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The Relationships between Adolescents' Climate Anxiety, Efficacy Beliefs, Group Dynamics, and Pro-Environmental Behavioral Intentions after a Group-Based Environmental Education Intervention

Oriane Sarrasin *, Johanna L. A. Henry , Cécile Masserey and Florence GraffInstitute of Psychology, Faculty of Social and Political Sciences, University of Lausanne,
1015 Lausanne, Switzerland

* Correspondence: oriane.sarrasin@unil.ch

Abstract: The present study examined the relationship between adolescents' efficacy beliefs (both personal and collective), climate anxiety (as measured with climate worry), group dynamics during an environmental intervention, and behavioral intentions in a setting where their agency was called upon. Data were collected in French-speaking Switzerland during and after four environmental education interventions during which adolescents developed climate-related projects or narratives in small groups. Questionnaire data ($N = 150$ adolescents) were matched with observations (from group dynamics) and interview data (from teachers). Self- and collective efficacy, climate anxiety, citing group work as a most interesting part of the intervention, and observed group attention were all positively related to stronger pro-environmental intentions. In addition, feeling involved in the group was also indirectly related to pro-environmental behaviors, through climate anxiety. Overall, our results suggest that being worried about climate change has the potential to translate into climate action. In addition, working in small groups has clear benefits for adolescents.

Keywords: adolescents; climate anxiety; climate change; collective efficacy; environmental education interventions; pro-environmental behaviors; self-efficacy; sustainability



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1. Introduction

According to the 2022 report of the Working group II of the Intergovernmental Panel on Climate Change (IPCC), “climate change has caused substantial damages, and increasingly irreversible losses, in terrestrial, freshwater and coastal and open ocean marine ecosystems (high confidence). The extent and magnitude of climate change impacts are larger than estimated in previous assessments (high confidence)” [1] (p. 8). Climate change is however not the only boundary humankind must respect to keep the Earth habitable: scientists have identified eight others (e.g., [2,3]), four of which have already been exceeded (i.e., extinction rate, atmospheric CO₂, flow of nitrogen and phosphorus, and deforestation; [4]). Not yet exceeded, climate change and biosphere integrity are however two core boundaries connected to all others, each “having the potential on its own to drive the Earth system into a new state should they be substantially and persistently transgressed” [3] (p. 736).

The resulting increasing instability of Earth systems will have more consequences on children and adolescents during their lifetime than on older generations [5]. Climate change has indeed not only more direct impacts (e.g., from extreme weather events) but also more indirect impacts—as “an impending global threat” [6] (p.35)—on children and adolescents. It is thus not surprising that across the world younger generations are increasingly anxious about climate change [7]. For instance, a survey conducted in 2021 with more than 10,000 children and young people in ten countries found that 84% were at least moderately worried when it comes to climate change, and 45% reported that their daily life

was affected [8]. What are the correlates of climate anxiety? Do these anxious feelings lead individuals to act for the environment? Research on the topic has produced mixed results: in some cases, climate anxiety is the trigger for climate action, and sometimes it paralyzes individuals (e.g., [9–11]).

Educators may thus wonder how to propose climate-related activities to children and adolescents without generating too much worry and other paralyzing emotions. In their recent literature review on climate anxiety, Crandon et al. [12] state that at the meso-level (e.g., community, school) educators can mitigate the negative consequences of climate anxiety by helping children and adolescents to build agency. Research should now pinpoint how climate-related activities can raise young people's concern for the environment while simultaneously increasing their sense of efficacy and sustaining their intentions to act for the environment. While both self-efficacy and collective environmental efficacy beliefs are known to lead individuals to form intentions to act for the environment (e.g., [13,14]), how such beliefs may be strengthened by interventions among children and adolescents is still understudied.

Compared to informative techniques (i.e., presenting facts about climate change), environmental education interventions designed to engage learners (e.g., through debates and small-group discussions) appear to be particularly effective in impacting students' knowledge, attitudes, and behaviors [15]. For this reason, group-based environmental education interventions may be seen as promising tools to generate efficacy beliefs among younger audiences. However, a meta-analysis revealed that group-based environmental education interventions (i.e., "programs that let students actively work together through discussion or collaboration", p. 2) do not have more impact on children's and adolescents' knowledge, and pro-environmental attitudes, behavioral intentions, and self-reported behaviors [16]. To gain insight into the advantage of group-based environmental education interventions, we hypothesized that group work may be related to students' intentions to engage in acts for the environment only when they are involved in efficient and cohesive groups.

To shed light on the role played by climate anxiety, self-efficacy and collective efficacy beliefs, and group dynamics on young people's pro-environmental intentions, the present project evaluated the impact of environmental education interventions (Youth Climathons), during which small groups collectively develop a climate-related project or narrative. To test our assumptions, we mixed online questionnaire responses by adolescents ($N = 150$), observational data of group dynamics, and semi-directed interviews. All data were collected during four Climathons that took place in French-speaking Switzerland in Spring 2022.

1.1. When Young People Worry about Climate Change

While there is no unanimous definition of climate anxiety or eco-anxiety, some elements are widely acknowledged within the scientific community: climate anxiety is a state of psychological and sometimes physical discomfort of varying degrees; this state is characterized by fears of a threat related to climate change, in the near or more distant future; ecological catastrophe is itself perceived as uncertain, difficult to predict, and not under control [17]. Negative climate-related emotions can thus arise even in the absence of direct experiences with environmental damages [18]. A scoping review carried out by Coffey et al. [19] revealed that children, adolescents, and younger adults are more prone to climate anxiety than older individuals. Published in the same year (i.e., 2021), and therefore not included in the above-cited review, a survey conducted by Hickman et al. [8] in ten countries indeed showed that feelings of anxiety related to climate change are widespread among children and young people (see also [6]). In the Swiss canton in which the present research was carried out, a survey conducted among high schoolers and apprentices in 2021 showed that 71% were quite or very concerned about climate change; this share was even higher when it came to biodiversity loss [20]. A longitudinal study (in four waves) conducted in Australia among participants aged from 10–11 to 18–19 found that most

had persistent high (13%), moderate (14.9%), or increasing (24.3%) levels of worry, while concern decreased among only 21% of the participants [21].

What are the consequences of climate anxiety on children, adolescents, and young people? Can it coexist with engagement in pro-environmental behaviors, broadly defined as “the commission of acts that benefit the natural environment (e.g., recycling) and the omission of acts that harm it (e.g., avoid air travel)” [22] (p. 92)? Pro-environmental behaviors can be private (e.g., recycling) or public (e.g., participating in a protest), and their impact (in carbon reduction) is of varying size. Since children (and to a lesser extent adolescents) do not have the ability or power to engage in some pro-environmental behaviors (e.g., young children often cannot choose what they eat), specific scales or measures have been developed (e.g., [23,24]).

