**The role of self-efficacy and collective efficacy in climate change emotional and behavioral responses**

**Fields of research:** General field: social science. Specific field: Psychology – other topics

**Keywords**: climate change emotions, climate anxiety, pro-environmental behavior, self-efficacy, collective efficacy, environmental education, collective action

1. **Scientific Background**
2. **Psychological aspects of climate change mitigation and adaptation**

Climate Change (CC) is one of the most pressing issues facing humanity today. The global temperature has reached approximately 1°C above pre-industrial levels and is expected to continue rising as a consequence of anthropogenic green gases emissions (IPCC, 2018; IPCC 2014). CC is expected to have widespread impacts on human and natural systems worldwide (IPCC 2014). Policymakers worldwide are concerned about meeting the goal of limiting global temperature rise to 1.5°C, which is considered the threshold point (IPCC, 2018), and reducing the level of greenhouse gas (GHG) emissions to net-zero no later than 2050 (European Commission, 2019). Individuals have an impact on climate change through private sphere behavioral choices (e.g., transportation choices, dietary choices, and energy consumption; Dietz et al., 2009; Wolske & Stern, 2018), and collective actions (e.g., signing a petition for climate regulation, or participating in pro-environmental activities; Bamberg et al., 2019; Schulte et al., 2021). Profound changes in individual and household behavior are essential if we are to achieve the required reduction in GHG emissions (IPCC, 2018; Wolske & Stern, 2018). Behavioral science can provide insights that will help us to meet this challenge (Clayton & Manning, 2018; Nielsen et al., 2021). As CC becomes a reality worldwide, mitigation (i.e., efforts to reduce or prevent greenhouse gas emissions) is no longer sufficient to protect humanity from its consequences, and adaptation (i.e., actions taken to prepare for, and adjust to, effects and predicted impacts of CC) has become an urgent issue as well (European Commission, 2021; Manning & Clayton 2018; Reser & Swim, 2011; Urban et al., 2021).

Adaptation strategies include various actions that are taken in order to adapt to the anticipated consequences of CC, such as rising sea levels, floods, and heat waves. As human perceptions and behaviors clearly contribute to and are influenced by, CC, psychological research is essential for informing the planning and implementation of effective mitigation and adaptation policies (APA, 2022; Clayton & Manning, 2018). The development of personal and community resilience and well-being in the face of CC is an essential part of CC adaptation (Chapman et al., 2018; Doherty, 2018).

Studying people’s emotional responses to CC is an important part of such research as emotions are related both to CC mitigation behavior and to the promotion of resilience and well-being (Brosch, 2021; Clayton, & Karazsia, 2020; Doherty, 2018; Pihkala, 2022). Identifying interventions that provide people with the capabilities required to confront CC challenges can serve as an important means to enhance these objectives (APA, 2022; Molthan-Hill et al., 2019; Mochizuki, & Bryan, 2015). The proposed research will contribute to these challenges by proposing and testing an innovative theoretical framework on the inter-relations between efficacy beliefs, climate emotions, and climate behavior. Research and theories on four themes—efficacy beliefs, collective action, coping strategies, and action-based environmental education—are integrated here to provide new ways of thinking about the role of efficacy beliefs in promoting adaptive responses to CC and the potential for active engagement to enhance efficacy beliefs. As CC is a social challenge that requires both individual and collaborative mitigation and adaptation actions, the framework focuses on both self-efficacy and collective efficacy, and on individual and collective behavior. Although previous research has addressed specific aspects of the proposed framework (e.g., the influence of efficacy beliefs on pro-environmental behavior, and the way engagement with environmental action can enhance well-being), this novel framework proposes a holistic and comprehensive view of the mutual relations between participating in pro-environmental activity, efficacy beliefs, and emotions toward CC. The research aims are twofold. **First,** **we will empirically test a theoretical framework that explores the relations between CC emotions, behavioral responses, and efficacy beliefs** (see Figure 1). **Second, we will investigate the influence of action-based and knowledge-based interventions on the efficacy beliefs, behavioral intentions, and climate emotions** (see Figure 2). The study will focus on young adults in Israel. This focus is motivated by recent studies that suggest that young people are particularly vulnerable to CC distress (Hickman et al., 2021; Wu et al., 2019), and the need to better understand coping strategies that can help in the adaptation and enhancement of resilience (Clayton, 2020; Doherty, 2018; Ojala, 2012).

