al., 2008), and pro-environmental intention. We also assessed whether this link would be moderated by economic concern of the individual. As to the expressive pathway, we investigated the link between collective efficacy, namely, the perceived ability of one's relevant group to attain common goals (Bandura, 2000; Chen, 2015), and pro-environmental intention. We also assessed whether this link would be moderated by place identity.

## **1. Individual and collective efficacy as determinants of climate change action**

A large part of research on the determinants of pro-environmental behaviour has focused on individual-level actions, such as water and energy conservation (Fornara et al., 2016; Lauren et al., 2016; Russell-Bennett et al., 2018), recycling (Tabernero et al., 2015), and sustainable consumer choices (Carfora & Catellani, 2022). Therefore, individual rather than collective efficacy has been most frequently investigated as a predictor of these behaviours. Undoubtedly, individuals' beliefs regarding their

own ability to engage in behaviours (Bandura, 1989) intended to reduce one's carbon footprint are a key component in the development of behavioural intention. However, collective efficacy is also likely to play a relevant role in this case, inducing individuals to engage in pro-environmental actions only when they think that many people will be able to successfully engage in similar actions (Chen, 2015).

Collective efficacy may be defined as the belief in one's group capability to achieve results through collective action (Bandura, 2000). Indeed, so far collective efficacy has been mainly investigated as a predictor of collective and political action (e.g., Mummendey et al., 1999; van Zomeren et al., 2008). More recent studies on perceived efficacy in tackling the issue of climate change similarly referred to the collective dimension of efficacy (Thaker et al., 2019), and its interplay with social identity (Haugestad et al., 2021; Sabherwal et al., 2021).

The Social Identity Model of Pro-Environmental Action (SIMPEA, Fritsche, et al., 2018) extended the existing social identity approach to collective action (van Zomeren et al., 2008) to the domain of environmental behaviour. In doing so, the model attempted to combine the predictors of environmental attitudes and behaviours that pertain to the individual level, such as knowledge and belief in climate change, as well as emotions and individual efficacy (Bamberg, 2013; Klöckner, 2013; Steg & De Groot, 2010), with predictors that pertain to the collective level, such as social identity, group norms, and collective efficacy (van Zomeren et al., 2008). Further studies indicated that in the case of climate mitigation engagement in pro-environmental action is rooted not only in an individual but also in a collective dimension (Choi & Hart, 2021; Hamann & Reese, 2020; Jugert et al., 2016).

In line with the SIMPEA model our work aims at empirically testing the independent predictive role of *both* individual and collective efficacy on intentions to tackle climate change, and investigate the different factors that may affect these predictors.

## **2. Different pathways that lead to climate action**

Past research also suggests that individual efficacy is associated with a cognitive and instrumental dimension: Fernández-Ballesteros and colleagues (2002) found that socioeconomic status affects perceived individual efficacy in addressing social issues. Conversely, collective efficacy seems to be more closely related with emotional and expressive motives, such as in-group identification and identity (Zumeta et al., 2016).

The idea of distinct concerns and motives leading to engagement with socially relevant behaviour is grounded in previous social psychology research (Stürmer & Simon, 2004), which has explored the processes through which individuals develop the intention to participate in collective action. These processes have been identified as two distinct pathways, one associated with instrumental motives, and one with emotional, or expressive, motives (Milesi & Catellani, 2011).

The instrumental pathway pertains to the assessment of costs and benefits deriving from participation in a certain action. When considering joining a social movement, or adopting certain behaviours, individuals carefully weigh the material and cognitive demand of such choices, and the potential advantages deriving from them (as well as the likelihood of obtaining them). For instance, when someone considers reducing their energy consumption, they may be influenced by the cost of buying energy-efficient appliances, and the inconvenience of monitoring their electricity bills. They may on the other hand consider how likely their efforts are to succeed, and how likely they are to reduce their carbon footprint.

