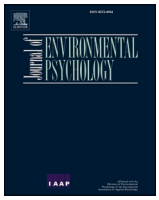
Journal of Environmental Psychology 107 (2025) 102798

Contents lists available at ScienceDirect

Journal of Environmental Psychology

journal homepage: www.sciencedirect.com/journal/journal-of-environmental-psychology



Climate change anxiety as a mental toll for parents: Investigating the relationship between climate change anxiety and parenting practices

Hoi-Wing Chan [a,*], Li Lin [b,**], Kim-Pong Tam [c]

[a] The Hong Kong Polytechnic University, Hong Kong SAR, China
[b] Lingnan University, Hong Kong SAR, China
[c] The Hong Kong University of Science and Technology, Hong Kong SAR, China

ARTICLE INFO

Handling Editor: W. Schultz

ABSTRACT

Emerging studies have suggested that the experience of anxiety associated with climate change can take a toll on people's mental health. While researchers and mental health professionals have emphasized the roles of parents in helping children and adolescents cope with climate change anxiety, they have yet to consider how parents' experience of climate change anxiety may hamper their parenting roles. This gap warrants research attention, as the experience of mental tolls possibly reduces parents' psychological capacities for attending to the needs and well-being of their children. The present research fills this gap by examining the relationships between climate change anxiety and maladaptive parenting practices (i.e., low autonomy support, high psychological control, and high inconsistent parenting) among a sample of US parents, with a three-wave longitudinal design (N at Time 1 = 684). Our results from the partial least square-structural equation modeling showed that maladaptive parenting practices were associated with concurrent climate change anxiety and prior parenting practices. These results suggest the possibility that climate change anxiety, as a mental toll, has an immediate and contemporaneous impact on maladaptive parenting practices, which contribute to the accumulation of such practices over time. Overall, our findings provide preliminary support to the notion that climate change anxiety can bear negative consequences to parenting practices, which may undermine their role in assisting their children to cope with climate change anxiety.

1. Introduction

Climate change threatens individuals' mental well-being. Previous studies have shown that the direct experience of extreme weather events or climate-related disasters (e.g., flooding, brushfire, hurricanes) can have adverse effects on mental health, including post-traumatic stress disorder, anxiety, and depression (e.g., Galea et al., 2007; Tunstall et al., 2006; for reviews, see Doherty & Clayton, 2011; Palinkas & Wong, 2020). Other studies also found the indirect influence of the changes in climate (e.g., hotter temperature), environmental quality (e.g., increased dust pollution), and social conditions (e.g., worsened economic conditions) on mental health via worsening physical health conditions (Berry et al., 2010; Crandon, Dey, et al., 2022). This indirect experience also extends to individuals who are exposed to climate change information through news, social media, and interpersonal discussion (i.e., vicarious experience; e.g., Whitmarsh et al., 2022). Recent studies suggest that people may experience distress, fear, and anxiety when they are aware of, think about, or come to terms with climate change (e.g., Clayton & Karazsia, 2020; Hickman et al., 2021). Such an experience is referred to as climate change anxiety, which can range from emotional responses to clinically significant symptoms reflecting impairment in daily functioning (Chan, Tam, & Clayton, 2024; Clayton, 2020; Heeren et al., 2023). Studies have revealed a negative link between climate change anxiety and indicators of mental well-being (e.g., Chan, Tam, & Clayton, 2024; Ogunbode et al., 2022; for a meta-analysis, see Gago et al., 2024), suggesting that climate change anxiety can be a looming challenge for mental health conditions.

While researchers have expressed concerns about how young people struggle with climate change anxiety (e.g., Crandon, Scott, et al., 2022; Galway & Field, 2023; Hickman et al., 2021; Ma et al., 2022; Whitlock, 2023), attention on parents is relatively sparse. Given the important role of parents in shaping the development of children and adolescents,

* Corresponding author. Department of Applied Social Sciences, Hung Hom, Hong Kong.
** Corresponding author. Department of Psychology, Tuen Mun, Hong Kong.
E-mail addresses: william-hw.chan@polyu.edu.hk (H.-W. Chan), jocelyn.lin@ln.edu.hk (L. Lin).

https://doi.org/10.1016/j.jenvp.2025.102798
Received 6 January 2025; Received in revised form 1 October 2025; Accepted 2 October 2025
Available online 3 October 2025

researchers have examined how parents can help children cope with their distress about climate change (e.g., Baker et al., 2021; Léger-Goodes et al., 2023; for a discussion on the role of parents, see Crandon, Scott, et al., 2022). Some practitioners also offer guidelines for parents (e.g., Burke et al., 2018). Yet, it overlooks the possibility that parents may experience climate change anxiety, and such an experience can hamper their parental roles. Indeed, previous studies have demonstrated how parental distress and anxiety, in general, would negatively influence their parental practices, which can have a negative impact on their offspring's well-being (e.g., Borre & Kliewer, 2014; Murray et al., 2009; Yang et al., 2021). It follows that parental climate change anxiety can be a risk factor for not only their own but also their children's mental health. The present study is one of the first to investigate the potential influence of parents' climate change anxiety on their parenting practices, using a three-wave longitudinal survey.

1.1. Climate change anxiety

Climate change anxiety can be broadly defined as a collection of psychological responses featured in worry, anxiety, or distress when people come to terms with or think about climate change and its impacts. While there is no consensus on what constitutes climate change anxiety (Heeren & Asmundson, 2023; van Dijk et al., 2025), there are two widely adopted operationalizations of it. The first considers it as an emotional or cognitive-emotional experience related to the feeling of worry and anxiety about the climate change threat (e.g., Ogunbode et al., 2022). For example, it can be measured in terms of how much people feel tense, worried, and anxious when they think about climate change. It can also be measured through tapping into what makes people feel anxious (i.e., the contents of affective experience; e.g., "I am overwhelmed by the awareness of the approaching climate disaster"; Marczak et al., 2023).

The second considers the symptoms or impairments associated with such affective experience (e.g., Clayton & Karazsia, 2020; Tam et al., 2023; Whitmarsh et al., 2022). In particular, Clayton and Karazsia (2020) developed the Climate Change Anxiety Scale to capture the symptoms associated with unhealthy and uncontrollable worry and anxiety about climate change. This scale has two dimensions, cognitive-emotional impairment and functional impairment. The first dimension captures symptoms associated with rumination about the climate change threat (e.g., difficulty concentrating and sleeping, having nightmares about climate change, repeatedly thinking and analyzing one's response to climate change). The second dimension captures symptoms that reflect impairments in daily functioning (e.g., reduced ability to have fun with or satisfy the needs of family and friends, and work to one's full potential). It is noteworthy that the two-dimensional structure of the scale has not always been replicated, with some studies supporting the original two-factor model (e.g., Tam et al., 2023), some revealing a three-factor model (e.g., Larionow et al., 2022), and some suggesting a one-factor model (e.g., Cruz & High, 2022).