1. **The interplay between climate emotions, climate action, and well-being**

Climate emotions are many and varied and exist on a broad spectrum that can range from negative feelings such as despair, anger, and shame to positive feelings such as hope and pride (Pihkala, 2022; Stanly et al., 2021). Climate emotions are associated with both impairment in well-being and adaptive responses. Hence, an interplay of emotions needs to be considered when studying them and explaining their effect on climate action (Sangervo et al., 2022). Negative emotions such as worries, grief, and guilt are associated with psychological distress and impairment in mental health (Clayton & Karazsia, 2020; Ogunbode et al., 2021; Van Susteren, & Al-Delaimy, 2020). Young adults and children are particularly vulnerable to climate-related distress; they do not have any power to influence current policy, but they will be the ones most affected by it (Hickman et al., 2020; Simon et al., 2021; Wu, et al., 2021). While CC negative emotions such as worry and anger are disturbing and may affect well-being, they also often encourage individuals to engage in pro-environmental actions (Stanly et al., 2021; Xie, 2019; Landmann, & Rohmann, 2020; Verplanken & Roy, 2013) and predict adaptive behaviors such as purchasing insurance or seeking information about hazards (Van Valkengoed, and Steg, 2019). The complex and challenging pattern of positive and negative outcomes of climate emotions raises the question of how adaptive responses can be promoted, and how individual resilience can be strengthened—along with environmental and social resilience (Doherty & Clayton, 2011; Doherty, 2018; Pihkala, 2022). Special attention in CC research has been given to the phenomenon of climate anxiety (Clayton & Karazsia, 2020; Hickman et al., 2021; Sangervo et al., 2022). Climate anxiety is commonly defined as distress relating to climate crises, and not as a mental disorder (Hickman et al., 2021; Sangervo et al., 2022). It is considered a rational response that causes people to search for information and solutions, and as a constructive form of anxiety. Climate anxiety has been shown to lead to both action and paralysis (Sangervo et al., 2022). Although it can lead to adaptive responses, in some instances climate anxiety might become too intense and overwhelming, and lead to functional impact (Clayton & Karazsia, 2020; Hickman et al., 2020). It is therefore important to further study the factors that shape climate anxiety, and its influences on well-being and behavioral outcomes (Clayton & Karazsia, 2020; Hickman et al., 2020; Sangervo et al., 2022). **Having a better understanding of coping strategies can provide some important insight regarding these challenges (Clayton et al., 2021; Ojala, 2012).** Coping refers to a person's cognitive and behavioral efforts to manage stress (Lazarus & Folkman 1984). Coping with the threat of CC implies a focus on how effectively people manage their own emotional responses and stresses that the idea of coping can include behavioral as well as cognitive and emotional strategies (Clayton, 2020). Ojala (2012) argues that as negative emotions in the face of CC are a realistic response, the important thing is to find effective ways of handling these feelings. Similarly, Sangervo et al. (2022) argued that it is important to measure forms of climate hope, efficacy, coping, and/or resilience, since they may moderate the effect of climate anxiety on behavior (Sangervo, et al., 2022). The study of coping in climate adaptation is an emerging field of research. Ojala discusses meaning-focused coping: a strategy that aims to elicit positive feelings associated with a stressor, which do not eliminate the negative emotions but buffer the detrimental effect of those emotions on well-being (Ojala 2012, 2015). This approach is in line with research on the role of positive affect in coping with stressful events. Positive affect broadens an individual's attentional focus and behavioral repertoire and consequently builds the social, intellectual, and physical resources required to facilitate coping and adaptation to stress (Folkman & Moskowitz, 2000; Fredrickson, 1998). Moreover, experiencing positive affect during stressful circumstances may interrupt the adverse effect of negative affect and prevent a decline in its negative outcomes (Folkman & Moskowitz, 2000). Studies that investigated the role of positive affect in coping during stressful events provide further support to this claim (Israel-Cohen et al., 2015; Kaplan Mintz et al., 2021). An example of such a coping strategy is in eliciting hope. Research findings show that in the case of CC hope is associated with pro-environmental behavior and reduced levels of worries and climate anxiety (Geiger et al., 2021; Ojala, 2012, 2015; Snyder, 2000). Problem-focused coping (Lazarus & Folkman 1984) is another strategy for dealing with CC emotions. In the case of CC problem-focused coping involves an active search for solutions, planning, and trying to do something to fight CC (Ojala, 2012). Because coping with global environmental problems can inhibit or foster behavioral changes, coping is an essential predictor of pro-environmental behavior (Chen, 2015). Furthermore, several studies have found a positive association between pro-environmental behavior and emotional well-being (Zawadzki et al., 2020). It follows that encouraging individuals to participate in pro-environmental action can serve to promote well-being (Clayton, 2020; Doherty, 2015).