The emotional/expressive pathway pertains to whether participation in (collective) action satisfies other type of needs, mainly related to one's social identity, such as the status of one's in-group (Saab et al., 2015), expressing one's politicised social identity (Simon & Klandermans, 2001), fulfilling collective self-determination and procedural fairness demands (Tiroto & Pahl, 2023), and addressing group emotions such as moral obligation or moral outrage (Skitka, 2010). Collective efficacy plays an important role in this pathway, as it represents the understanding that the desired change is obtainable not (only) individually, but as a group. Again, when one considers reducing their energy consumption, they may be influenced by their identification with fellow environmentally conscious people, and whether they believe that group as a whole to be able to bring positive change in society.

In light of the above, individual and collective efficacy may be considered two key drivers of the motivation to engage in pro-environmental behaviour along the instrumental and the emotional/expressive pathways, respectively. In our research, we focused on different internal and external factors that may further moderate their effects on the intention to tackle climate change.

### **3. Perceived economic condition as a moderating factor of the link between individual efficacy and pro-environmental intention**

Past research suggests that economic concerns sometimes interfere with individuals' commitment to pro-environmental causes, as people strategically consider the impact of making environmentally sustainable choices on their personal finances, and vice-versa. Huddart Kennedy and colleagues (2015) noted that socioeconomic status is generally positively correlated with environmental concern and pro-environmental behaviour, as confirmed by others studies investigating the role of household income (e.g., Casaló & Escario, 2018; Huddart Kennedy et al., 2015). Some research highlighted how this latter variable can be considered a powerful predictor of self-efficacy (Farrell et al., 2016). On the other hand, some correlational data indicates that this is not always the case, and individuals with a high personal or household income are actually *less* inclined to engage in pro-environmental behaviour (Druckman & Jackson, 2009; Kerkhof et al., 2009). It is therefore possible that the

economic condition only indirectly affects the intention to tackle climate change, by interfering, under certain conditions, with other predictors of pro-environmental behavioural intention. Recent research indicates that communication regarding negative future economic perspectives moderates the effect of climate change belief on individual support for mitigation policies, as citizens worry about not being able to afford expensive interventions to tackle climate change (Bertolotti, et al., 2021). This might be the case also with individual pro-environmental behaviour, as the positive effect of individual efficacy may be hindered by the perception of an unstable or difficult economic condition, or conversely boosted by the perception of financial security.

#### **4. Place identity as a moderating factor of the link between collective efficacy and pro-environmental intention**

As for the second pathway, the expressive or emotional pathway, our work considered the psychosocial dimension of place identity, which has been frequently explored in the existing literature on the predictors of climate change mitigation (e.g., Devine-Wright et al., 2015; Hernández Bernardo et al., 2010; Scannell & Gifford, 2010). In fact, previous studies highlighted the necessity to investigate the links between place identity and environmental collective action (Devine-Wright, 2013). Stedman (2002) demonstrated that place attachment – a dimension that is frequently used interchangeably with place identity – enhances place-protective behaviours. In a similar fashion, other studies highlighted that place attachment significantly predicts place-related pro-environmental behaviours (Halpenny, 2010). Within this theoretical framework, Scannell and Gifford (2010) considered the hypothetical role of natural versus civic place attachment as predictors of pro-environmental behaviours. We therefore considered place identity not only as an independent predictor of pro-environmental behavioural intention, but also as a potential moderator of collective efficacy. The more citizens are invested in their place of residence and consider it part of their identity, the more they may rely on people sharing such identity to pursue the common goal of protecting their environment from the consequences of climate change. Conversely, individuals with little or no attachment to their local environment are unlikely to base their intention to act to tackle climate change on perceived community support in pursuing that goal.

#### **5. Study overview and hypotheses**

In light of the above, in the present study, we explored individual intention to tackle climate change. We took into account the role of three main predictors, namely belief in climate change, individual and collective efficacy. We also considered two

potential moderating factors that represent potential promoting factors (or, conversely, obstacles) along the two pathways to behavioural intention. These moderating factors are the perceived economic condition for the instrumental pathway and place identity for the expressive pathway.

We formulated the following hypotheses:

H1: Climate change belief predicts the individual intention to tackle climate change. This hypothesis would be in line with the role of belief as the initial precursor of the intention to act in a pro-environmental manner.

H2: Both individual and collective efficacy predict the intention to tackle climate change.