Recent attempts have been made to examine the relationships between the two different operationalizations of climate change anxiety. Several studies have adopted latent profile analysis and revealed that people could have distinct experiences of affective-based and symptom-based climate change anxiety (e.g., Chan, Tam, & Clayton, 2024; Wullenkord et al., 2024). Other studies have proposed a potential transition from affective response to impairment (e.g., Parmentier et al., 2024). For example, Chan, Lin, et al. (2024) found that affective-based climate change anxiety was related to more frequent experience of impairment-based climate change anxiety four months later. Furthermore, while both forms of climate change anxiety were consistently associated with worse well-being, Gago et al.'s (2024) meta-analysis revealed that such an association was more robust with impairment-based climate change anxiety. Furthermore, the impairment-based climate change anxiety does not merely capture people's feelings of worry and anxiety but also how much they have been impaired by such experiences. As such, the impairment response fits our theorization of climate change anxiety as a mental toll. We thus operationalized climate change anxiety using the impairment-based response (i.e., the Climate Change Anxiety Scale).

1.2. Climate change anxiety and parents

Climate change anxiety can arise from the anticipated negative consequences of climate change on one's existence and ways of living, the perceived uncertainty of the future, and the sense of powerlessness in tackling the climate crisis (e.g., Chan, Tam, & Clayton, 2024; Clayton, 2020). This sentiment is expected to be particularly pronounced among young people, who will have to cope with the impacts of climate change throughout their lifetime. It should also apply to parents, who presumably care deeply about the future of their offspring. Parents may even struggle to bring a better future for their children while feeling guilty about not being able to solve the climate change problems (Gaziulusoy, 2020). However, to the best of our knowledge, only a handful of studies examined climate change anxiety among parents. Schelhas and Gast (2024) interviewed a group of parents who engaged in climate actions. They found that these parents were worried about climate change and experienced cognitive and emotional tolls. For example, the authors reported that their informants experienced deep-seated and paralyzing fear about climate change. Benoit et al.'s (2022) study on newspaper narratives found that parents described their support for youth climate actions as they experienced eco-anxiety by thinking and imagining their children's lives in the future (e.g., 2050). Lykins et al. (2024) provided direct insights into how climate change anxiety may influence mothers' well-being. They found that climate change anxiety was related to higher antenatal depression and worry among pregnant women participants. Their follow-up content analysis also revealed that these women expressed worry and concern regarding the negative impacts of climate change on their children's future. These studies point to the possibility that parents are vulnerable to climate change anxiety and its potential mental health consequences.

While parents play a crucial role in helping children deal with their climate change worry and anxiety, the literature has yet to explore how parents' experience of climate change anxiety may influence their psychological capacity to raise and nurture their children. Parenting studies have documented that parents who experience a mental toll, such as psychological distress, anxiety, depression, and burnout, are less likely to engage in autonomy-supporting and caring parenting practices but more likely to engage in controlling parenting (e.g., Sweeney & Wilson, 2023; Yang et al., 2021; see also Yaff, 2021). They could also be more focused on personal needs (e.g., Hodgins, 2008) and less involved in parenting their children (e.g., Danner-Wlaardingerbroek et al., 2013). Such distress can be elicited by external and situational stressors. For example, during the COVID-19 pandemic, Hanetz-Gamliel et al. (2021) found that the COVID-19 threat was related to higher levels of anxiety among mothers, which, in turn, was related to more coercive parenting practices. This effect can be explained by the fact that responsive or supportive parenting involves intensive consideration of children's needs, opinions, and autonomous decisions and thereby requires mental energy and effort from parents (e.g., Mabbe et al., 2018). As such, parents who experience a mental toll may have a reduced capacity to engage in autonomy-supporting parenting practices. Instead, they may discipline their children via controlling practices, which usually require less consideration of what their children feel and want. These parents may also respond to their children spontaneously and according to their momentary feelings, resulting in inconsistent parenting behaviors. We thus expect that climate change anxiety, as a mental toll, would relate to less supportive but more controlling parenting practices.

1.3. Hypotheses

In the present research, we aim to investigate the relationship

between parents' climate change anxiety and their parenting practices. We conceptualize climate change anxiety as a potential mental toll on parents. We thus operationalize climate change anxiety in terms of the impairment-based anxiety response captured by the climate change anxiety scale (Clayton & Karazsia, 2020), which is more aligned with the discussion and concern about the looming mental health challenges brought by climate change (see also van Valkengoed et al., 2023). We derive three hypotheses based on previous studies that examine the effect of psychological distress and other mental health conditions on parenting. That is, when parents experience a mental toll, they are less likely to engage in autonomy-supporting but more likely to engage in psychologically controlling and inconsistent parenting. We thus expect a negative association between climate change anxiety and autonomy-supportive parenting (Hypothesis 1) and a positive association between climate change anxiety and psychologically controlling parenting (Hypothesis 2) or inconsistent parenting (Hypothesis 3).

Lastly, as parenting research often contrasts psychological control with behavioral control (Barber et al., 2005), we also explore how climate change anxiety relates to behavioral control. While the former represents maladaptive manipulation of children to fulfill one's goals, the latter represents constructive parenting that provides guidance and rules for regulating children's behaviors. As behavioral control can involve a set of clear rules and guidance for children, it may or may not require the same amount of mental capacity as autonomy support. Indeed, previous studies did not have conclusive evidence regarding how parents' mental health conditions influence their behavioral control (e.g., Epkins & Harper, 2016; Xu et al., 2020). We thus explore the role of climate change anxiety on behavioral control without making a prior hypothesis.