1. **Efficacy beliefs, and their influence on CC emotions and behavior**

Efficacy beliefs are beliefs about the ability to produce results through action. Whereas self-efficacy refers to beliefs in one's own capability to execute the competencies needed to have control over certain events, collective efficacy refers to one's belief in a group’s ability to effect change in a societal situation (Bandura, 1982). According to Bandura, as many of the challenges people face reflect group problems requiring sustained collective effort to produce a change, the strength of groups, organizations, and nations lies partly in people's sense of collective efficacy—that they can solve their problems through combined effort (Bandura, 1982). Self-efficacy has an impact on various affective and cognitive aspects such as outcome expectations, perception of impediments and opportunities in the social environment, behaviors, and behavioral intentions (Bandura, 2000). It influences behaviors in many aspects of life including work, learning, and health (Gwaltney, Metrik et al., 2009; Schunk, 1985; Stajkovic, & Luthans, 1998). It also can contribute to well-being and resilience. Self-efficacy plays an important role in the processes of coping with stress, as it influences the evaluation of stressors, and the selection and execution of strategies used to face them (Freire et al., 2019). According to Bandura (1982), inefficacy in coping with potentially aversive events is the main cause that makes them fearsome, and people are saddened and depressed by their perceived inefficacy in gaining highly valued outcomes. Hence, experiences that increase coping efficacy can diminish fear arousal and increase commerce (Bandura, 1982). Research findings confirm that self-efficacy is positively associated with psychological well-being (Liu et al., 2010; Siddiqui, 2015).

With respect to CC mitigation, efficacy beliefs are among the most powerful determinants of CC engagement. Higher levels of efficacy beliefs lead to higher levels of private sphere pro-environmental behavior (Bradley et al., 2020; Gregersen et al., 2019), collective action (Hornsey et al., 2021a,b; Schulte et al., 2021; Van Zomerenet al., 2010), and support of GHG emission reduction policy (Kothe et al., 2019; Wolters & Steel, 2021). Some scholars have also pointed out **the potential of efficacy beliefs in enhancing well-being** **in the face of CC**. Reser and Swim (2011) offer a model of "psychological processes that influence adaptation and coping with climate change" in which self-efficacy serves as an antecedent of emotional and behavioral adaptation to CC (Reser & Swim, 2011). They define self-efficacy as one of the appraisal coping strategies of CC. Doherty (2015) suggested that perceived efficacy serves as a mediator between pro-environmental action and emotional well-being (Doherty, 2015), and Clayton (2020) suggested that attention to self-efficacy can help in better understanding the relationship between climate anxiety and behavioral responses. **Nevertheless, while much attention has been given to the association between efficacy beliefs and mitigation responses, research on the role of efficacy beliefs in promoting psychological resilience and well-being is scarce.**

One of the challenges regarding CC efficacy beliefs relates to the fact that CC is a global issue and that the action of an individual is not felt to be significant enough to make a change. This can lead to low perceived control, and a feeling of inefficacy (Bamberg et al., 2018; Brik et al., 2021; Hornsey et al., 2021b), which was identified as one of the leading barriers to mitigation responses (Gifford, 2011; Gifford et al., 2018). It has been therefore suggested that collective efficacy beliefs need to be studied in addition to, or instead of, self-efficacy (Bamberg et al., 2018; Chen, 2015; Schulte et al., 2021). It was also suggested that researchers should find a way to confront the challenge of CC inefficacy by boosting both individual and collective efficacy (Brick et al., 2021). **The proposed study aims to address these gaps by studying the influence of both self-efficacy and collective efficacy on CC emotional responses and CC behavioral responses.** In addition, this study will focus on the ways efficacy beliefs can be developed through active engagement and educational interventions.

1. **Promoting coping through active engagement and educational interventions**

Given the important role of efficacy beliefs in CC mitigation and adaptation, it is important to understand their determinants and know how to develop interventions that can enhance them (Hornsey et al., 2021a,b; Molthan-Hill et al., 2019). A common belief is that providing people with information on how their actions can influence CC could lead to a change in their efficacy beliefs (Brosh Hornsey et al., 2021). Some studies have confirmed this assumption (e.g. Van Zomeren et al., 2010). Nevertheless, according to Bandura (1982), efficacy is not a fixed act or simply a matter of knowing what to do, but rather involves a generative capability in which the component of cognitive, social, and behavioral skills are organized into integrated courses of action. It can therefore be concluded that gaining knowledge of a subject is not sufficient to enhance efficacy (Bandura, 1982). In line with this argument, in the case of climate mitigation and adaptation, studies have revealed that providing information is not always sufficient to make a change in efficacy beliefs (Hornsey et al., 2021a,b). In addition, although making people aware of CC is important, if we want people to be prepared to cope with its impacts and the related stress, simply informing them of this is unlikely to encourage adaptive coping (Mah, et al., 2020). Another important route for empowering individuals to be active agents in society is actively engaging in pro-environmental activity, as is commonly suggested in environmental education literature (Trott, 2022; UNESCO, 2011). It is recommended that students not only actively participate in environmental action, but also take an active role in analyzing alternatives, envisioning alternative solutions, and designing actions (Jensen & Schnack, 1997; Vaughter, 2016). Furthermore, successfully working to achieve a common goal, and engaging in collective environmental actions, can enhance collective efficacy (Krasny, 2020). Research on education for sustainable development found that active engagement as part of course pedagogy promotes motivation and students’ perceived ability to enhance sustainability (Mintz et al., 2014; Mintz & Tal, 2018). Furthermore, active engagement in environmental issues can also support learners' psychological well-being (Krasny & Tidball, 2009; Trott, 2022; Venhoeven et al., 2013; Zawadzki et al., 2020). The importance of active engagement in promoting affective outcomes is also found in research on civic engagement in environmental issues (Krasny & Tidball, 2009; 2015). Krasny and Tidball have found that participating in communal environmental practices such as community gardening and watershed restoration gives rise to a positive loop in which individual and collective resilience are developed (Krasny & Tidball, 2009; 2015). To summarize, participating in active engagement with the environment, and actively searching for solutions to environmental issues gives rise to adaptive behavioral and emotional outcomes.