This would confirm the importance of perceived collective efficacy, already assessed in the existing literature, as determining the intention to fight climate change. If confirmed, this hypothesis would also extend our knowledge on the topic by considering a relatively understudied area, perceived individual efficacy to tackle climate change.

H3: The perceived economic condition positively moderates the effect of perceived individual efficacy on the intention to tackle climate change. We expected individual efficacy to predict the intention to tackle climate change only at high levels of perceived economic condition. This would indicate that those who report a better economic situation of their own family are more likely to show stronger intention to fight climate change.

H4: Place identity positively moderates the effect of perceived collective efficacy on the intention to tackle climate change. We expected collective efficacy to positively influence the intention to tackle climate change among individuals with a strong place identity, but not among individuals with weak place identity. This would point out that those who show a stronger place identity are more likely to report a more robust intention to address climate change.

## **6. Methods**

### **6.1. Participants**

Prospective participants were contacted in summer 2018 by a public opinion research firm, and invited to take part in a survey of the environmental attitudes and behaviours of citizens of the Garda Lake area in Italy. The place of residence was the main inclusion criterion, as only individuals currently living in the area were contacted. The survey, which included also two survey experiments (data from those sections are not reported in this study; Arata et al., 2021; Bertolotti & Catellani, 2021), was administered through the agency's proprietary digital platform, and participants received a small reward for completion. Of the 612 individuals that were initially contacted, 500 (87.7%) completed the full questionnaire. Participants

were slightly more females (53.6%) than males (46.4%), with an average age of  $M = 39.71$ ,  $SD = 14.66$ , and had relatively high education background (43.2% had university education, 46% high school education, and the remaining 10.8% middle or lower school education). Most participants were active workers (66.4%), with a smaller number of students (17.8%), unemployed (6.4%), retirees (3.2%) and other occupations (6.2%).

We conducted a power analysis with G\*Power, version 3.1.9.7 (Faul et al., 2007) to determine the minimum sample size for the overall model. We set a small effect-size,  $f^2 = .05$ , with a significance criterion of  $\alpha = .05$  and power = .80. The minimum sample size needed was  $N = 322$ . Therefore, the sample size of our study was more than acceptable to test H1 and H2. An additional power analysis was conducted for the follow-up moderation analyses to test H3 and H4, setting a more stringent criterion regarding the expected effect size ( $f^2 = .02$ ). The minimum sample size needed was  $N = 395$ , which is comparable with the number of actual participants in the study.

## **6.2. Measures**

### **6.2.1. Intention to tackle climate change**

The intention to tackle climate change was measured with the following five items (adapted from Parag et al., 2011): «How likely are you to reduce energy consumption (electricity and gas) in the next few months?»; «How likely is that you reduce non-renewable energy consumption in the next few months?»; «How likely is that you do not exceed in using air conditioning in the next few months?»; «How likely is that you turn the heating thermostat down in the next few months?»; «How likely is that you use the washing machine and dishwasher at low temperatures in the next few months?». The participants were asked to respond on a 7-point scale ranging from 1 (*Not at all likely*) to 7 (*Very likely*). The five items (Cronbach's  $\alpha = .943$ ) were averaged into a single index.

### **6.2.2. Belief in climate change**

Participants' belief in climate change was assessed with the following item (adapted from Gifford & Comeau, 2011): «You have heard about the idea according to which the world's climate is changing because of the temperature increase in the last 100 years. What is your opinion? Do you think that the world's climate is changing?». The participants responded on a 7-point scale ranging from 1 (*Not at all*) to 7 (*Very much*).



### 6.2.3. Individual efficacy

Individual efficacy was measured with the following items (adapted from Kellstedt et al., 2008): «I can encourage others to reduce land use and water pollution in the lake area with my actions»; «I feel that I can contribute personally to reduce land use and the lake's water pollution»; «I can improve my ability to act in favour of a reduction of land use and pollution in the lake». Participants reported their agreement with each item using a 7-point scale ranging from 1 (*Completely disagree*) to 7 (*Completely agree*). The three items (Cronbach's  $\alpha = .883$ ) were averaged into a single index.