To test the associations between climate change anxiety and parenting practices, we conducted a three-wave longitudinal study, with a six-month separation between each data collection. Previous studies have shown that a six-month separation is sufficient to detect changes in parenting practices (e.g., Wang et al., 2023). We thus deemed a six-month interval as appropriate to test the hypothesized effects. We have pre-registered our hypotheses. In our pre-registration, we registered only a two-wave study. However, researchers have criticized using two-wave data in estimating longitudinal effects (e.g., Lucas, 2023), as the cross-lagged panel model yielded a biased estimation of the cross-lagged effect. We thus deem a three-wave design more appropriate for testing our hypotheses. A three-wave design also allows us to examine whether the observed associations between climate change anxiety and parenting practices would replicate at different time points. Given the conceptual overlap between climate change anxiety and generalized anxiety (Chan, Lin, et al., 2024; Clayton, 2020), we controlled for the effects of generalized anxiety on parenting practices for all analyses. The pre-registration link is here: https://osf.io/f5a72/?view_only=e1875f7d5ade4f0a9e64ecf58ffd3924.[1]

2. Method

2.1. Participants

We recruited 701 US parent participants from Academic Prolific, an online crowdsourcing platform for recruiting research participants with diverse backgrounds (see Supplementary Table S1). As stated in the pre-registration, we recruited only parents who had at least one child aged between 12 (early adolescence) and 22 (late adolescence or emerging adulthood). Previous studies have found that adolescents and young people are at risk of experiencing distress associated with climate change (e.g., Hickman et al., 2021; for a review, see Wortzel et al., 2024). As such, focusing on parents with adolescent children can provide insights into whether parents' experience of climate change anxiety would impede their capacity to provide the support needed by these adolescents. We pre-determined our sample size based on the hypothesized effects and the expected attrition rate between Time 1 and Time 2 data collection, as only Time 1 and Time 2 surveys were pre-registered. Furthermore, we excluded participants who failed the attention check questions. Overall, 684, 544, and 448 participants completed and passed the attention check questions at Time 1, Time 2, and Time 3, respectively. At Time 1, 394 (57.6 %) male and 289 (42.3 %) female participants completed the survey (with mean age = 46.2, SD = 7.1). The majority of participants either held an associate degree (28.7 %) or a Bachelor's degree (41.5 %). None of them were elementary school or below. The majority of the participants reported having two children (43.0 %), followed by those having one child (28.0 %). About 18.6 % of the participants reported having three children. The remaining participants reported having four children or beyond. The attrition analyses showed that participants who completed all three waves of data reported more frequent behavioral control at Time 1 compared with those who dropped out at Time 2, with a small effect size (Hedge's g = .28). No other differences were observed. Supplementary Table S6 presents the full results.

2.2. Measures and procedures

At each time point, respondents completed an online questionnaire. All participants indicated their consent to participate in the study after reading the consent form. The questionnaire is part of a larger project exploring the relationships between different constructs relevant to climate change and pro-environmental behavior (see the pre-registration for details). Participants reported their climate change anxiety and parenting practices. The data collection procedure has been approved by the research ethics committee of the university affiliated with the first author. We reported the details of the measures used in this study in the Supplementary Information. Supplementary Table S4 shows the reliability indexes of these measures.

Climate change anxiety. We measured climate change anxiety using the climate change anxiety scale (13 items; Clayton & Karazsia, 2020). This scale involves two components of impairment-based anxiety responses – cognitive-emotional impairment and functional impairment. The first component captures the experiences of repeated worry and rumination about climate change, while the second component captures the experiences of reduced ability to function in daily activities and enjoy life. Participants reported on a 5-point scale to indicate how frequently they have such experiences (1 = never to 5 = almost always). Although some studies demonstrate the robustness of the two-factor model (e.g., Tam et al., 2023), other studies have recommended using only the overall score of the climate change anxiety scale (e.g., Cruz & High, 2022). As we aim to test the effect of climate change anxiety without specific hypotheses regarding each component of it, we opted to use the overall score of the scale to capture climate change anxiety.

Generalized anxiety. We measured generalized anxiety using the seven-item generalized anxiety scale (GAD-7; Spitzer et al., 2006). Participants reported on a 4-point scale (1 = never to 4 = nearly everyday) to indicate how frequently they experienced an anxiety-related symptom within the past two weeks. This scale has been validated and used in previous studies examining the effects of climate change anxiety, as measured by the Climate Change Anxiety Scale (e.g., Chan, Tam, & Clayton, 2024; Whitmarsh et al., 2022).

Parenting practices. We adapted the existing measures of perceived parenting behaviors from child report to parent report. Across these measures, participants reported the degree to which the statements applied to them on a seven-point scale (1 = not true of me at all, 7 = very true of me). First, parents reported their autonomy support by responding to an eight-item scale adapted from Wang et al.'s (2007) study (e.g., "I allow my child to make choices whenever possible.") Third, they reported their use of psychological control by responding to 10 items adapted from Wang et al.'s (2007) study (e.g., "I avoid looking at my child when he/she has disappointed me."). The Parents as Social Context Questionnaire (Skinner et al., 2005) was adapted to measure behavioral control and inconsistent parenting, with the subscales of

structure and chaos, respectively. For behavioral control, a sample item is "If my child has a problem, I help her/him figure out what to do about it." For inconsistent parenting, a sample item is "I change the rules a lot at home."

Demographic information. Participants reported their gender (male, female, and others), age, highest education attained, annual household income, number of children, and political orientation (1 = strong Democrat to 7 = strong Republican). Supplementary Table S1 shows the demographic information of the participants.

2.3. Data analysis

Based on our pre-registered analysis plan, we conducted both OLS regression and covariance-based structural equation modeling to examine the concurrent and longitudinal associations between climate change anxiety and the four parenting practice variables. However, in the data cleaning phase, we found that there was a strong kurtosis of climate change anxiety (Time 1 = 9.38, Time 2 = 9.24, Time 3 = 10.51). This distribution of climate change anxiety violated the normality assumption required for OLS regression and covariance-based structural equation modeling, making the results from these analyses potentially unreliable. Therefore, we have chosen to report these results in the Supplementary Information. As an alternative, we adopted two additional analytic approaches that are considered more robust against the violation of the normality assumption. We emphasize that these two alternative approaches were selected purely in a post-hoc manner as a response to the strong kurtosis of the climate change anxiety scale. Since we are not aware of any consensus in the literature regarding the best way to analyze data facing a similar situation, we believe it is important to establish the robustness of our findings by considering the consistency, or lack thereof, of the results generated from multiple approaches.

In Approach 1, we transformed climate change anxiety into a categorical variable. Individuals who scored in different ranges on the climate change anxiety scale may exhibit qualitatively distinct patterns of the anxiety responses. As such, we attempted to deal with the non-normality by identifying subgroups of individuals who may respond to the scale differently. The transformation was performed based on a series of latent profile analyses. We decided to use latent profile analysis because it does not rely on arbitrary cutoff scores for determining the number of groups to be formed (Nylund-Gibson & Choi, 2018). Next, we conducted a lag-2 path analysis to examine how climate change anxiety (with the transformed categorical variable) at Time 1 relates to the four parenting practice variables at Time 3 by controlling the autoregressive effects of the corresponding parenting variables at Time 1 and Time 2 (i.e., a lag-2 model), generalized anxiety at Time 1, and demographic variables. We used the lag-2 model, as previous studies suggested that it is more robust against the bias induced by unmeasured trait factors in longitudinal analyses compared with the lag-1 model (Murayama & Gfrörer, 2024).[2] It is noteworthy that transforming climate change anxiety into a categorical variable may reduce the variance of the measure, and therefore, possibly reduce its sensitivity in detecting individual differences in climate change anxiety. We thus also conducted an alternative analysis (Approach 2) based on a non-parametric method, without transforming the variable into a categorical one (Hair Jr, Matthews, Matthews, & Sarstedt, 2017).