1. **Studying perceptions and emotions toward climate change among young adults in Israel**

The study will focus on young Israeli adults. The rate of global warming in Israel is almost twice as high as the global rate. In 2020 Israel warmed by an average of 1.5⁰C compared to 1950 (Israel Meteorological Service, 2021). Israel is defined as a high-risk area, and more exposed to CC risks (Israel Meteorological Service, 2021; The State Comptroller and Ombudsman of Israel, 2021). Predicted impacts of CC on the country include an increase in the duration and intensity of heat waves, an increase in desertification processes, an increased risk of floods, and an increased probability of forest fires (ICCIC, 2011). Nevertheless, according to the State Comptroller, until 2021 the state of Israel has yet to make the necessary perceptual shift. Only a few public entities have taken any action for improving adaptation to CC, or mitigation efforts. The per capita emissions in Israel, though exhibiting a downward trend, were ranked tenth on a list of countries with the highest per capita rate in 2016 (The State Comptroller and Ombudsman of Israel, 2021). In the last UN Climate Conference in Glasgow, Israel signed several international agreements and declared a goal of reducing GHG emissions to zero by 2050. Yet, a recent report for the Knesset from May 2022 suggests that the required main moves have not been taken yet (Shahak & Benita, 2022).

Data on individuals' perceptions and feelings toward CC in Israel is very limited. Only a few studies thus far have focused on these themes and, as far as I know, none of them have focused on climate emotions, climate anxiety, or efficacy beliefs. It seems that there is some increase in public awareness and concern about CC during the last decade. In research conducted in 2014 CC was considered to be less threatening to participants, compared to other threats, and was perceived to be a distant threat (Carmi & Bartal, 2014). In a cross-national comparison of attitudes regarding CC that was based on the 2016 European Social Survey, Israelis were rather skeptical or unaware of CC compared to most other nations (Poortinga et al., 2019). The average rate of concern about CC in the Israeli sample was the lowest among all 24 samples in the survey. However, a more recent survey from 2020 showed some shift in public awareness. Most of the participants were aware of CC and expressed concerns about the dangers of global warming (Aviram-Nizan & Shoef-Kolviz 2021). While these findings provide some insights into public opinion regarding CC, a more depth investigation is needed to explore emotional and behavioral responses to CC in Israel and coping strategies, particularly in young adults. The proposed research will address these aims.

1. **Research objectives & expected significance**
2. **Research Objectives**

I aim to investigate the relationships between active engagement in environmental issues, efficacy beliefs, and emotional responses to climate change. I propose to model how self-efficacy and collective efficacy are developed through active participation in pro-environmental activities, and how in turn they influence emotions toward CC, climate anxiety, and willingness to further participate in pro-environmental activities. The research has the following objectives:

1. Explore the level of emotional responses to CC, climate anxiety, and climate efficacy beliefs (self and collective) in young adults in Israel
2. Map the relationships between pro-environmental behavior (individual and collective), efficacy beliefs (self and collective), emotional responses to CC, and climate anxiety
3. Identify the influence of action-based (individual and collective), and knowledge-based climate educational interventions on climate efficacy beliefs (self and collective)
4. **Expected significance**

The study of emotional and behavioral responses to CC is an emerging field of research. Further research is needed on the interplay between emotional and behavioral responses and on the role of coping strategies and, specifically, efficacy beliefs (Clayton, 2020; Sangervo et al., 2022). The proposed research will address these challenges. It will focus on the role of efficacy beliefs as both a source and a product of environmental engagement and clarify its potential as a coping strategy in CC adaptation. The multifaceted approach of the proposed research, which explores the bi-directional relationships between behavioral and emotional responses to CC, and the role of efficacy beliefs in these relationships, is innovative and timely. A second significant contribution of this study lies in the integration of psychological and educational models for enhancing our understanding of effective interventions. Furthermore, acquiring a good understanding of what contributes to the development of efficacy beliefs related to CC will help in designing effective science-based educational interventions. Finally, the research will provide important information on climate emotions, climate anxiety, and efficacy beliefs in young people in Israel. As the awareness of CC is rising in Israel, and as actual incidents of extreme weather are becoming more common, such understanding will be important in supporting policy decision-making, and as a baseline for future investigations.