Worrying about climate change can be constructive or unconstructive [10]. Indeed, “an emerging consensus among researchers is that, while climate anxiety can stimulate adaptive responses (for example, reducing one’s carbon footprint), it has the potential to cause functional impairment” [12] (p. 123). On the one hand, climate anxiety can be related to impairments such as trouble concentrating, sleeping issues, and depressive symptoms (e.g., [7,8]; for a review, see [9]). Despair and a feeling of powerlessness may lead individuals to what has been called “eco-paralysis” [25]. On the other hand, climate anxiety was also found to relate to a greater willingness to act for the environment or to a greater engagement in pro-environmental behaviors (e.g., [11,26]).

While personal factors (e.g., social psychological mechanisms such as perceived self- and collective efficacy) partly explain interindividual differences in the consequences of climate anxiety (that is, climate inaction vs. action), situational variables also play a role. Crandon et al. [12] for instance identified factors that can mitigate climate anxiety consequences among children and adolescents at different levels: individual, micro (e.g., relationships), meso (e.g., school), eco (e.g., society), and macro-system (e.g., cultural background) levels. Many of the cited factors that can help children and adolescents to overcome unconstructive forms of climate anxiety involve engaging them in action. For instance, at the school level, the authors stressed that educators and other adults interacting with younger audiences should facilitate “action to build agency” (p. 126). Along the same lines, in a comment following the publication of the results of the survey by Hickman et al. [8], Sampaio and Sequeira suggest that “clinicians should also be aware of the evidence suggesting that engagement in pro-environmental behaviors and initiatives, especially in contexts of high collective and participative efficacy, are likely to be a helpful strategy for coping with climate anxiety” [27] (p. e89). As reviewed in the following section, self- and collective environmental efficacy beliefs are indeed central to predicting individuals’ engagement in pro-environmental behaviors.

1.2. Self- and Collective Environmental Efficacy

Perceived lack of control over the environment is a strong predictor of individuals’ climate inaction [28,29]. By way of contrast, when individuals believe in the capacity of their acts to have a significant impact on the environment (i.e., when they have a strong sense of environmental self-efficacy), they tend to engage in more pro-environmental behaviors (e.g., [30,31]). Similar findings were noted with younger samples: Among middle and high school students, self-efficacy was found to relate directly and indirectly to higher self-reported [32,33] and actual pro-environmental behaviors [34].

However, the global and interconnected nature of climate change suggests that research on the antecedents of individual climate (in)action must consider less individualistic variables. Indeed, “although an individual person may refrain from having holidays at far-away destinations, stop eating meat and using green electricity, she or he will never see any impact of these personal changes on climate change. These crises are the result of collective behavior and can thus only be solved on a collective level” [35] (p. 245). Thus, research in environmental psychology needs to examine how groups’ perceived ability to attain their goals affects individuals’ personal and collective pro-environmental behaviors.

A dozen recent studies have highlighted that collective efficacy beliefs do play an important role in predicting individuals' willingness to act for the environment, sometimes even to a greater extent than self-efficacy beliefs (for a summary of their results, see [36,37]).

The impact of children's or adolescents' collective environmental efficacy beliefs has attracted less research attention. Two studies conducted among young people (13–25 years old in Germany, [38]) and University students (Switzerland, [39]) did not find any significant relationship between collective efficacy beliefs and pro-environmental activism. These two studies however examined a specific behavior (i.e., activism), which was found to be strongly predicted by social norms (i.e., friends are perceived as participating in climate strikes or protests) and trust in climate scientists, among other factors. Moreover, in a study by Cologna et al. [39], while collective efficacy beliefs (measured with one item, i.e., "humans can reduce climate change and we are going to do so successfully") did not predict attending a climate strike, believing that climate strikes make a difference when it comes to climate change did so. Other studies with young samples used scores composed of items measuring self- and collective efficacy, making it impossible to disentangle their respective impacts [32,40].

Overall, it appears that research investigating what leads adolescents to form self- and collective environmental efficacy beliefs is still scarce. Moreover, whether these perceptions of their own and their membership groups' ability to reach their goal (i.e., to contribute to limiting climate change) affect adolescents' intentions to act for the environment needs further investigation. For these reasons, the present project examined how developing a project or a narrative in small groups during an environmental education intervention related to adolescents' willingness to act for the environment. We assume that working in groups did not per se impact adolescents' sense of efficacy, but that feeling engaged was likely to trigger a sense of agency that may co-exist with climate anxiety feelings.

1.3. Environmental Education Interventions

Different terms are used to describe interventions targeting young audiences: climate change education, education for sustainable development, environmental education or interventions, etc. Here, we follow van de Wetering et al.'s definition of environmental education as "all programs that provide children and adolescents with information or training to improve their environmental outcomes" [16] (p. 1). This definition covers a wide range of interventions, varying in length (e.g., one hour vs. multi-year projects), setting (i.e., in vs. out of school), educational approaches (e.g., students working alone vs. in groups; direct experiences with nature vs. indirect), and goals. Regarding the latter, the goal of most interventions is either to increase participants' knowledge of climate change or to modify their environmental beliefs and affects [41], despite the fact that knowledge alone is not enough to engage in climate action [42]. A review of 199 studies evaluating the impact of environmental education interventions indeed found that only a minority of them (e.g., 20%) directly targeted behavioral change [41]. Moreover, in most cases, the behaviors in question were "amenable to change" [16] (p. 10), and few interventions target behaviors that are both more difficult to change and have a greater impact on the environment (e.g., consumption and public-sphere behaviors).

Having conducted a meta-analysis of the effects of 169 studies (carried out with samples younger than 20 years old), van de Wetering et al. [16] found that environmental education interventions have an impact on participants' knowledge, attitudes, behavioral intentions, and behaviors. Moreover, the effect of the interventions was found to be greater on knowledge than on the three other outcomes under consideration. The authors also investigated whether several interventions' features significantly moderated the effect on the four outcomes under study: group learning (vs. not), experience with nature (vs. not), classroom-based intervention (vs. not), multiple sessions (vs. single), etc. No feature was found to have a significant moderating impact. Regarding the lack of impact of group learning, the authors argued that "peer discussion can make students realize that the main messages endorsed by environmental education may occasionally conflict with peer norms,

possibly leveling out potential benefits of group learning” (pp. 9–10). Evidence from reviews and single studies however suggests that group-based environmental education interventions may be more effective. Indeed, a systematic review of 49 publications on climate change education interventions showed that two themes were common to most effective interventions: “(1) The programs focused on making climate change information personally relevant and meaningful for learners. (2) The activities or educational interventions were designed to engage learners” [15] (p. 799). Working in groups rather than alone is likely to engage children and adolescents, or at least some of them. Moreover, in a survey conducted among more than 2000 Finnish adolescents about their experiences in various interventions, Uitto et al. [43] found that prosocial (e.g., cleanup events) and agency (e.g., a project to enhance school functions) experiences have a greater impact on social psychological variables (i.e., pro-environmental values, self-efficacy) than ecological experiences (e.g., studying the life cycle of products). While group work was not directly considered, collective aspects (e.g., working together or participating in a project) appeared to play a role.