In Approach 2, we used the partial least square-structural equation modeling (PLS-SEM; Hair et al., 2017) to test the relationships between climate change anxiety and parenting practices. We used PLS-SEM for two reasons. First, PLS-SEM is more robust against the violation of normality assumption than the covariance based-structural equation modeling (CB-SEM; Hair et al., 2017). As there is a strong positive kurtosis in climate change anxiety, PLS-SEM is more appropriate than CB-SEM in testing our hypotheses. Second, PLS-SEM is better suited for exploratory research, theory development, and testing relationships between variables that are not well-documented, while CB-SEM is more suitable for confirmation research and testing competitive models based on well-established theories (Dash & Paul, 2021; Hair et al., 2017). As the present study tests the underexplored relationship between climate change anxiety and parenting practices, we deemed it more suitable to use the exploratory rather than the confirmatory approach.

PLS-SEM involves a measurement model and a structural model. The measurement model tests the reliability and validity of the proposed model, while the structural model tests the hypothesized links between the latent variables. We constructed an evolution model following the recommendation by Roemer (2016) (see Fig. 1). The evolution model examines the concurrent association between two variables at a specific time point while also considering the autoregressive effect of the two variables. The evolution model focuses on understanding how the outcome variable evolves over time by considering its prior states (i.e., the autoregressive path) and the concurrent influence of other variables (i.e., the concurrent path). Our model thus assumes that parenting practices are, on the one hand, influenced by prior parenting practices (i.e., a carry-over effect of previous parenting practices) and, on the other hand, by the concurrent mental health status (i.e., climate change anxiety and generalized anxiety), a contemporaneous effect (i.e., lag-0). This assumption is tenable if we consider the immediate and contemporary influence of mental toll on parenting (Mabbe et al., 2018), which may lead to an accumulation of maladaptive parenting practices over time. We also compared this model with an alternative longitudinal model that considered the lag-1 and lag-2 effects of mental health status (i.e., climate change anxiety and generalized anxiety) instead of the concurrent effects (except for Time 1). This alternative model assumes that mental health status at prior time points would predict the change in parenting practices later.

3. Results

3.1. Approach 1: Transforming climate change anxiety into a categorical variable

As noted, we transformed climate change anxiety into a categorical variable before subjecting it to analysis. We first conducted a series of latent profile analyses using Mplus 8.1 (Muthen & Muthen, 1998–2017). In particular, we treated all climate change anxiety items at Time 1 as the indicator variables of the latent profile. We evaluated models ranging from 2 to 6 latent profiles. Supplementary Table S2 shows the results. A two-profile solution shows the optimal fit to the data as reflected by the likelihood ratio test, with an entropy of .998. Also, other solutions included a small size profile (N < 5 %), which would be difficult to interpret meaningfully. We thus opted for the two-profile solution. The two latent profiles show that one group of parent participants almost did not experience climate change anxiety (N = 629; 91.96 %; with the mean of items ranging from 1.03 to 1.43) and the other group of parent participants (N = 55; 8.04 %) experienced some degree of climate change anxiety (with the mean of items ranged from 2.18 to 2.94). Based on this result, we binary coded climate change anxiety.

With the transformation of the climate change anxiety variable, we used the binary-coded variable of climate change anxiety in a lag-2 path analysis to examine the longitudinal associations between climate change anxiety and the four parenting practice variables. Table 1 shows the results. We observed that the binary-coded climate change anxiety at Time 1 was related to psychological control and inconsistent parenting at Time 3, when controlled for the lag-1 and lag-2 autoregressive effects of the corresponding parenting practices. These results were consistent with Hypotheses 2 and 3. Yet, it was unrelated to autonomy support at Time 3, which was inconsistent with Hypothesis 1. It was also unrelated to behavioral control at Time 3. A similar pattern of associations was also observed for generalized anxiety at Time 1. Overall, these findings support the notion that parents who experienced climate change anxiety reported more frequent psychological control and inconsistent parenting than those who did not experience climate change anxiety, even when taking into account the autoregressive effects of these