1. **Detailed description of the proposed research**
2. **Working hypotheses**
3. Climate emotions are associated with pro-environmental behavior
4. Climate emotions are associated with climate anxiety
5. Efficacy beliefs (self and collective) are positively associated with pro-environmental behavior and negatively associated with climate anxiety
6. Engagement in pro-environmental behavior affects climate emotions (enhances positive emotions and reduces negative emotions) and intention to participate in further pro-environmental behavior. These relations are partly mediated by efficacy beliefs.
7. Action-based interventions will be more effective in enhancing self-efficacy and willingness to participate in pro-environmental behavior than knowledge-based intervention, and collective-action-based interventions will be more effective than individual-action-based interventions in enhancing these outcomes.
8. **Research design and methods**

The research project will take place in Israel among young adults (aged 18-30). This focus is motivated by recent studies that suggest that young people are particularly vulnerable to CC distress (Hickman et al., 2021; Wu et al., 2019) and the need to better understand coping strategies that can help in adaptation (Clayton, 2020; Doherty, 2018; Ojala, 2012). In order to gain a good understanding of the perceptions and emotions of different groups in Israeli society, the research participants will include both Jewish and Arabic participants. A mixed-methods approach, including qualitative and quantitative methods, will be used for data collection and analysis. This approach enables us to identify general patterns along with a deeper analysis of processes (Johnson & Onwuegbuzie, 2004). The research program will include semi-structured interviews, a survey, a controlled experiment, and an investigation of educational interventions. The research will be carried out in four major stages over a four-year period. The first two stages will address the first three research hypotheses. These stages will include an interview-based study in which the ways CC is perceived and understood by young people in Israel will be explored (study 1), and a survey that will investigate the associations between the research variables (study 2). The next two stages aim to address the fourth and fifth hypotheses. These stages will include a controlled experiment (study 3) and an investigation of educational interventions (study 4). The first three stages will include participants from the general population. As the fourth part is focused on educational interventions, we will use a sample of higher education students. All studies will be conducted after obtaining ethical approval from the Ethics Committee of the University of Haifa. be asked to provide, informed

***2.1 Study 1: In-depth exploration of young adults' perceptions of CC***

This stage will be performed during the first year of the research. This study will be based on 50 semi-structured interviews with young adults from different cultural groups in Israel. The participants will be recruited through social networks and mailing lists. The interview study will serve to enhance a deep understanding of how young adults in Israel perceive the phenomenon of CC. The interview protocol will include questions concerning participants' views on the impacts of CC, their emotional reactions to it, their pro-environmental behaviors, and their efficacy beliefs. All interviews will be recorded and transcribed. Data analysis will be based on content analysis principles (Krippendorff, 2019), and will integrate inductive and deductive coding (Charmaz 2006; Maxwell, 2005). A phenomenographic analysis process will then take place (Marton, 1981). This analysis will provide a structured description of the different ways CC is perceived by different people and may provide us with insights as to why different people approach CC in different ways. The findings will also serve to establish accurate, locally and culturally appropriate items for the survey study in stage 2.

***2.2 Study 2: Investigating climate emotions and exploring the associations between emotions, reported behaviors, efficacy beliefs, and climate anxiety among young adults in Israel***

This stage will be performed during the second year and we will investigate the levels of climate anxiety and individual and collective efficacy beliefs in young adults in Israel. The data will allow us to examine the associations between the variables in the model. We will distribute an online questionnaire in both Hebrew and Arabic to 800 participants, aged 18-30, sampled from an online panel. Quotas will be set to ensure that our sample is representative in terms of gender, ethnic group, education, income, socioeconomic status, and place of residence. The questionnaire will largely consist of close-ended questions. A pilot study will be administered before conducting the main survey. We will use a sample of 100 participants to check the internal validity of each of the scales. The questionnaire items will be developed based on the existing literature and will also be aligned to local perceptions and expressions, informed by the findings from the interview study conducted as the first stage of the research. The questionnaire will be developed in Hebrew and translated into Arabic. Scales that had not been previously translated into Hebrew or Arabic will be translated and back-translated by two independent translators.

**Questionnaire measures**.

*Emotions toward climate scale*. Although much of the research on climate emotions focuses on negative emotions, positive emotions are also relevant to the study of climate emotions and their associations with well-being and behavior (Ojala, 2012; Pihkala, 2022). Hence, this section will include measures of positive emotions and negative emotions toward CC. Examples of scales that can be adapted to this measure are PANAS (Positive Affect Negative Affect Schedule) (Watson et al., 1988) or short PANAS (Thompson 2007).

*Climate anxiety*. A climate anxiety scale that enables measuring both the cognitive-emotional aspects and functional impairment will be used, such as the CAS (Clayton & Karazsia, 2000). A translation of this scale has already been performed by the PI and an assessment of its validity in a Hebrew-speaking sample is currently being performed.