Group-based environmental education interventions may have been found to be no more effective because not all group learning experiences engage participants equally. Indeed, among the 59 (out of 169) marked by van den Wetering et al. [16] as involving group learning experiences, a great diversity of interventions is found (e.g., a board game, [44]; several environment-related activities in a summer camp, [45]). Notably, not all group interventions involve an explicit common goal that needs cooperation and cohesiveness between group members. In the present project, we assume that participants form efficacy beliefs and intentions to act for the environment only or more strongly when group dynamics are cohesive and engage their sense of agency.

1.4. Hypotheses

The present study’s goal is to provide some answers to two research questions. First, we will examine how climate anxiety and self- and collective environmental efficacy beliefs interrelate, and how they relate to pro-environmental intentions after an intervention during which adolescents’ agency was highlighted, by working in teams to achieve a specific goal (i.e., to develop a climate-related project or narrative). Second, we will shed light on whether subjective (i.e., perceived by the participants) and objective (i.e., observed by researchers) group dynamics relate to adolescents’ sense of efficacy (both personal and collective), climate anxiety, and pro-environmental intentions.

Based on past research, we were able to form hypotheses regarding relationships between some of the constructs under study. In other cases, previous studies provided mixed results and we had no firm expectations. First, cohesive and efficient group dynamics should be related to both increased environmental self- (H1) and collective efficacy (H2). Based on previous studies on the topic, both may be related positively to each other [13] or not [39], and are expected to be related to stronger intentions to act for the environment H3 and H4 [36,37]. How efficacy beliefs and climate anxiety are related to each other, and how simultaneously considering anxiety and efficacy constructs impacts pro-environmental intentions remain to be examined, since research on the topic has produced mixed results so far [9,12].

2. The Current Project

The present project was carried out in collaboration with a Swiss non-profit company active in the sustainable development sector. One of its key activities is the organization of Climathons, which are 1.5-day events (similar to “hackathons”) during which small teams develop climate-related projects. Several concrete challenges are proposed by partners (e.g., electricity providers, cities) and the best project (per challenge) is selected by a committee, and in most cases, implemented. A version—Youth Climathons—exists for younger audiences. Here again, participants (from 12 to 18) “work on the city’s and partners’ challenges and develop solutions”. By doing so, Climathons can be described as interventions

that “focus on local, tangible, and actionable aspects of sustainable development”, described as most effective by Anderson [46]. The non-profit company we collaborated with proposes another version of Youth Climathon, in which adolescents develop a narrative regarding the future of their generation.

Youth Climathons’ objective is to equip adolescents with “the competencies and skills needed to become change-makers and drive systemic innovation and climate action” [47]. As such, Climathons can be described as building “adolescents’ abilities to work toward goals by engaging them in large individual or group projects, such as completing a work of art, preparing a production, planning an event, or impacting their community” [48] (p. 277). It may be argued that project-oriented Climathons are more likely to foster a sense of efficacy among adolescents than narrative-oriented Climathons, since the former type focuses on more tangible and local outcomes.

Youth Climathons are organized in three steps ([47]):

1. Preparation in class with one of their teachers (eight hours, over a series of days or weeks). The first phase aims at giving adolescents the necessary knowledge—about the current environmental situation and future challenges—for the next phase of the Climathons. Teachers can decide when they organize these preparatory sessions.
2. Project or narrative development in small groups during one full day, hereafter referred to as ‘Climathon day’. Members of the non-profit company and external experts are present to coordinate the activities, provide help, etc.
3. Project implementation. In collaboration with teachers, the winning project is implemented, or the narratives (generally all) are showcased.

As organized by the company we collaborated with, three classes (about sixty participants) are usually involved in the same Youth Climathon. Each class is mentored by one teacher. Teams are formed by the teachers or the young people themselves, and are generally composed of members from different classes.

Our research team evaluated four Youth Climathons that took place in French-speaking Switzerland from February to April 2002 in four different towns (between around 3000 and 26,000 residents) located in the same canton (i.e., Swiss State). Prior to the start of data collection, an ethical authorization was granted by the committee in charge of evaluation all research projects that take place in the canton’s (primary, middle, and high) schools. During two Climathons (#1 and #3), participants developed a project (in both cases, about sustainable food), while they developed a narrative (e.g., imagining a school day of someone of their age but from the next generation) during the other two (Climathons #2 and #4).

Altogether, three types of data frequently used to estimate the impact of environmental education interventions were collected [15]. First, we were allowed to add or modify items in a questionnaire (see Section 3.2.) designed by the non-profit company, and completed by the participants several days following Climathon day (note that it was not possible to have a pre-test questionnaire completed before Climathon day). In agreement with the non-profit company and the schools involved, we had to keep the questionnaire as short as possible. Second, observation notes were taken by at least three members of the project during the last three Climathon days (Climathon #1 was used as a pilot to develop the observation grid; see Section 3.3.). Third, the teachers involved were invited to be interviewed, and three agreed (see Section 3.4.).

3. Materials and Methods

3.1. Participants

In total, 169 individuals participated in the four Climathons under investigation. Among them, 150 participants completed the online questionnaire a few days after Climathon day. One hundred forty-four participants indicated their gender: 41.3% identified as male, 44.7% as female, and 10% as other, or said that they would rather not answer. They ranged in age from 11 to 19 ($M = 13.77$, $SD = 1.13$). Most of the participants were in middle school (97.3%), while 2.7% of the sample were in high school. More detailed information per Climathon is provided in Table 1.

Table 1. Climathons' and samples' characteristics (Climathon type, number of participants who completed the questionnaire, number of groups, share of participants who described themselves as female, and participants' age).

Climathon	Type	N Participants	N Groups	% Female	Age (M, SD)
1	Project	41	NA	34.1%	12.55 (0.56)
2	Narrative	53	10	46.2%	13.98 (0.87)
3	Project	52	12	52.8%	14.29 (0.87)
4	Narrative	4	2	25.0%	16.00 (0.82)

In the last three Climathons, participants were invited to provide their group number or the name they gave to their group (for data protection reasons we could not link participants' names, groups, and questionnaire responses). Some participants (17.43%) reported not remembering their group number: only ninety participants mentioned the group they belonged to. In the end, we had information about 22 groups, whose known participant numbers ranged from 1 to 7 ($M = 4.09$, $SD = 1.56$).

3.2. Questionnaire

All the items included in the questionnaire are presented in Appendix A, along with descriptive statistics. Only the questions used to test our hypotheses and open questions are described in the following subsections.