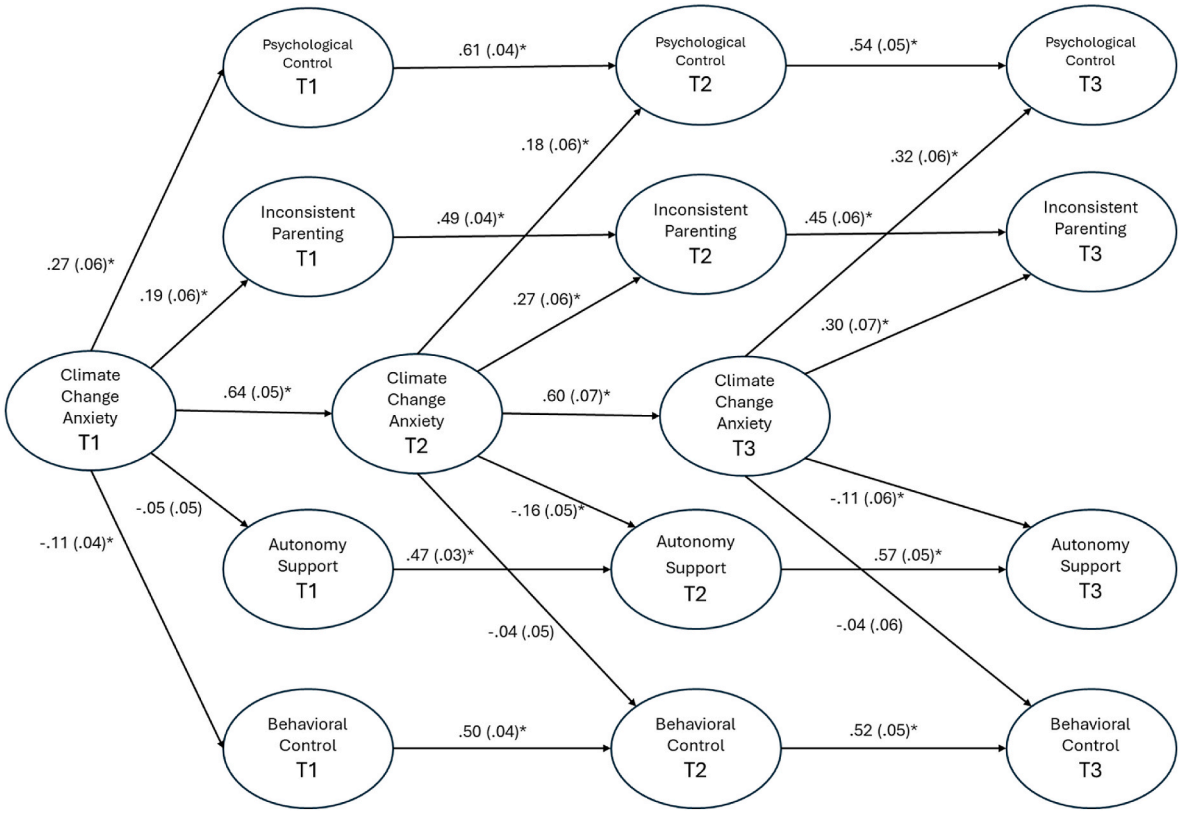


Fig. 1. Illustration of the PLS-SEM (contemporaneous effects). Note. For simplicity, the autoregressive and concurrent paths of generalized anxiety were not included in the above path diagram. Generalized anxiety at Time 1, 2, and 3 was used as a predictor of all four parenting practices at Time 1, 2, and 3 respectively. The model also included the autoregressive path of generalized anxiety. The number shows the unstandardized effect and the bracket shows the bootstrapped standard error. * 95 % CI did not include zero.

parenting practices.[2]

3.2. Approach 2: Using the PLS-SEM

As mentioned, our second approach is to test the association between climate change anxiety and parenting practices using PLS-SEM, a statistical method that is more robust against violating the normality assumption. Below, we first presented the results for evaluating the measurement model and then proceeded to test the hypothesized associations with the structural model.

Evaluating the measurement model. We evaluated the measurement model based on the reliability and validity indexes. Specifically, the reliability of the model can be deduced by the indicator reliability (i.e., factor loadings of the indicator) and the internal consistency reliability (i.e., Cronbach's alpha, the composite reliability, and the exact reliability coefficient). Supplementary Tables S4 and S5 show the details. Most of the factor loadings were larger than .70, while all of the factor loadings were beyond .40. All internal consistency reliability indexes were larger than .70. Overall, these indexes support the reliability of the model. The validity of the model was deduced by the convergent validity (based on the average variance extracted; AVE) and discriminant validity (based on the heterotrait-heteromethod correlations; HTMT correlations). The AVE values of all but one construct (autonomy support at Time 1) were larger than the cutoff of .50. Although the AVE of autonomy support at Time 1 was .46, we decided to retain the construct as autonomy support at Time 2 and Time 3 showed AVE higher than the cutoff. Retaining autonomy support at Time 1 is crucial to estimate its Time 1 to Time 2 autoregressive effect. The HTMT correlations were below the cutoff of .85, supporting the discriminant validity of the constructs.

Testing the hypothesized effect with the structural model. We treated all four parenting practices as the outcome variables, while climate change anxiety and generalized anxiety were the predictor variables at each time point. We also included the autoregressive effects of each variable. Fig. 1 shows our model, and Table 2 shows the results.

Climate change anxiety at each time point was positively related to psychological control (f^2 = .08, .06, and .17 at Time 1, 2, and 3, respectively) and inconsistent parenting (f^2 = .04, .11, and .14 at Time 1, 2, and 3, respectively) at each time point, reflecting small to moderate effect sizes. The bootstrapped 95 % confidence interval revealed that all these associations were statistically significant. These findings were consistent with Hypotheses 2 and 3, suggesting that parents experiencing climate change anxiety were more likely to engage in psychologically controlling and inconsistent parenting. Climate change anxiety at Time 2 and Time 3 was negatively related to autonomy control at Time 2 (f^2 = .03) and Time 3 (f^2 = .02) with small effect sizes, respectively, while its negative association with autonomy control at Time 1 was negligible (f^2 = .002). The bootstrapped 95 % confidence interval also revealed that the negative associations were statistically significant at Time 2 and Time 3 only. These findings were partially consistent with Hypothesis 1 (i.e., a negative association between climate change anxiety and autonomy support).

Lastly, we observed that climate change anxiety was related to behavioral control with negligible effect sizes (f^2 = .01, .001, and .002 at Time 1, 2, and 3, respectively). The bootstrapped 95 % confidence interval showed that the negative association was statistically significant at Time 1 only. These findings did not show a consistent relationship between the experience of climate change anxiety and behavioral controlling parenting. We did not observe consistent associations between generalized anxiety and parenting practices across the three time points, with effect sizes ranging from negligible to small. We also observed autoregressive effects of all variables with medium to large effect sizes

Table 1
Results of the lag-2 path analysis with climate change anxiety as a binary variable.

	Time 3 Autonomy Support				Time 3 Psychological Control				Time 3 Inconsistent Parenting				Time 3 Behavioral Control			
	b (SE)	p	95 % CI	Beta	b (SE)	p	95 % CI	Beta	b (SE)	p	95 % CI	Beta	b (SE)	p	95 % CI	Beta
Time 1 Climate change anxiety (binary coded)	−.06 (.09)	.524	[-.23, .12]	−.03	.31 (.14)	.023	[.04, .57]	.09	.46 (.14)	.001	[.18, .74]	.14	−.02 (.12)	.892	[-.25, .22]	−.01
Time 1 Generalized anxiety	−.01 (.03)	.844	[-.07, .05]	−.01	.02 (.05)	.605	[-.07, .11]	.02	.11 (.05)	.036	[.01, .21]	.09	−.03 (.04)	.543	[-.10, .06]	−.02
Lag-2 Autoregressive effect (Time 1)	.11 (.03)	.000	[.06, .17]	.15	.23 (.05)	.000	[.14, .32]	.24	.17 (.05)	.000	[.08, .26]	.17	.47 (.05)	.000	[.37, .57]	.43
Lag-1 Autoregressive effect (Time 2)	.59 (.04)	.000	[.51, .67]	.58	.50 (.05)	.000	[.41, .58]	.49	.39 (.04)	.000	[.30, .47]	.40	.34 (.05)	.000	[.25, .44]	.33
Demographic covariates																
Age	.00 (.00)	.636	[-.01, .01]	.02	.00 (.01)	.507	[-.01, .01]	.02	.00 (.01)	.599	[-.01, .01]	.02	−.01 (.00)	.001	[-.02, −.01]	−.11
Education	.01 (.02)	.640	[-.04, .06]	.02	.05 (.04)	.212	[-.03, .12]	.05	.02 (.04)	.573	[-.06, .10]	.02	.03 (.03)	.295	[-.03, .10]	.04
Income	−.02 (.02)	.426	[-.06, .03]	−.03	−.02 (.03)	.639	[-.08, .05]	−.02	−.06 (.03)	.099	[-.12, .01]	−.08	.03 (.03)	.341	[-.03, .08]	.04
Sex (1 = male, 0 = female)	.04 (.05)	.351	[-.05, .13]	.04	−.01 (.07)	.897	[-.14, .12]	−.01	.21 (.07)	.004	[.07, .35]	.12	−.02 (.06)	.763	[-.13, .10]	−.01
Number of children	−.04 (.02)	.021	[-.08, −.01]	−.08	−.01 (.03)	.730	[-.07, .05]	−.01	−.02 (.03)	.564	[-.08, .04]	−.02	.01 (.03)	.769	[-.04, .06]	.01
Political orientation	.01 (.01)	.349	[-.01, .03]	.03	−.01 (.02)	.717	[-.04, .03]	−.01	−.01 (.02)	.508	[-.05, .02]	−.03	.00 (.02)	.851	[-.03, .03]	.01
Model Info																
R-squared	.46				.50				.38				.50			
Chi-squared	155.03															
df	36															
CFI	.953															
RMSEA	.070															
SRMR	.066															