*Pro-environmental behavior*. As the model proposes bi-directional relationships between behavioral and affective variables, we will include two kinds of pro-environmental behavior measures. First, reported behavior items will serve to investigate the relations between reported participation in environmental activities and affective variables. Section, behavioral intentions items will be used to better distinguish the causal relationship between past activity and intended activity. In addition, behaviors will be measured at both the individual level (e.g., energy consumption, and transportation choices) and the collective level (e.g., participating in collective protest). The literature in environmental psychology offers many scales of pro-environmental behavior (e.g. Stanley et al., 2021; Whitmarsh & O’Neill, 2010). Based on a literature review I will choose the items that are most relevant to the present research.

*Efficacy beliefs.* Based on the theoretical model, the research will focus on both self-efficacy and collective efficacy. A literature review will be performed to inform our choice of survey items (e.g. Bamberg et al., 2015; Chen, 2015; Landmann, & Rohmann 2020).

In addition to the model variables, the survey will include some measures that could provide a more in-depth understanding of participants’ attitudes toward environmental issues in general, such as the New Ecological Paradigm (NEP; Dunlap et al., 2000) and, more specifically, attitudes toward CC, such as van Valkengoed et al. (2021).

*Demographic information*: Age, gender, occupational status and social class, level of education, etc.

***2.3 Studies 3 and 4: Action-based and knowledge-based interventions***

According to the theoretical model, participating in pro-environmental activities enhances efficacy beliefs that in their turn enhances willingness to participate in further pro-environmental behavior and also influences climate emotions. The model also suggests a direct link between pro-environmental activity and these two kinds of dependent variables (figure 2). The model, alongside hypotheses 5 and 6, will be tested in studies 3 and 4.

Study 3 will be a controlled laboratory experiment in which we will examine the effects of short interventions on efficacy, affect, and intentions relating to CC. As efficacy beliefs develop over time (Bandura, 1982), study 4 will focus on long-term interventions, so that we may capture the process of change over time (study 4).

***2.3.1 Study 3: Controlled experiment***

During the third year of the research project, we will investigate the influence of action-based short-term interventions. There will be three experimental groups and one control group, each consisting of 200 participants (*N*=800) sampled from an online panel, all of whom will participate in an online experiment. As with all other studies in this proposal, all participants will be in the 18-30 age group. Quotas will be set to ensure similarities in demographics between the groups. The study aims to investigate the influence of two forms of pro-environmental action: individual and collective action, and also the influence of a knowledge-based intervention. Hence the four research groups will be (1) Individual action-based intervention (2) Collective action-based intervention (3) knowledge-based intervention (4) control. After signing a consent form participants will be randomly assigned to one of the groups. The first phase of the experiment is the manipulation. Participants will then fill in a survey that includes measures of self-efficacy, collective efficacy, positive affect, negative affect, individual pro-environmental intentions, and collective pro-environmental intentions. The items in the measures will be the same as in study 2.

*Experimental interventions*. All three interventions will be based on a comprehensive review of relevant interventions in the experimental literature. The knowledge-based intervention will consist of either watching a video or reading a text describing opportunities for acting in a pro-environmental way (e.g. Van Zomeren et al., 2010). The individual action-based intervention will involve an activity that has a direct environmental impact, such as the Work for Environmental Protection Task (WEPT; Lange & Dewitte 2022). The collective action-based intervention will consist of a collective environmental activity, such as signing a petition or suggesting an environmental campaign.

***2.3.2 Study 4: Long-term educational interventions***

Integrating long-term educational interventions into the research project is important for several reasons. First, as mentioned above, according to Bandura (1982) efficacy beliefs should be considered as a process, and their influence on affective and behavioral outcomes should also be considered over the long term. Second, although collective and individual pro-environmental behaviors can be manipulated as part of a short-term experiment, the possibilities for such short-term interventions are limited, and might best focus on behaviors that require a low investment of cognitive and emotional effort. Interventions that involve long-term environmental engagement can require a greater investment of effort, enhance cognitive and emotional engagement, and yield a deeper process of involvement that can lead to more sustainable outcomes. Finally, the findings from studies of educational interventions have a higher external validity and the conclusions can yield greater practical implications, as they can be applied in higher education institutes. As higher education students are part of the age group we focus on in this research the results can have a direct influence on the development of effective educational interventions related to CC.

As with study 3, study 4 will include three interventions: a knowledge-based intervention, an individual-action-based intervention, and a collective-action-based intervention. The interventions will take place at the University of Haifa, where the PI serves as staff at the Department of Learning and Instructional Sciences. The interventions will last 6 weeks. All participants will be University BA students and will receive monetary compensation for participating. The overall number of participants will be 60: 20 in each of the groups. After signing a consent form participants will be randomly assigned to one of the groups.