3.2.1. Independent Variables

Group dynamics, our independent variable, was operationalized with both questionnaire items we created for the present study (described in the present paragraph) and observations by the researchers (see Section 3.3.). In a first questionnaire item, participants were invited to state from 1 (not at all) to 5 (very much) how much they felt involved in the group decisions and the solutions the group developed (*gr_involv*; $M = 3.83$, $SD = 1.01$). Then, they were asked to tick elements (out of a list of 6 propositions in project-oriented Climathons, and out of 5 elements in narrative-oriented Climathons) that were most interesting to them (multiple answers were allowed). Altogether, 40.67% selected 'developing solutions/narratives in groups during the Climathon day' (*clim_interest_3*, 1 = group work perceived as interesting, 0 = as not interesting; missing data—16.00%—were recoded as 0). Finally, an open-ended question invited participants to describe what they preferred during Climathon day (*clim_prefer*). All responses that mentioned something related to the fact they were working in groups (e.g., teamwork, working in groups, collaboration) were coded as 1 (29.3%), while all other responses were coded as 0.

Participants who ticked group work as a most interesting Climathon element reported being more involved in group work ($M = 4.15$, $SD = 0.75$) than those who did not ($M = 3.62$, $SD = 1.13$; $t(142) = -3.31$, $p < 0.001$). Similarly, participants who spontaneously mentioned working in groups as what they preferred were more involved ($M = 4.14$, $SD = 0.77$) than those who did not ($M = 3.70$, $SD = 1.08$; $t(142) = -2.43$, $p = 0.02$). By way of contrast, the two dichotomous indicators (*clim_interest_3* and *clim_prefer*) were only marginally significantly related ($\chi^2(1) = 3.48$, $p = 0.06$). Due to their different nature, it was not possible to combine these three items into a score. They were thus treated separately in the analyses.

3.2.2. Mediating Variables

Four items measured the three mediating variables of our model. In all cases, possible responses ranged from 1 (no, not at all) to 5 (yes, a lot). First, to estimate participants' self-efficacy, young people were invited to state the extent to which they thought that their actions can make a difference for the environment (*env_3*; $M = 3.29$, $SD = 1.15$). We decided to use the words "can make a difference" since they seemed particularly relevant to measure young people's perceptions of their ability to act for the environment [49]. Then,

two items measured participants' perceptions of collective efficacy: "Is your generation able to solve issues related to climate change?" (*quest_3*; $M = 3.41$, $SD = 1.21$), and "Is society in general able to solve issues related to climate change?" (*quest_4*; $M = 3.57$, $SD = 1.19$). Feeling that a group is "able to" is an important component of collective efficacy [50] and similar wording (e.g., "evidently, no individual alone will be able to mitigate climate change or combat biodiversity loss"; p.3, [51]) is frequently found. These two items were quite strongly correlated ($r = 0.46$, $p < 0.001$) and were less correlated to the self-efficacy item ($r(\text{env}_3\text{-quest}_3) = 0.32$, $p < 0.001$, and $r(\text{env}_3\text{-quest}_4) = 0.27$, $p < 0.001$). For these reasons, we kept self- and collective efficacy as separate constructs in the analyses. Finally, participants' climate anxiety was measured with a key aspect, that is worry [10]: "I am worried about climate change" (*env_2*; $M = 3.73$, $SD = 1.07$; see [26] for the use of a similar single item to estimate climate worry).

3.2.3. Dependent Variable

Pro-environmental behavioral intentions (i.e., what participants report intending to do after the Climathon) were measured with three items ($\alpha = 0.77$; $M = 3.04$, $SD = 1.00$). Possible responses ranged from 1 (no, not at all) to 5 (yes, a lot) in all cases. A first item measured students' general willingness to do more for the environment: participants were invited to state the extent to which classroom work (project-oriented Climathons) or preparing a narrative (narrative-oriented Climathons) encouraged them to act more for climate (*clim_env_2*; $M = 2.91$, $SD = 1.21$). Then, a second item evaluated participants' willingness to engage in public-sphere pro-environmental behaviors, an often-overlooked dimension [24]: students evaluated to which extent their participation in a Climathon made them want to be more involved in environmental or climate-related organizations or programs (*clim_env_5*; $M = 2.92$, $SD = 1.17$). Finally, we decided to add an indirect question, which is usually less prone to social desirability [52]. Indeed, participants stated to which extent they would recommend Youth Climathons to friends (*quest_1*; $M = 3.34$, $SD = 1.18$).

3.3. Observations

Our goal was to collect data about group dynamics as objectively as possible. However, since to our knowledge no observation grid to describe small group dynamics during a rather large (up to 60) environmental education intervention has been developed, we decided to use the first Climathon as a pilot to estimate what kinds of information we would be able to obtain. Three out of the four authors were present during Climathon #1. It appeared that noting down what adolescents were saying to each other was quite difficult, because the overall activity was too noisy. In addition, when observers went too close to groups (i.e., to hear what they were saying), adolescents seemed to modify their behaviors: either they wanted to appear more focused on the tasks (the same phenomenon was observed when teachers were approaching groups) or they asked questions of the observers (e.g., about the quality of their work).

For this reason, we decided to observe groups from a certain distance and to evaluate them, on a scale from 1 to 10, on three dimensions that did not necessitate hearing all the content of their conversations: apparent group cohesiveness, attention, and interest in the task. Scores (between 0 and 10) were given by several authors (from two to four, depending on the Climathon) during several slots (the day was divided into four or five different slots by the non-profit company, e.g., welcome, icebreaker, brainstorming, presentation time). Observers moved from one group to another and scored each group during each slot. From Climathon #2 to Climathon #4, 24 groups were evaluated in this way. We noticed that group dynamics could vary a lot along the three dimensions during the same slot, hence accounting for some variability in the scores given by the different observers. Indeed, different factors appeared to explain fluctuations in group dynamics: the presence of an adult nearby, timing (e.g., lower attention at the end of each period), disruptions in other groups nearby, etc. For this reason, we did not estimate an interjudge agreement across observers and averaged the different scores given to each group during each slot.

Scores were computed. In a first step, mean scores of perceived cohesiveness ($\alpha = 0.88$; from 4.87 to 9.01, $M = 7.10$, $SD = 1.29$), attention ($\alpha = 0.87$; from 4.00 to 9.16, $M = 6.87$, $SD = 1.37$), and interest ($\alpha = 0.89$; from 4.25 to 8.80, $M = 7.04$, $SD = 1.55$) were computed, by averaging the scores attributed to each group across all slots. In a second step, a general score was arrived at by combining the three dimensions ($\alpha = 0.96$; from 4.43 to 8.99, $M = 7.02$, $SD = 1.37$).

3.4. Interviews

Teachers involved in the Climathons were invited to participate in a semi-directed interview with one of the authors (always the same one). Several agreed to do so but some of them did not reply to the email she sent afterwards. In the end, three interviews were conducted. They lasted 30 (Teacher A), 33 (Teacher B) and 40 (Teacher C) minutes respectively. These interviews were conducted for a larger project on sustainability at school, in which teachers who did not participate in Climathons also took part.

The interviewer asked a broad range of questions pertaining to the Climathon itself, and to the topic of climate change in the school context more generally. The questions covered topics such as teachers' perceptions of their students' involvement and interest, reasons that led their class to participate in a Climathon, perceptions of the potential impacts of the Climathons on the adolescents' attitudes and behaviors, etc.