### 6.2.4. Collective efficacy

Collective efficacy was measured with the following items (adapted from Morton et al., 2011): «The land use and the lake's water pollution can be prevented thanks to the mobilisation of our community»; «If we act collectively we will be able to minimise the consequences of land use and water pollution in the lake area»; «I am confident that by acting collectively, we can halt the land use and pollution in the lake area»; «Those of us who live on the lake have the capability to act collectively in favour of a reduction of land use and lake pollution». Participants responded using the same 7-point scale ranging from 1 (*Completely disagree*) to 7 (*Completely agree*). The four items (Cronbach's  $\alpha = .907$ ) were averaged into a single index.

### 6.2.5. Place identity

Place identity was measured with the following items (adapted from Scannell & Gifford, 2010): «I feel tied to the Garda Lake community»; «I miss my lake when I am away»; «The lake's natural areas are special to me»; «This lake is special to me»; «Here, on the lake, there are people like me»; «I am tied to this lake»; «I am tied to the green areas that are around the lake»; «I am proud of my lake». Agreement with each statement was recorded on a 7-point scale ranging from 1 (*Completely disagree*) to 7 (*Completely agree*). The eight items (Cronbach's  $\alpha = .957$ ) were averaged into a single index.

### 6.2.6. Perceived economic condition

Perceived economic condition was explored with the following statement: «In the past year, the economic situation of your family has gotten...». The participants had to complete the statement by choosing one of the following options: *Much*

worse; Worse; Remained the same; Better; Much better; I don't know. The latter option was selected by 108 participants (21.6%), which were excluded by the main analyses.

### 6.2.7. Socio-demographic variables

Additional information on participants was collected, including their age, gender, education, and profession.

## 7. Results

The data were analysed using IBM SPSS Statistics (Version 28). The dataset and original materials (in Italian) are available for download at [https://osf.io/esahm/?view\\_only=4ef0093c43a44492b4276317d4aec47d](https://osf.io/esahm/?view_only=4ef0093c43a44492b4276317d4aec47d).

We reported means, standard deviations, and correlations among all variables in the model in Table 1.

To test our hypotheses, we ran a stepwise linear regression model with the intention to tackle climate change as the dependent variable. Belief in climate change was entered as a single predictor in the first step, to gauge its relative weight in the model. We then entered individual and collective efficacy in the second step, followed by place identity and perceived economic condition, and the respective two-way interactions with individual and collective efficacy in the third and final step (the full stepwise model is reported in Table 2). The two main predictors and the moderators were centred prior to the analysis.

To check for multicollinearity, the Variance Inflation Factor (VIF) was calculated. While no standard cut-off values have been made available in the current literature, previous research suggested that values ranging from 5 to 10 can be considered a legitimate cut-off reference (Stine, 1995). As a consequence, our results highlighted that multicollinearity was not a concern,  $VIF = 2.13$ .

Results of the first step of the regression indicated that belief in climate change was a strong predictor of the intention to tackle it, explaining a large share of the variance alone,  $R^2 = .479$ ,  $F(1, 390) = 358.06$ ,  $p < .001$ . The inclusion of our two key predictors i.e., the two efficacy indexes, significantly increased the explained variance,  $R^2 = .095$ ,  $F(2, 388) = 43.25$ ,  $p < .001$ . Individual and collective efficacy were independently and positively associated with the intention to tackle climate change. These two preliminary steps of the regression model therefore corroborated our initial hypotheses (H1 and H2), showing that the intention to engage in pro-environmental behaviour and tackle climate change is associated with one's awareness of the issue, on one hand, and with one's perceived ability to deal with it, both at the individual and collective level.