*Data collection and analysis.* There are three sources of data in study 4: (1) A close questionnaire will be distributed to all participants before and after participation. The measures will be based on those used in study 2 and will include measures of climate emotions, self-efficacy, collective efficacy, climate anxiety, and environmental attitudes. The pre-intervention questionnaire will also include questions on participants’ previous engagement with pro-environmental activity (individual and collective), and the post-intervention questionnaire will include a behavioral intention scale. (2) A reflective report will be filled in during the intervention period (week 3), and again in the last week (week 6). Participants will report on their feeling regarding the process in an open question. (3) Interviews will be conducted with three participants in each group in order to have a deeper understanding of how they perceived the process and its influence. All qualitative data will be analyzed using content analysis. Quantitative data will be statistically analyzed.

*Educational interventions.* The intervention will begin with a text reading that provides general information on CC, human activity that influences GHG emissions, and possible mitigation and adaptation actions. Participants in the information-based intervention condition will be asked to watch videos and read articles that deal with CC, and to write a summary that could be used to teach CC issues to other university students and k12 students. Participants in the individual-action condition will be asked to participate in a program that aims to produce change in private-sphere pro-environmental behavior. The program will be based on choosing a behavior to focus on, receiving information and tips, and reporting on individual progress through a diary. Participants in the collective-action condition will be split into four groups. Each group will be asked to choose a local environmental issue that relates to CC, and jointly design a campaign and educational program to be implemented on the campus.

***2.4 Preliminary results***

The PI has already conducted several studies that will contribute to aspects of the proposed research. In studies that were conducted in higher education courses Mintz et al. (2014), and Mintz and Tal (2018) highlighted the importance of collaborative action and active engagement in environmental and sustainability issues in enhancing students’ perceived competence in dealing with sustainability issues, and their motivation to promote sustainable development. Research conducted in a citizen science community supported the importance of active engagement in environmental issues in promoting emotional engagement (Kaplan Mintz, Arazy, and Malkinson, 2022). The importance of positive affect as a coping strategy in stressful times was investigated in a recent study that focus on the importance of contact with nature during the first COVID-19 (Kaplan Mintz, Ayalon, Eshet, & Nathan, 2021).

[A remark: I am currently conducting a pilot study which include 5 interviews with young adults, on topic similar to the research scope, and a survey aimed to validate the climate anxiety scale. I will be happy to have advice on how to describe such process as it has not been published yet]

***2.5 Available resources***

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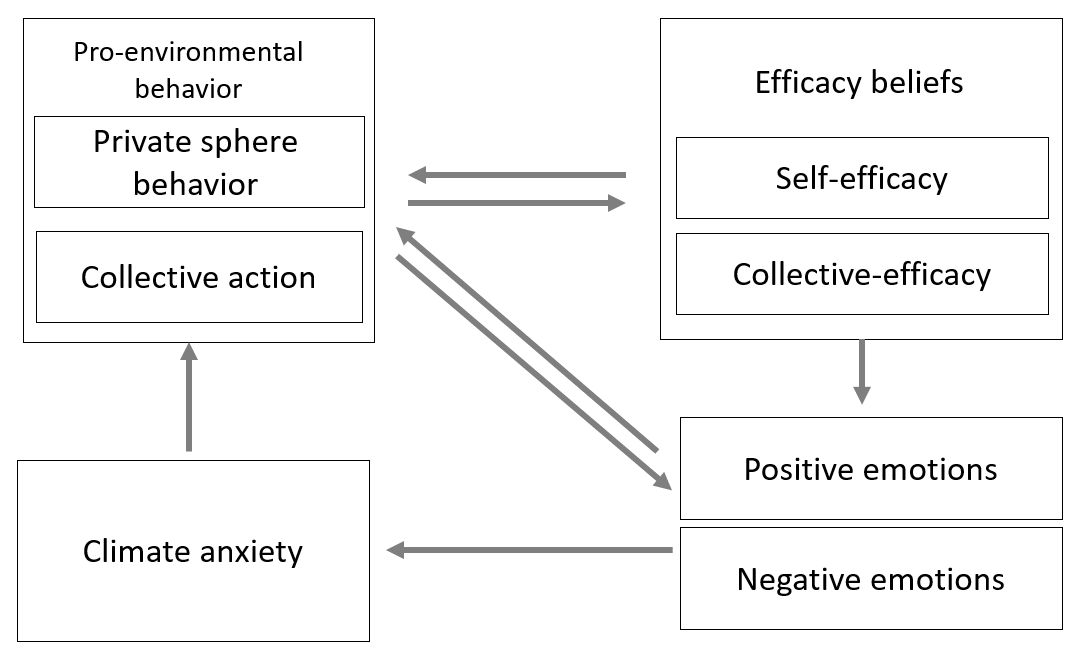
The PI is a faculty member at the University of Haifa and at Shamir Research Institute, where there is an excellent infrastructure for conducting the proposed research in terms of computing resources, support for research, and a pool of skilled graduate students who can be employed as research assistants.