3.5. Analytic Strategy

The present study mixed two data types in a partially mixed concurrent dominant status design [53]: quantitative and qualitative data were gathered roughly at the same time, and one facet—here the quantitative data—“has a greater emphasis” (p. 268).

In the first step, data from all participants who filled in the online questionnaire ($N = 150$) were used in a path model to test our hypotheses and explore our open research questions (see Figure 1). In this first analysis, only participants' perceptions of group dynamics were considered. In the second step, data from participants for whom we had group-level information (Climathon #2 to Climathon #4; $N = 90$) were analyzed in multilevel regressions. Here, scores derived from our observations were integrated in the analyses. In all quantitative analyses gender (1 = female, 0 = other), age and town (with Climathon #1 as reference category) were used as control variables. We did not consider Climathon type (project vs. narrative) because it is confounded with the town variable (only one Climathon type was proposed in each town).

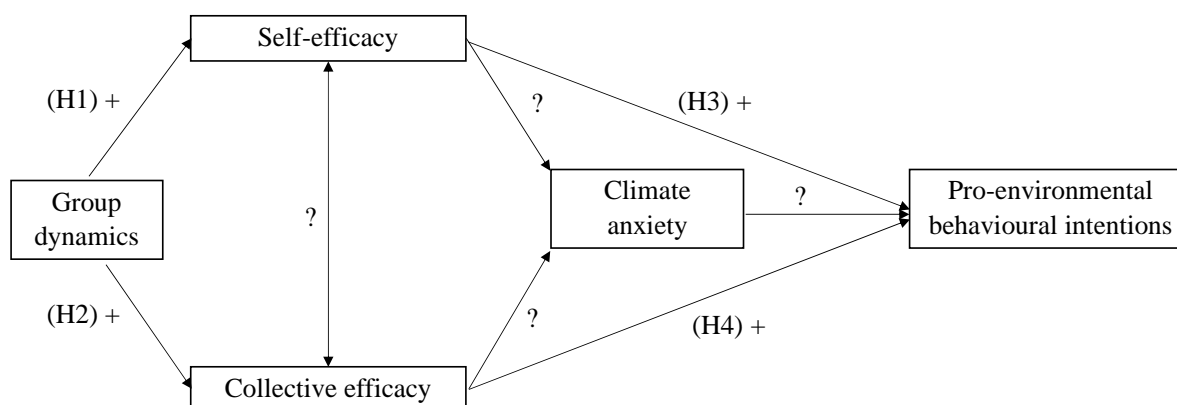


Figure 1. Summary of hypotheses and open questions.

In the third and last step, interview data and some qualitative observation notes we took when completing the grid (see Section 3.3.) were used to complement or nuance some of the results found in the quantitative analyses. Since the focus of the present study was on the quantitative analyses, we relied on only the qualitative data that were directly related to the constructs of interest.

4. Results

4.1. Individual Path Model

A path model was tested with Mplus 8. The model was found to fit the data adequately ($\chi^2(1) = 1.89, p = 0.17, CFI = 0.995, RMSEA = 0.080$). Note that the error of *gr_involv* was allowed to correlate with the errors of both *clim_interest_3* and *clim_prefer*. Paths that yielded significant estimates are presented in Figure 2.

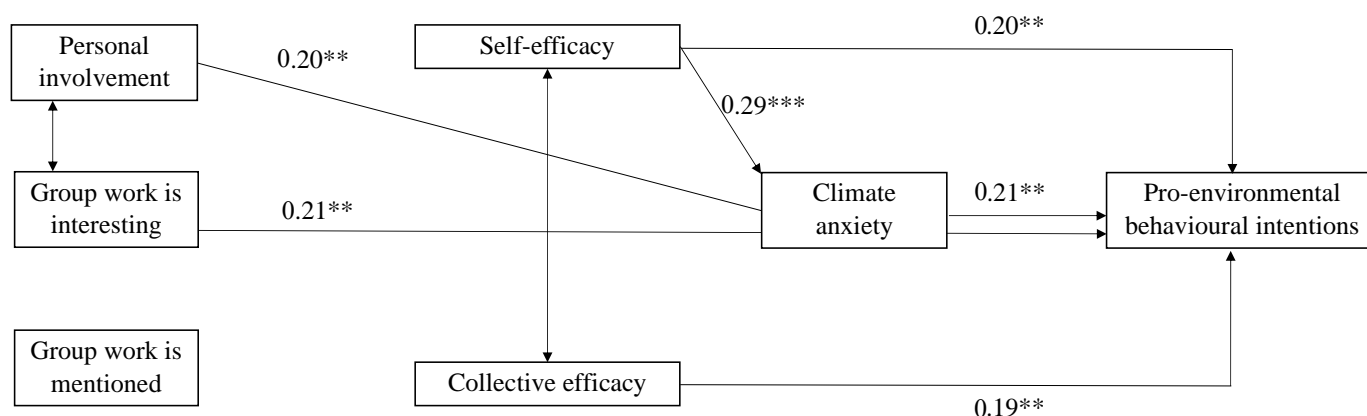


Figure 2. Results of the path model. Only significant (and standardized) estimates are presented. The effects of control variables are not included in the present figure. Note that there is a direct relationship between ‘group work cited as interesting’ and ‘behavioral intentions’ (and no indirect link through ‘climate anxiety’). *** $p < 0.001$; ** $p < 0.01$.

First, contrary to our expectations (H1 and H2), none of the three measures of subjective group dynamics significantly related to self- and collective efficacy. Participants’ perceived personal involvement in group work (*gr_involv*) was indeed not related to feelings of self- ($\beta = 0.13, p = 0.13$) and collective ($\beta = 0.12, p = 0.19$) environmental efficacy. Non-significant results (self-efficacy, $\beta = -0.05, p = 0.59$; collective efficacy, $\beta = 0.06, p = 0.47$) were also found when it came to citing group work as one of the most interesting Climathon elements (*clim_interest_3*). However, participants who spontaneously mentioned group work as one of their preferred elements (*clim_prefer*) reported marginally significantly higher feelings of both self- ($\beta = 0.14, p = 0.09$) and collective ($\beta = 0.16, p = 0.06$) efficacy. While we did not expect direct relationships between group dynamics and variables later in the model, personal involvement in group work was found to relate to higher levels of climate anxiety, and finding group work as interesting was related to stronger pro-environmental intentions (see Figure 2). Then, in line with our expectations (H3 and H4), both self- and collective efficacy were related to stronger pro-environmental intentions (see Figure 2).

Then, expectations regarding the relationships between climate anxiety and the other variables of the model were more open (see Figure 1). We found that self-efficacy was related to higher levels of climate anxiety, while the relationship between collective efficacy and the latter was not significant ($\beta = 0.12, p = 0.13$). In addition, climate anxiety was also related to stronger pro-environmental intentions. Finally, the two following indirect paths yielded significant estimates: involvement in group work—climate anxiety—behavioral intentions ($\beta = 0.04, p = 0.05$), and self-efficacy—climate anxiety—behavioral intentions ($\beta = 0.06, p = 0.03$).