Note. We also included the Time 1 autoregressive effect in the model to predict Time 2 parenting practice variables. All effects were significant at $p < .001$. Results remained consistent without including the demographic covariates.

Table 2
Results of the structural model of the PLS-SEM (evolution model).

	Autonomy support			Psychological control			Inconsistent parenting			Behavioral control		
	b (SE)	95 % CI	f-squared	b (SE)	95 % CI	f-squared	b (SE)	95 % CI	f-squared	b (SE)	95 % CI	f-squared
At Time 1												
Climate change anxiety	−.05 (.05)	[-.14, .04]	.002	.27 (.06)	[.15, .38]	.075	.19 (.06)	[.07, .31]	.037	−.11 (.05)	[-.21, −.03]	.013
Generalized anxiety	−.07 (.04)	[-.15, .02]	.004	.12 (.04)	[.04, .20]	.015	.22 (.04)	[.14, .30]	.051	−.09 (.04)	[-.17, −.01]	.009
At Time 2												
Climate change anxiety	−.16 (.05)	[-.25, −.07]	.032	.18 (.06)	[.07, .30]	.057	.27 (.06)	[.15, .38]	.107	−.04 (.04)	[-.13, .05]	.001
Generalized anxiety	−.05 (.05)	[-.14, .04]	.003	.05 (.03)	[-.02, .11]	.004	.07 (.04)	[.00, .14]	.007	−.04 (.04)	[-.11, .02]	.002
t-1 Autoregressive effect	.47 (.03)	[.42, .54]	.303	.61 (.04)	[.53, .69]	.652	.49 (.04)	[.41, .57]	.364	.50 (.04)	[.43, .58]	.333
At Time 3												
Climate change anxiety	−.11 (.06)	[-.23, −.01]	.019	.32 (.06)	[.20, .45]	.165	.30 (.07)	[.16, .44]	.135	−.04 (.06)	[-.15, .07]	.002
Generalized anxiety	−.05 (.04)	[-.12, .03]	.003	.03 (.04)	[-.04, .11]	.002	.14 (.04)	[.06, .22]	.030	−.08 (.04)	[-.16, .00]	.008
t-1 Autoregressive effect	.57 (.05)	[.49, .66]	.499	.54 (.05)	[.43, .64]	.476	.45 (.06)	[.34, .56]	.303	.52 (.05)	[.42, .62]	.360

Note. SE = bootstrapped standard error. f-squared >.02, .15, and .35 indicate small, medium, and large effect sizes respectively.

(f^2 ranged from .30 to 1.04), suggesting a strong stability (or carry-over effect) of the constructs. That is, parenting practices and mental health status were highly stable and likely to be accumulated over time.

We constructed an alternative longitudinal path model that includes the lagged effects instead of the concurrent effects. Table 3 shows the results. We observed that the effect sizes of the lagged effects of climate change anxiety on parenting practices were negligible ($f^2 < .02$). The bootstrapped 95 % CI revealed that only the lagged effects of climate change anxiety on inconsistent parenting were positive and statistically significant (i.e., not including zero). Furthermore, we compared the BIC values of the outcome variables at Time 2 and Time 3 between the two models. Most of the BIC values of the evolution model (i.e., the concurrent paths) were smaller than those of the lagged model (see Table 4), suggesting that the evolution model fitted the data better than the lagged model. We thus preferred the evolution model and interpreted our findings based on this model.

4. General discussion

The present research explores whether the experience of climate change anxiety can influence how parents of children aged 12 to 22 interact with their children. Our results provide preliminary support to this notion – U.S. parents experiencing climate change anxiety tend to report more psychologically controlling and inconsistent parenting. They also tend to report less autonomy-supporting parenting, although the results are not entirely consistent (not observed at Time 1 in the PLS-SEM model and non-significant in analysis with the binary-coded climate change anxiety variable). These parenting practices are considered to be maladaptive, as numerous studies have documented that more psychologically controlling and inconsistent parenting and less autonomy-supporting parenting would harm children's well-being (e.g., Bradshaw et al., 2024; Dwairy, 2008; van der Kaap-Deeder et al., 2017). Our results also suggest that the effects of climate change anxiety on parenting practices are independent of generalized anxiety symptoms. Accordingly, the experience of climate change anxiety possibly influences people's functioning above and beyond those implied by generalized anxiety symptoms (in this case, parenting

Table 4
Summary of the BIC values of the PLS-SEM.

	Evolution model	Lagged effect model	Delta BIC (Evolution model - lagged effect model)
Time 1 Inconsistent parenting	−52.876	−52.984	0.108
Time 1 Autonomy support	13.462	13.432	0.030
Time 1 Psychological control	−51.220	−51.714	0.494
Time 1 Behavioral control	0.863	1.065	−0.202
Time 2 Inconsistent parenting	−292.524	−226.817	−65.707
Time 2 Autonomy support	−183.183	−158.748	−24.435
Time 2 Psychological control	−403.309	−359.400	−43.909
Time 2 Behavioral control	−180.328	−177.739	−2.589
Time 3 Inconsistent parenting	−330.229	−236.756	−93.473
Time 3 Autonomy support	−288.320	−288.180	−0.140
Time 3 Psychological control	−387.180	−294.772	−92.408
Time 3 Behavioral control	−201.334	−245.194	43.860
Time 2 Climate change anxiety	−339.955	−342.461	2.506
Time 3 Climate change anxiety	−292.146	−293.244	1.098
Time 2 Generalized anxiety	−476.206	−476.746	0.540
Time 3 Generalized anxiety	−496.391	−496.234	−0.157

Table 3
Results of the structural model of the PLS-SEM (lagged effect model).