***2.6 Expected results and pitfalls***

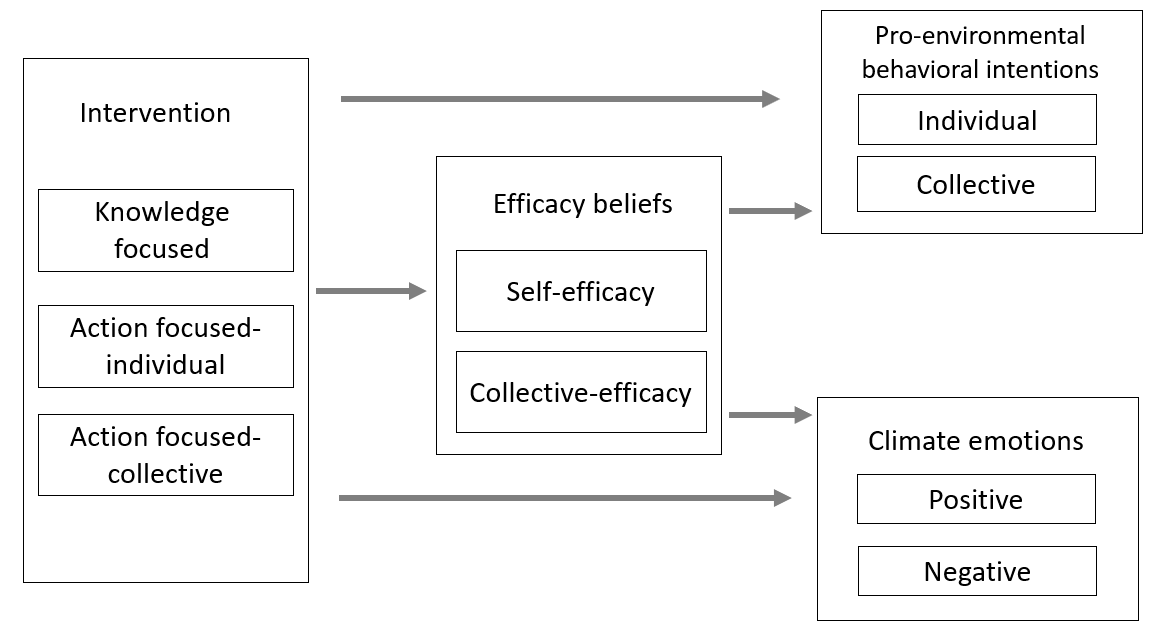
The comprehensive approach of the proposed research which explores the bi-directional relationships between behavioral and emotional responses to CC, and the role of efficacy beliefs in these relations, is innovative and timely. Specifically, it will contribute to the understanding of the ways the two kinds of efficacy beliefs—self-efficacy and collective efficacy—are developed through active engagement in environmental action, and how they influence behavior and emotions related to CC. Its innovative integration of psychological and educational models will enhance our understanding of effective interventions and provide us with information about the development of efficacy beliefs related to CC. This understanding will inform the design of effective, science-based educational interventions. Finally, the research will provide important information on climate emotions, climate anxiety, and efficacy beliefs in young people in Israel. As awareness of CC is rising in Israel, and as actual incidents of extreme weather are becoming more common, such an understanding will be important in shaping policy decision-making and as a baseline for future investigations.

An additional and more general contribution of the proposed research is to support the development of environmental psychology in Israel—a field that is receiving growing interest worldwide. Hundreds of scholars focus their efforts on aiming to understand human-environment relations, and many articles and books are published every year. National and international psychology associations such as APA and IAAP acknowledge the significant role of psychological research in addressing pressing social and environmental issues, and initiate professional communities such as APA division 34 in APA (APA, n.d.), and division 4 in IAAP (IAAP, n.d.). APA has also initiated a climate change task force (APA 2020; 2022). In Israel, the field of environmental psychology is in its infancy. Little research has thus far addressed human-environment interaction, and very few scholars are active in this field. The proposed research will help to address this gap between Israel and other countries and develop this important field of study.

I anticipate three main obstacles to the research and have plans to mitigate them. First, study 1 presents a challenge in recruiting participants from diverse backgrounds and communities for the interviews. I will address this obstacle by recruiting two research assistants from diverse backgrounds who will help in reaching different groups and building trust with them. Second, study 4 presents a challenge in recruiting 60 students from the university. Enhancing sustainable goals is a leading strategy at the University of Haifa today, and there are several organizational departments that are involved in enhancing research and education on sustainability issues in general, and on climate change in particular. I will therefore ask for the assistance of these departments in advertising the project and recruiting students. Support has already been offered by the Director of Innovation and Sustainability at the University (see attached supporting letter). Finally, study 4 presents another challenge in keeping participants engaged throughout the 6-week intervention period. I will address this obstacle by providing students with a weekly reminder about the project, and a support meeting with the researcher once every two weeks.



*Figure 1*: an integrated framework for the relationship between climate action, climate emotions, climate anxiety, and efficacy beliefs



*Figure 2*: The proposed influence of action-based and knowledge-based interventions on efficacy beliefs, climate action, and climate emotions

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