Finally, when it comes to control variables, participants who identified as female mentioned group work more often as one of the most interesting elements ($\beta = 0.17, p = 0.03$), and reported higher levels of self-efficacy ($\beta = 0.19, p = 0.02$), and behavioral intentions ($\beta = 0.15, p = 0.02$). Age did not significantly relate to any of the variables of interest. Several significant differences between towns were also found, but with no recurring pattern (for instance, regarding Climathon type): compared to Climathon #1 (project), group work was less cited as interesting in Climathon #3 (project, too; $\beta = -0.37$,

$p = 0.002$), group work was more often spontaneously mentioned as a preferred element in Climathon #2 (narrative; $\beta = 0.26, p = 0.05$), environmental self-efficacy was lower in Climathon #2 (narrative; $\beta = -0.33, p = 0.01$) and #3 ($\beta = -0.25, p = 0.05$), climate anxiety was lower in Climathon #4 (narrative; $\beta = -0.20, p = 0.03$), and behavioral intentions were lower in Climathon #3 (project; $\beta = -0.19, p = 0.05$).

4.2. Multilevel Regressions

Multilevel regressions were performed on data from participants for which the group membership was known ($N = 90$). Prior to conducting multilevel regressions (again with Mplus 8), we verified whether a substantial share of the overall variance of our variables of interest was due to the nesting structure (i.e., the fact that participants worked in groups). This is done by examining the Intraclass Correlation Coefficient (ICC), an index varying between 0 and 1. “When the ICC is not different from zero or negligible, one could consider running traditional one-level regression analysis” [54] (p. 212). We found non-negligible variation between groups in perceived personal involvement in group work (12.7%), climate anxiety (10.2%), and behavioral intentions (16.6%). By way of contrast, only a very small portion of the overall variance of self- (2.3%) and collective (0.5%) efficacy was due to the grouping structure. Note that Mplus does not provide ICCs for dichotomous outcomes; for this reason, we performed direct multilevel regressions on the two dichotomous measures of subjective group dynamics, that is *clim_interest_3* and *clim_prefer*.

Multilevel regressions were thus carried out with behavioral intentions, climate anxiety, involvement in group work, and group work seen as interesting and spontaneously mentioned, as dependent variables (detailed results are provided in Appendixes B–E). The overall objective group dynamics score and the three separate dimensions (perceived cohesiveness, attention, and interest) were used as independent variables in separate models (one in each). In all models, at the individual model level, the same predictors as in the path model were used (but for the town, because the number of variables became too high).

Overall, group-level variable had barely any significant impact. The general score of objective group dynamics did not significantly predict any of the psychological constructs ($p > 0.15$; see Appendix B). When the three dimensions were examined separately, perceived personal involvement was marginally significantly higher in groups perceived as cohesive by the observers ($b = 0.18, SE = 0.10, p = 0.083$). Perceived group attention was found to relate positively to pro-environmental intentions ($b = 0.09, SE = 0.05, p = 0.046$).

4.3. Additional Information from Teacher Interviews

First, all teachers noticed that only some of their students seemed openly concerned with climate change in general. For instance, Teacher A said that only a few students talked spontaneously about climate change in class (sometimes because they had read something in the newspapers, according to Teacher C). Teacher A however noticed that the previous year s/he had a few students that were so distressed (“they had symptoms”) by the topic that they had to leave the class sometimes when climate change was mentioned. Teacher C said that s/he also observed that (“unfortunately”) only a few students are moved by climate-related issues, or understand why the fact that climate is warming is an issue. In addition, Teacher B said that s/he had a few climate-conscious students thanks to their parents’ own beliefs and interests, but that it is often limited to amenable behaviors, such as recycling. In his/her words, they are “deep in the capitalist system”: they want a car, a house, etc. and they do not think that much about their carbon footprints.

When it comes to the strategies used by students to overcome their climate anxiety, Teacher A said that s/he observed two types of students worried about climate change: some students “accept that something can be done to get things better” (they feel “reassured” thanks to that), while with some others, it is “like telling them that a meteorite will fall on us and that we can do nothing about it”. All three teachers agreed on the fact that efficacy beliefs tend to arise among students who are informed about climate change in

their families. During Climathon day, the research team indeed observed that some groups had discussed the task in advance with their parents.

When it comes to the distinction between self- and collective efficacy, Teacher C mentioned that some students are relieved to know that they can contribute, as individuals, to limit climate change but others see it as a burden. Teacher A said it could be even more the case among older adolescents because they have more financial power than younger ones, and they understand that acting for the environment may mean buying fewer things they want to buy. When it comes to communicating about climate change, Teacher B saw the Climathon as an opportunity to talk about climate change and sustainability in a less negative tone than usual, because the intervention focused on solutions.

Generally, group dynamics were rarely mentioned by the teachers interviewed. More generally about the Climathons, Teacher A said s/he saw these events as opportunities to have students spending a lot of time working on a climate-related project. Teacher B also said that it is one of the rare opportunities when students are asked to give their opinion on something. Regarding group dynamics, Teacher C however noticed that in some groups some students play a central role, acting as a driving force. Finally, Climathon was perceived as something clearly out of the ordinary in the school, which, according to Teacher C, may help students to remember what was done during that event.

5. Discussion

Climate anxiety may prevent young (and less young) people from engaging in climate action [9,12]. For this reason, it is crucial that research examines which activities or interventions can generate feelings of efficacy strong enough to give participants a sense of agency. With this goal in mind, the present study examined the relationships between adolescents' efficacy beliefs (both personal and collective), climate anxiety (as measured with climate worry), and pro-environmental intentions after an intervention when they collaborated on a project or narrative in small groups. Results of quantitative analyses showed that self- and collective efficacy, climate anxiety, citing group work as a most interesting part of the intervention, and observed group attention were all positively related to stronger pro-environmental intentions. In addition, feeling involved in the group was also indirectly related to pro-environmental behaviors, through climate anxiety. In the following sections, we discuss how these results, combined with extracts from the interviews we conducted with teachers, contribute to the research on climate anxiety, efficacy beliefs, and group dynamics among adolescents.

5.1. How to Trigger Constructive Climate Anxiety

While the adolescents who participated in the present study appeared to be on average rather worried about climate change when asked to rate their feelings with a Likert-type scale in an online questionnaire, the information given by three of their teachers offered a much more nuanced view. Indeed, the teachers perceived only a minority of their students to be openly climate-anxious. There may be several explanations for this discrepancy. First, it is known that individuals tend to underestimate how much others around them worry about climate change, which contributes to self-silencing mechanisms [55]. Added to the fact that "peers become increasingly important" in early adolescence [56] (p. 299), it may be that feeling anxious or worried about climate change is not something that all adolescents are comfortable showing to their classmates or teachers. Second, when explicitly asked about climate change, adolescents stated (on average) to be worried, but that, among some of them at least, the topic was not salient in their everyday life (as presumed by the teachers). In the present study, it may be assumed that the preparatory work in class and the project or narrative itself have made the topic particularly salient for a few days.