**Table 1***Means, standard deviations and correlations of the main variables*

	<i>M (SD)</i>	1	2	3	4	5	6
1 Belief in climate change	5.29 (1.38)	–	.545*	.523*	-.144*	.640*	.702*
2 Individual efficacy	4.83 (1.33)		–	.819*	-.023	.706*	.635*
3 Collective efficacy	4.78 (1.21)			–	.028	.665*	.629*
4 Perceived economic condition	2.82 (0.90)				–	-.156*	-.081
5 Place identity	5.14 (1.22)					–	.667*
6 Intention to tackle climate change	5.32 (1.09)						–

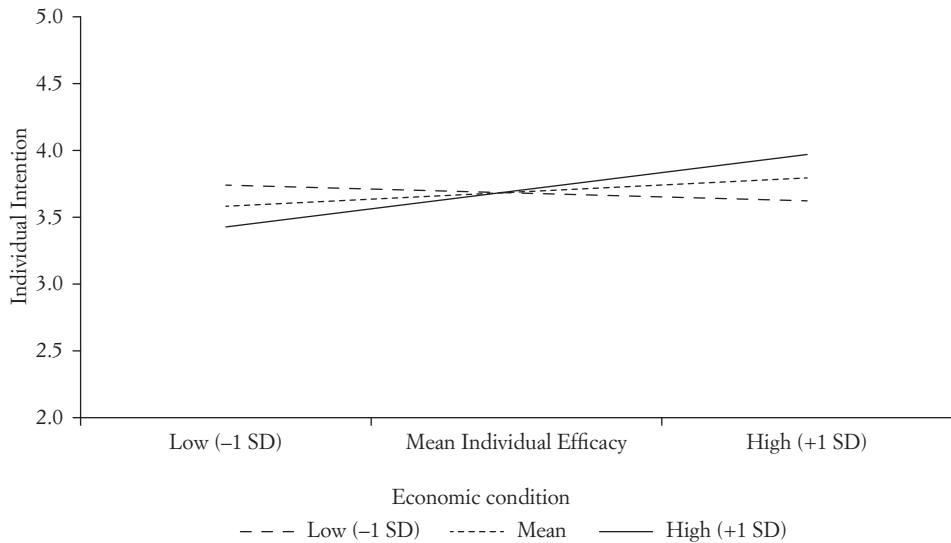
\*  $p < .001$ .**Table 2***Linear Multiple Regression Model of Intention to Tackle Climate Change*

	<i>B</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>	95% C.I.		VIF
						LL	UL	
1 (Constant)	2.549	.148		17.172	.000	2.257	2.840	
Belief in climate change	.517	.027	.693	18.972	.000	.463	.570	1.000
2 (Constant)	3.301	.158		20.997	.000	2.999	3.619	
Belief in climate change	.375	.029	.503	12.892	.000	.316	.431	1.387
Individual efficacy	.137	.044	.167	3.086	.002	.054	.229	2.651
Collective efficacy	.197	.049	.216	4.037	.000	.098	.290	2.598
3 (Constant)	3.688	.176		20.894	.000	3.341	4.035	
Belief in climate change	.303	.032	.406	9.336	.000	.239	.367	1.844
Individual efficacy	.105	.047	.128	2.237	.026	.013	.198	3.185
Collective efficacy	.139	.050	.152	2.766	.006	.040	.237	2.928
Economic condition	.009	.039	.008	.236	.814	-.068	.086	1.081
Place identity	.194	.046	.220	4.254	.000	.104	.283	2.594
Ind. efficacy $\times$ Econ. cond.	.165	.046	.204	3.586	.000	.074	.255	3.134
Coll. efficacy $\times$ Econ. cond.	-.143	.051	-.164	2.818	.005	-.244	-.043	3.292
Ind. efficacy $\times$ Place identity	-.064	.034	-.105	1.899	.058	-.130	.002	2.982
Coll. efficacy $\times$ Place identity	.077	.040	.109	1.990	.046	.003	.157	3.199

When the two moderators and the respective interaction terms were entered in the final step of the regression, the model remained significant and further increased its predicting power,  $\Delta F(6, 382) = 5.43$ ,  $p < .001$ ,  $\Delta R^2 = .033$ . Belief in climate change, individual efficacy, and collective efficacy retained their positive and

**Figure 1**

*Intention to tackle climate change as a function of individual efficacy and perceived economic condition*



*Note.* The reported values of the dependent variable are computed at conventional  $-1 SD$ ,  $M$ ,  $+1 SD$  values of the predictors.