	Autonomy support			Psychological control			Inconsistent parenting			Behavioral control		
	b (SE)	95 % CI	f-squared	b (SE)	95 % CI	f-squared	b (SE)	95 % CI	f-squared	b (SE)	95 % CI	f-squared
At Time 1												
Climate change anxiety	−.05 (.05)	[-.14, .04]	.002	.27 (.06)	[.15, .38]	.075	.19 (.06)	[.07, .30]	.036	−.12 (.04)	[-.21, −.03]	.013
Generalized anxiety	−.07 (.04)	[-.15, .02]	.004	.12 (.04)	[.05, .20]	.015	.22 (.04)	[.14, .30]	.053	−.09 (.04)	[-.17, −.01]	.008
At Time 2												
t-1 Climate change anxiety	−.04 (.04)	[-.12, .04]	.002	.01 (.04)	[-.08, .09]	.000	.10 (.05)	[.01, .19]	.014	−.00 (.04)	[-.08, .08]	.000
t-1 Generalized anxiety	−.05 (.04)	[-.13, .03]	.003	.01 (.03)	[-.05, .07]	.000	.05 (.03)	[-.02, .11]	.003	.01 (.03)	[-.06, .08]	.000
t-1 Autoregressive effect	.48 (.03)	[.42, .54]	.293	.65 (.04)	[.57, .73]	.673	.51 (.04)	[.43, .59]	.335	.51 (.04)	[.44, .59]	.338
At Time 3												
t-2 Climate change anxiety	−.07 (.04)	[-.15, .01]	.007	.11 (.07)	[-.01, .24]	.006	.12 (.05)	[.02, .22]	.018	−.01 (.04)	[-.09, .07]	.000
t-2 Generalized anxiety	.01 (.03)	[-.05, .07]	.000	−.02 (.03)	[-.08, .05]	.000	.04 (.04)	[-.02, .11]	.003	.03 (.03)	[-.04, .09]	.001
t-1 Autoregressive effect	.15 (.05)	[.06, .24]	.027	.17 (.06)	[.04, .29]	.024	.10 (.05)	[.01, .02]	.011	.28 (.05)	[.19, .38]	.087
t-2 Autoregressive effect	.52 (.05)	[.42, .62]	.324	.48 (.06)	[.36, .59]	.206	.46 (.05)	[.35, .56]	.205	.39 (.06)	[.27, .51]	.161

Note. SE = bootstrapped standard error. f-squared >.02, .15, and .35 indicate small, medium, and large effect sizes respectively.

practices). Overall, these results highlight the need to consider the potentially harmful effects of climate change anxiety on parents, which may manifest in more maladaptive parenting practices.

How does the experience of climate change anxiety influence parenting practices? Previous studies found that for parents to adopt supportive and nurturing parental behaviors, they need to have sufficient psychological resources (e.g., Mabbe et al., 2018; Van der Kaap-Deeder et al., 2017). When such resources are depleted, parents tend to engage in maladaptive parenting practices, such as being more psychologically controlling and less consistent in their responses to their children's behaviors. The experience of climate change anxiety may deplete parents' psychological resources and thereby make them engage more in maladaptive parenting practices. Our results from the PLS-SEM suggest that this process could happen in an immediate manner (i.e., a contemporaneous effect). That is, we found a concurrent association between climate change anxiety and the two maladaptive parenting practices at Time 2 and Time 3, while controlling for the parenting practices at the prior time point. This notion is consistent with previous studies that mental health conditions bear a contemporaneous impact on parents' daily functioning, including their ability to offer constructive and adaptive nurturing for their children (Borre & Kliewer, 2014; Yang et al., 2021). We also observed that parents who experienced some climate change anxiety at Time 1 reported more engagement in these two parenting practices at Time 3 (i.e., one year later), when controlled for parenting practices at Time 1 and Time 2, suggesting a potential longer-term effect of climate change anxiety. Notably, mental health conditions can influence parenting practices through multiple pathways, including more frequent experiences of stressful life events, a decline in social trust and social network, and a lack of psychological resources, to name a few (e.g., Apsley & Padilla-Walker, 2020; Drake & Ginsburg, 2011). The present study only explored the direct association between climate change anxiety and parenting practices. Future studies will benefit from explicating the processes underlying the influence of climate change anxiety on parenting practices, which also contributes to expanding the scope of the impacts of climate change anxiety beyond pro-environmental behavior.

Another possible mechanism is that parents engage in more psychologically controlling parenting practices as compensatory control. The experience of climate change anxiety can be accompanied by feelings of uncertainty and a sense of powerlessness (Hickman et al., 2021). These feelings may also imply a feeling of losing personal control. Based on the compensatory control theory (Kay et al., 2008; Landau et al., 2015), individuals tend to seek alternative sources to regain a sense of control when they lack personal control. For example, Kay et al. (2008) found that individuals who felt lacking personal control were more likely to support governmental control (a source of secondary control). Other studies also suggest that individuals tend to adopt authoritarian values and behaviors when facing threats with high uncertainty and uncontrollability (e.g., Neerdaels et al., 2024; for a review, see Schnelle et al., 2021). Considering more controlling and less responsive parenting as a form of authoritarian behavior, it is possible that the experience of climate change anxiety activates the need to endorse authoritarianism as a compensatory control response. This possibility warrants future research that directly assesses the role of personal control and the endorsement of authoritarianism by parents who experience climate change anxiety.

Our findings also imply that parents' experience of climate change anxiety can have negative consequences on children via more maladaptive parenting practices. Although we did not examine this possibility directly, the harmful effects of psychologically controlling and inconsistent parenting practices on children's well-being are well-documented by previous studies (e.g., Bradshaw et al., 2024; Dwairy, 2008). Importantly, the current findings also bear implications for how parents may respond to children's anxiety responses to climate change. The more psychologically controlling, more inconsistent, and less autonomy-supporting parenting practices suggest that parents may not actively take care of their children's emotional well-being, including their anxiety about climate change. Instead, these parents may focus more on managing their children based on their personal goals or momentary feelings without being concerned about how their children feel. It is thus possible that these parents are less likely to assist children to cope with and make sense of their climate change anxiety. While previous studies have suggested that parents may communicate climate change issues to their children in different manners (positive versus negative communications; e.g., Ojala & Bengtsson, 2019), it remains uncertain what factors lead parents to engage in constructive or unconstructive conversations with their children. Parents' narration of climate change as a dire threat may represent a crucial source for cultivating fear and anxiety about climate change among children, as previous studies have demonstrated how parents' communication of threat can lead to the risk of developing generalized anxiety disorder among their offspring (e.g., Murray et al., 2009). Furthermore, parents may also adopt an avoidance strategy to cope with their climate change anxiety, such that they are reluctant to discuss climate change with their children (Baker et al., 2021). These possibilities warrant future studies to scrutinize. For example, future studies can examine how parents experiencing climate change anxiety would respond to their children's distress and anxiety about climate change. This future direction can also contribute to understanding how climate change anxiety may be transmitted within a family and identify in what ways parents may successfully cope with their climate change anxiety.