Finally, the observed difference may be due to the single item we used to measure climate anxiety. We did so for two reasons: first, because the questionnaire had to be as short as possible, and second, because "feeling worried" was found to be a key aspect of climate anxiety [10,26]. Future research on the topic should consider using a more

comprehensive scale (e.g., the recently developed tool by Clayton and Karazsia, [18]), and consider measuring other climate-related emotions such as anger, sadness, and guilt, whose relationships with pro-environmental behaviors also vary across studies [57]. Anger and guilt, for instance, were found to increase among younger generations [58].

5.2. *Engaging Young Audiences through Collaborative Work*

Our results showed clear direct and indirect links between participants' subjective experiences of working in groups and their willingness to act more for the environment. Objective group dynamics—as observed by the research team—appeared to be less related to the constructs measured in the questionnaire. It may be so because the sample size was smaller (more than a third of the students did not remember or indicate their group number or name); it may also be, as previously mentioned, that group dynamics, at that age, are subject to very sudden variations, due to a broad range of factors. For instance, during one the project-oriented Climathons, the attention of the winning team appeared to us quite low at several points during the day, but mostly because they had progressed quite quickly in the tasks and were just chatting together while waiting for the next step (as Climathons are divided into five or six slots).

Contrary to our expectations, no significant relationships were found between group dynamics and self- and collective efficacy beliefs, which both predicted pro-environmental behaviors independently. In both cases, the scores varied almost only between participants, and barely so between groups. It may be so because, as in the survey conducted among university students in Switzerland [37], the items used to measure collective efficacy were too general (e.g., referring to the whole society) and too far from the perceived outcome expectancy of the task undertaken by the participants. In the present case, other sources may also have affected students' perceived efficacy: their teacher and the preliminary work in class, the students' family resources and interest in climate-related activities, etc. Research tends to focus on the role of efficacy beliefs as antecedents of pro-environmental behaviors. Some exceptions do exist. For instance, Ojala [40] found that problem-focused and meaning-focused coping strategies were related to feelings of environmental efficacy. Research on the topic could seek inspiration in the Social Identity Model of Pro-Environmental Action (SIMPEA) [35], that assumes "ingroup identification, ingroup norms and goals, and collective efficacy determine environmental appraisals as well as both private and public sphere environmental action" (p. 245), and examines how group-based environmental education interventions may generate collective identities, norms, and goals.

5.3. *Limitations*

The present study has several limitations. First, it cannot be ruled out that in the present case, students worried about climate change selected others like them into more efficient and cohesive groups, or were the group's driving force, as mentioned by one teacher. To pinpoint more precisely the social psychological mechanisms at stake in group-based environmental education interventions, future research on the topic should consider using a pre-post approach, as often done when evaluating the impact of such interventions [15]. Unfortunately, it was not possible to have participants fill in a first questionnaire, prior to Climathon day. Second, as already mentioned, the measures used to evaluate several constructs of interest were rather short, due to circumstances beyond our control.

Finally, we had to build our own measures to evaluate group dynamics. We see the grid we built as a first attempt (that undoubtedly needs further elaboration) to evaluate how adolescents interact within groups. For instance, given the high variations we observed within the same hour, we could have considered more measurement points (e.g., every 15 min), even though this would have meant only one observer per measurement point. We could also have limited our observations to the time adolescents were actually working on the project or narrative (some groups appeared to be dissipated but they were so because they were done with what they were supposed to do).

5.4. Research Implications

Beyond the limitations discussed above, the results of the present study indicate that providing children and adolescents with a sense of agency is of utmost importance when raising issues that may provoke feelings such as worry or anxiety [12]. More experimental and longitudinal research is needed to highlight which features of environmental education interventions are likely to impact adolescents' sense of both personal and collective efficacy over time. The results presented here suggest that feeling good when working in a group on a common goal may play a role, but no causal inference can be drawn from our research setting. On a practical level, the present results confirm that there is a need to go beyond informational interventions, and develop interventions that directly engage students and lead them to build a sense of agency.

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Institutional Review Board Statement: Ethical approval was granted by the Coordinating Committee of research in education (project ID: 826), to conduct field research from January to June 2022 [60].

Informed Consent Statement: Participants' parents were informed prior to the data collection that the event their children were about to participate in was accompanied by a research project. No parent refused that their children take part in the study. Participants could choose not to respond to the online questionnaire (several did so). Informed consent was obtained from the interviewed teachers.

Data Availability Statement: Data and syntaxes are available upon request.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Items' wording (translated into English), frequencies or means, and standard deviations.

Code	Item	N	M/%	SD
<i>age</i> *	How old are you?		13.77	1.13
<i>gender</i>	Are you:			
	A man	62	41.33%	
	A woman	67	44.67%	
	I'd rather not answer	4	2.67%	
	Other	11	7.33%	
<i>study</i> *	What is your academic track?			
	Pre-vocational ^{b,c}	78	52.00%	
	Pre-academic ^{b,c}	21	14.00%	
	High school ^d	2	1.33%	
	General training ^d	0	0%	
	School of commerce ^d	2	1.33%	
<i>env</i>	How much do you agree with the following statements? From 1 (not at all) to 5 (totally)			
	_1 Climate change and environment issues are important		4.09	0.97
	_2 * I am worried about climate change		3.73	1.07
	_3 * My actions can make a difference for the environment		3.29	1.15
<i>talk</i>	Do you talk often about the environment?			
	Yes	59	39.33%	
	No	86	57.33%	

Table A1. Cont.