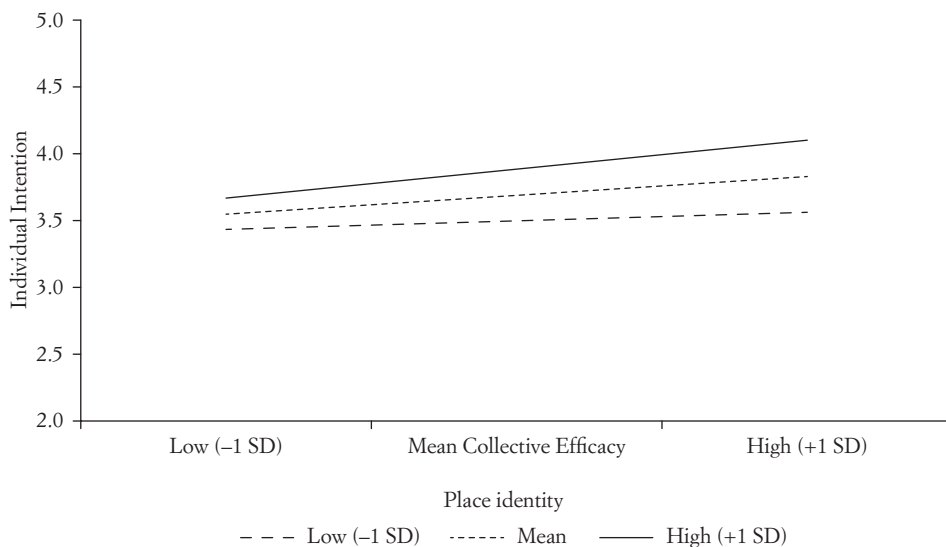
significant effects on participants' intention to tackle climate change. As for the moderators, only place identity had a significant, and quite strong, independent effect, whereas the perceived economic condition did not significantly predict the intention to tackle climate change. In the following paragraphs, we describe the moderation effects for each of the two main predictors.

### 7.1. Moderation of individual efficacy

The effect of individual efficacy on the intention to tackle climate change was partially moderated by the perception of the economic condition, as evidenced by the positive and significant effect of the individual efficacy  $\times$  economic condition interaction term,  $\beta = .201$ ,  $t = 3.55$ ,  $p < .001$  (Figure 1). A follow-up analysis of the conditional effects of individual efficacy at different levels of perceived economic condition was performed using PROCESS for SPSS (Model 1; Hayes, 2018). Results showed that whereas individual efficacy is positively associated with the intention to tackle climate change among participants with average,  $B = .15$ ,  $t = 2.80$ ,  $p = .005$ , 95% C.I. [0.04; 0.25], and high (+1  $SD$ ) perceived economic condition,  $B = .36$ ,  $t = 4.75$ ,  $p < .001$ , 95% C.I. [0.21; 0.51], this was not the case for participants with a low ( $-1 SD$ ) perceived economic condition,  $B = -.07$ ,  $t = 1.14$ ,  $p = .253$ ,

**Figure 2**

*Intention to tackle climate change as a function of collective efficacy and place identity*



*Note.* The reported values of the dependent variable are computed at conventional  $-1$  SD,  $M$ ,  $+1$  SD values of the predictors.

95% C.I.  $[-0.19; 0.05]$ . The interaction between individual efficacy and place identity was not significant,  $\beta = .105$ ,  $t = 1.90$ ,  $p = .058$ , indicating that the strength of participants' identification with their place of residence and local community had only limited impact on the instrumental pathway to climate action represented by individual efficacy in our model.

## 7.2. Moderation of collective efficacy

The effect of collective efficacy on the intention to tackle climate change was partially and positively moderated by place identity,  $\beta = .115$ ,  $t = 2.00$ ,  $p = .046$ . Conditional effects of collective efficacy (Figure 2) indicated again that its effect on the intention to tackle climate change was significant only among participants with average,  $B = .20$ ,  $t = 3.89$ ,  $p < .001$ , 95% C.I.  $[0.10; 0.30]$ , and high ( $+1$  SD) place identity,  $B = .29$ ,  $t = 4.09$ ,  $p < .001$ , 95% C.I.  $[0.15; 0.43]$ , whereas the effect was not significant among participants with low ( $-1$  SD) place identity,  $B = .10$ ,  $t = 1.41$ ,  $p = .158$ , 95% C.I.  $[-0.04; 0.24]$ . Interestingly, the interaction between collective efficacy and perceived economic condition was also significant,  $\beta = -.160$ ,  $t = 2.75$ ,  $p = .006$ , indicating that a positive perceived economic condition somehow interfered with the expressive pathway to climate action, that is the effect of collective

efficacy on the intention to tackle climate change. Follow up analyses of conditional effects confirmed this finding, showing that whereas the effect of collective efficacy was positive and strong across low ( $-1$  *SD*) and average levels of perceived economic condition,  $B = .41$ ,  $t = 6.11$ ,  $p < .001$ , 95% C.I. [0.28; 0.55] and  $B = .27$ ,  $t = 4.69$ ,  $p < .001$ , 95% C.I. [0.16; 0.39], the effect was no longer significant at high levels of perceived economic condition,  $B = .13$ ,  $t = 1.48$ ,  $p = .139$ , 95% C.I. [-0.04; 0.31].

## 8. Discussion

Our work aimed at measuring the Garda Lake area's inhabitants' intention to tackle climate change and exploring the individual and collective dimensions behind such intention.

We hypothesised that climate change belief would predict this intention (H1). The results fully supported this hypothesis, in line with the existing large body of research on the issue. Central to our key predictions, we expected that perceived individual and collective efficacy in performing actions to tackle climate change would independently predict the intention to enact such actions (H2). The results showed that such a prediction was confirmed. Moreover, we hypothesised that perceived economic situation would moderate the predictive effect of individual efficacy (H3), whereas place identity would moderate the effect of collective efficacy (H4). These hypotheses were fully supported, thus corroborating the notion of different pathways contributing to individuals' intention to act in a pro-environmental manner.

Our results complement the existing body of knowledge on the antecedents of pro-environmental intentions and behaviours in several ways. First, we provided empirical confirmation that both individual and collective efficacy are important in mobilising individuals to the common goal of tackling climate change, something that has been debated by recent research (Hamann & Reese, 2020; Jugert et al., 2016).

Furthermore, we provided a theoretical framework to interpret the influence of additional psychosocial factors on individuals' intention to address this issue, such as economic concerns, and place identity. As for the first factor, previous theoretical approaches proposed that higher-status individuals participate in collective only if they feel that the advantaged condition of their groups is undermined (Milesi & Catellani, 2011). Our research complements such an assumption and provides more evidence of the differential involvement of individuals of lower and higher (socio-economic) statuses in pro-environmental action. The regression analysis showed that individual efficacy was a significant positive predictor of the intention to engage in several pro-environmental behaviours, but only among individuals who consider themselves in a relatively good economic condition. In other words, the magnitude of participants' intention to engage in pro-environmental behaviour grew along

with individual efficacy, but to a lesser extent for individuals with worse economic concerns. Conversely, the effect of collective efficacy was relatively weaker among participants who consider themselves economically at ease, somewhat counterbalancing the two effects. Our results, although limited to economic perceptions rather than actual financial conditions, may contribute to interpreting some past findings regarding the income gradient in measured intentions to adopt sustainable behaviours (Casaló & Escario, 2018; Huddart Kennedy et al., 2015).

As for the other pathway to pro-environmental action, our findings provided empirical confirmation to some of the hypotheses formulated within the SIMPEA model (Fritsche et al., 2018). Our findings highlighted the crucial role of the collective dimension of efficacy as a predictor of intention to tackle climate change. Secondly, the catalysing effect of in-group identification on the interaction between collective efficacy on pro-environmental responses was confirmed by our results. Indeed, we found a positive moderating effect of place identity on the predictive effect of collective efficacy on the intention to tackle climate change. Therefore, citizens' strong identification with their place and its environment may offset the potential negative consequences of past or prospective economic disturbances (Bertolotti & Catellani, 2021; Bertolotti et al., 2022), by maintaining a positive influence of collective efficacy on pro-environmental behavioural intentions.