Code	Item	N	M/%	SD
talk_who	With whom? [if talk = yes] <i>Multiple answers allowed</i>			
	With friends	27	60.00%	
	With teachers	18	41.86%	
	With my family	48	12.73%	
	Other	4	10.26%	
school	In which city and school did you participate in a Youth Climathon? [anonymized, see Table 1]			
grp_id	What was the number or name of your group?			
clim_eval	How do you evaluate your experience during the Climathon? From 1 (very bad) to 5 (excellent)	144	3.66	0.83
clim_env	Can you give us your opinion about the following points? From 1 (no, not at all) to 5 (5, yes a lot)			
	_1 Did you like the preparatory work you did in class with your teacher? ^a	39	3.51	1.02
	_2 * Did the work in class ^{a,c} /did preparing a narrative ^{b,d} encourage you to be more active for the climate?	144	2.91	1.21
	_3 Do you think that you have now a better understanding of food-related climatic challenges?	140	3.06	1.13
	_4 Do you think that you have now a better understanding of food-related challenges ^{a,c} /climatic challenges ^{b,d} ?	56	3.23	1.13
	_5 * Did your participation in the Climathon make you want to be involved more in organizations or other programs related to climate change or the environment?	143	2.92	1.17
gr_involv *	During the Youth Climathon, did you feel involved in the group decisions and group work? From 1 (not at all involved) to 5 (much involved)	144	3.83	1.01
clim_interest	What was most interesting to you during the Youth Climathon? <i>Multiple answers allowed</i>			
	_1 The information about the 'food challenge' ^{a,c}	94	32.98%	
	_2 The tools used in class (analysis scheme, actor cards)	144	15.97%	
	_3 * The development of solutions ^{a,c} /narratives ^{b,d} in groups during Climathon day	126	40.70%	
	_4 The possibility to use boards, post-its, sheets, pens, etc.	144	34.03%	
	_5 The help from facilitators and experts that accompanied you during the whole day	145	42.07%	
	_6 The presentation given to the Youth Climathon Jury	145	22.76%	
	_7 Other	1	100%	
clim_prefer *	What did you prefer during the youth Climathon? Why? (open question)			
unclear	Are there some Climathon aspects you did not understand or that seemed unclear to you?			
	Yes Non	137	9.33%	
unclear_details	What did not you understand?			
quest	Can you answer to the following questions? From 1 (not at all) to 5 (a lot)			
	_1 * Would you recommend Youth Climathons to friends?	133	3.34	1.18
	_2 Does the knowledge you acquired help you to feel more at ease about the environment?	137	3.04	1.19
	_3 * In your opinion, is your generation able to solve issues related to climate change?	137	3.41	1.21
	_4 * In your opinion, is society in general able to solve issues related to climate change?	137	3.57	1.19
comment	Do you have comments or questions ?			

Note. * items used in the analyses. ^a Used in Climathon #1; ^b used in Climathon #1; ^c used in Climathon #3; ^d used in Climathon #4.

Appendix B

Table A2. Results of multilevel regressions, with the general score of group dynamics as group-level predictor.

Predictors/DV	Involvement in Groups		Climathon Interesting		Climathon Preferred		Climate Anxiety		Behavioral Intentions	
	b	SE	b	SE	b	SE	b	SE	b	SE
<i>Individual level</i>										
Female	0.21	(0.21)	−0.37	(0.67)	1.40	(0.61) *	0.15	(0.25)	0.42	(0.14) **
Age	0.11	(0.13)	−0.46	(0.43)	−0.73	(0.64)	0.01	(0.19)	−0.05	(0.13)
Group_involv							0.24	(0.10) *	0.12	(0.10)
Clim_interest_3							0.25	(0.16)	−0.36	(0.15) *
Clim_prefer							0.03	(0.24)	−0.03	(0.19)
Self-efficacy							0.08	(0.16)	0.21	(0.09) *
Collective efficacy							0.21	(0.16)	0.13	(0.09)
Climate anxiety									0.16	(0.09) †
<i>Group level</i>										
General dynamics	0.15	(0.11)	0.06	(0.31)	0.37	(0.36)	0.07	(0.05)	0.07	(0.05)

Note. ** $p < 0.01$; * $p < 0.05$; † $p < 0.10$.

Appendix C

Table A3. Results of multilevel regressions, with the score of perceived cohesiveness as group-level predictor.

Predictors/DV	Involvement in Groups		Climathon Interesting		Climathon Preferred		Climate Anxiety		Behavioral Intentions	
	b	SE	b	SE	b	SE	b	SE	b	SE
<i>Individual level</i>										
Female	0.21	(0.21)	−0.36	(0.67)	1.40	(0.61) *	0.15	(0.25)	0.41	(0.14) **
Age	0.11	(0.13)	−0.46	(0.42)	−0.73	(0.64)	0.01	(0.20)	−0.05	(0.13)
Group_involv							0.24	(0.10) *	0.12	(0.10)
Clim_interest_3							0.26	(0.16)	−0.36	(0.15) *
Clim_prefer							0.04	(0.24)	−0.03	(0.19)
Self-efficacy							0.08	(0.16)	0.21	(0.09) *
Collective efficacy							0.21	(0.16)	0.13	(0.09)
Climate anxiety									0.16	(0.09) †
<i>Group level</i>										
Cohesiveness	0.18	(0.10) †	0.12	(0.31)	0.41	(0.40)	0.05	(0.11)	0.07	(0.06)

Note. ** $p < 0.01$; * $p < 0.05$; † $p < 0.10$.

Appendix D

Table A4. Results of multilevel regressions, with the score of perceived attention as group-level predictor.

Predictors/DV	Involvement in Groups		Climathon Interesting		Climathon Preferred		Climate Anxiety		Behavioral Intentions	
	b	SE	b	SE	b	SE	b	SE	b	SE
<i>Individual level</i>										
Female	0.20	(0.21)	−0.32	(0.66)	1.43	(0.64) *	0.14	(0.25)	0.43	(0.14) **
Age	0.10	(0.12)	−0.46	(0.43)	−0.77	(0.65)	0.00	(0.20)	−0.05	(0.13)
Group_involv							0.24	(0.10) *	0.11	(0.10)
Clim_interest_3							0.25	(0.16)	−0.38	(0.15) *
Clim_prefer							0.04	(0.25)	−0.05	(0.19)
Self-efficacy							0.08	(0.17)	0.20	(0.10) *
Collective efficacy							0.21	(0.16)	0.12	(0.09)
Climate anxiety									0.16	(0.09) †
<i>Group level</i>										
Attention	0.13	(0.09)	0.20	(0.34)	0.15	(0.33)	0.03	(0.10)	0.09	(0.05) *

Note. ** $p < 0.01$; * $p < 0.05$; † $p < 0.10$.

Appendix E

Table A5. Results of multilevel regressions, with the score of perceived interest as group-level predictor.

Predictors/DV	Involvement in Groups		Climathon Interesting		Climathon Preferred		Climate Anxiety		Behavioral Intentions	
	b	SE	b	SE	b	SE	b	SE	b	SE
<i>Individual level</i>										
Female	0.22	→(0.21)	−0.35	(0.66)	1.42	(0.64) *	0.18	(0.25)	0.40	(0.15) **
Age	0.11	→(0.13)	−0.45	(0.42)	−0.76	(0.64)	0.03	(0.19)	−0.06	(0.13)
Group_involv							0.23	(0.09) *	0.13	(0.10)
Clim_interest_3							0.27	(0.15)	−0.35	(0.16) *
Clim_prefer							0.04	(0.24)	−0.02	(0.19)
Self-efficacy							0.08	(0.16)	0.22	(0.09) *
Collective efficacy							0.21	(0.15)	0.13	(0.09)
Climate anxiety									0.16	(0.09) †
<i>Group level</i>										
Interest	0.12	→(0.11)	0.15	(0.30)	0.20	(0.34)	0.11	(0.09)	0.04	(0.05)

Note. ** $p < 0.01$; * $p < 0.05$; † $p < 0.10$.

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