### **8.1. Limitations and future directions**

Considering the above, it is worth pointing out one of the limitations affecting this research: the lack of the variables' manipulation through experimental testing. Such a research design would allow for drawing causal inferences in terms of the relationship of the variables considered. Another limitation affecting this work is the reliance on data collected exclusively in the Garda Lake area, and in a precise period of time. As a consequence, biases possibly affecting the data should be taken into consideration, such as local issues influencing participants' interest and involvement in the topic (including adverse weather events related to climate change), as well as global issues (such as the current energy crisis) that may have further changed attitudes on the economy and the environment.

Yet, collecting data on several variables concerning climate change belief, perceived efficacy and intention to tackle climate change – to cite a few – allowed us to draw more robust conclusions on the relationship of the variables considered in our study. As a result, our study considered diverse dimensions that, taken together, permit the presentation of a sequential model of the intention to fight climate change.

Another possible limitation that should be considered here relates to the dimension of place identity. Much of the current research on the relationship between place and pro-environmental has used the concepts of place identity and place attachment interchangeably. In only a few cases, the two dimensions have

been individually addressed (e.g., Devine-Wright, 2009; Lewicka, 2008). This ambiguity affecting the use of terms such as «place identity», «place attachment» and other similar concepts might be detrimental to the advance of the research on this topic. In brief, place attachment refers to the bonds that have evolved from the cognitive, emotional and behavioural ties between individuals or groups and their environment (Brown & Perkins, 1992). Instead, place identity can be considered a sub-structure of self-identity consisting of elements such as memories, feelings and attitudes related to the physical space in which a person lives (Proshansky et al., 2014). Even if the two definitions share some aspects, the former focuses on the relationship between the person and the environment, and the second touches upon a specific dimension of self-identity. The place identity variable employed in this study comprised elements from both these understandings. Future research might use a different approach by exploring place attachment or place identity (or both) through separate variables.

Overall, the results just summarised can be considered part of a bigger model that may be tested in future research using Structural Equation Modeling. This hypothetical model would account for the relationship of concern for climate change, climate change belief, individual and collective efficacy and intention to address climate change. Such a model would draw from the empirical evidence of this study and previous research that proposed models to explore appraisal of climate change and intention to tackle it (e.g., Chen, 2015; Jugert et al., 2016).

Further research may look at areas that still need to be explored within this theoretical framework. For example, future studies may assess if the abovementioned relationship between the emotional pathway and collective efficacy holds when empirically tested. In addition, other works may explore the dimensions considered here in geographical areas other than the Garda Lake. Such an approach will assess if the model presented in this work is valid even in other contexts. Lastly, an extension of this work would entail an experimental investigation of the topic. Consequently, causal inferences could be drawn, and a more robust theoretical framework could be provided.

## **8.2. Conclusion**

Taken as a whole, this work added empirical evidence to the current understanding of determinants of pro-environmental intentions. In order to do so, a novel theoretical framework was investigated, finding concurrent, and perhaps complementary, effects of individual and collective efficacy as determinants of people's intention to tackle climate change.



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### **A dual pathway to pro-environmental behavioural intention: Individual vs collective efficacy and their moderators**

Efficacy beliefs are crucial in motivating pro-environmental behavioural intentions. However, past research on how individual and collective efficacy may lead to pro-environmental behaviour intention has been limited. In a study involving a representative sample (N = 500) of citizens of the Garda Lake area (Italy), we investigated how individual and collective efficacy were related to the intention to tackle climate change. We also tested whether perceived economic condition would moderate the effect of individual efficacy on intention and whether place identity would moderate the effect of collective efficacy on intention. As predicted, individual efficacy positively predicted the intention to tackle climate change and this link was stronger among those in a more affluent economic condition (i.e., the instrumental pathway). Collective efficacy also positively predicted the intention to tackle climate change and this link was stronger among participants with higher place identity (i.e., the expressive pathway). Discussion focusses on how pro-environmental behaviour can be promoted by appealing to citizens' individual or collective efficacy, depending on their material conditions and social identity.

*Keywords:* pro-environmental behaviour, individual efficacy, collective efficacy, place identity.

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