Lastly, given the potential negative impacts of climate change anxiety on parenting practices, it would be crucial for researchers and mental health professionals to help parents build knowledge and cope with their anxiety associated with climate change. For example, it would be crucial to develop programs that can help parents validate their feelings about climate change, develop support groups for them to talk about their thoughts and feelings, and provide them with know-how and guidelines to support their children (e.g., Boehme et al., 2024; Crandon, Scott, et al., 2022; Sanson et al., 2018). As parents can face a dual challenge of managing their own climate change anxiety as well as struggling to support their children to cope with distress associated with climate change, it is critical to develop programs that can handle both challenges. One such program is parent-centered support groups (e.g., ClimateMaMa, Sierra Club's Climate Parents), which can help parents gain knowledge and affirm their roles in supporting their children. Furthermore, such a support group may help them regain psychological resources by satisfying their basic psychological needs for relatedness (i.e., having a sense of connection; Ryan & Deci, 2008). Last but not least, previous studies have suggested that engaging in climate activism could be a way to buffer the mental health impact of climate change anxiety (e.g., Schwartz et al., 2023). In this case, it may be crucial to explore whether participating in collective actions or providing a channel for parents to voice their opinions could help them cope with their climate change anxiety. Such participation may contribute to regaining a sense of control, and therefore, reduce the need to engage in compensatory control through psychologically controlling their children. These suggestions remain to be empirically validated in future studies.

The present study has two noteworthy limitations. First, the present study relies only on a sample of online participants from the United States. As such, our sample is not representative of the U.S. parents, and our results may not be generalizable to all U.S. parents. It is possible that the survey only attracted those who are interested in climate change issues but are yet hesitant to reveal their feelings about climate change. Accordingly, the current study may underestimate the prevalence of climate change anxiety among American parents. Relatedly, climate change anxiety is also less prevalent in the United States than in other countries more vulnerable to climate change impacts (e.g., China and India; Tam et al., 2023). It is thus crucial for future studies to replicate and extend the findings in countries with different prevalence rates of climate change anxiety. Furthermore, this prevalence can also vary across different geographical locations within a country (e.g., coastal

versus non-coastal areas). It is thus important for future studies to examine how the prevalence of climate change anxiety among parents varies according to different geographical locations within the U.S., and test whether our findings can be replicated. Second, the current study relied on parents' self-reports on their parenting practices. Parents may underestimate their maladaptive parenting practices while overestimating their constructive parenting practices (Morsbach & Prinz, 2006). In this case, the current findings may have underestimated the impact of climate change anxiety on maladaptive parenting practices. Future studies can include parent-child dyads, which enable researchers to measure not only children's perceived parenting practices but also how such perceptions would influence their well-being. Notwithstanding these limitations, given that our hypotheses are pre-registered and tested with a three-wave longitudinal design, our findings still offer valuable insights into understanding the underexplored impact of climate change anxiety among parents.

5. Endnote

1. Our pre-registration covers several research projects. We presented only the results on the relationship between climate change anxiety and parenting practices here. In our pre-registration, we also aim to explore the potential associations between climate change anxiety and happiness orientations or consideration for future consequences. As these analyses are exploratory in purpose, we presented these results in Supplementary Information.
2. We also subjected the categorical variable to a series of climate change anxiety (between-subjects) x time (within-subjects) repeated-measures ANCOVA, which allowed us to examine how parenting practices differed at the three time points across the subgroups of parents with different levels of climate change anxiety, while controlling for the effect of generalized anxiety. We conducted these analyses in an earlier version of the manuscript. In hindsight, the lag-2 path analysis can provide a more direct and concise test on the association between climate change anxiety (binary coded variable) and parenting practices (which is our main analysis). We thus opted to remove these results from the main text. For the sake of transparency, we provided a brief summary of our findings below and presented the full results in Supplementary Table S3. We found that parents who experienced some climate change anxiety reported more frequent engagement in psychological controlling and inconsistent parenting at all three time points. We did not observe any significant mean differences in autonomy support and behavioral control. These results were consistent with our main conclusion.

CRediT authorship contribution statement

Hoi-Wing Chan: Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Li Lin:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Kim-Pong Tam:** Writing – review & editing, Investigation.

Declarations of competing interest

None.

Acknowledgments

This research is partially funded by a Departmental Research Fund (P0046089) by the Department of Applied Social Sciences, The Hong Kong Polytechnic University conferred to H.-W. Chan, and by a General Research Fund from the Research Grants Council of the Hong Kong Special Administrative Region, China (Project No. LU15602521) conferred to L. Lin.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jenvp.2025.102798.

References

Apsley, H. B., & Padilla-Walker, L. M. (2020). Longitudinal links between parents' mental health, parenting, and adolescents' mental health: Moderation by adolescent sex. *Journal of Family Psychology, 34*(7), 886–892. https://doi.org/10.1037/fam0000788

Baker, C., Clayton, S., & Bragg, E. (2021). Educating for resilience: Parent and teacher perceptions of children's emotional needs in response to climate change. *Environmental Education Research, 27*(5), 687–705. https://doi.org/10.1080/13504622.2020.1828288

Barber, B. K., Stolz, H. E., Olsen, J. A., Collins, W. A., & Burchinal, M. (2005). Parental support, psychological control, and behavioral control: Assessing relevance across time, culture, and method. *Monographs of the Society for Research in Child Development, 70*, 1–151. https://www.jstor.org/stable/3701442.

Benoit, L., Thomas, I., & Martin, A. (2022). Ecological awareness, anxiety, and actions among youth and their parents–a qualitative study of newspaper narratives. *Child and Adolescent Mental Health, 27*, 47–58. https://doi.org/10.1111/camh.12514

Berry, H. L., Brown, K., & Kjellstrom, T. (2010). Climate change and mental health: A causal pathways framework. *International Journal of Public Health, 55*, 123–132. https://doi.org/10.1007/s00038-009-0112-0

Boehme, B. A. E., Kinsman, L. M., Norrie, H. J., Tessier, E. D., Fleming, S. W., & Asmundson, G. J. H. (2024). Climate anxiety: Current evidence and future directions. *Current Psychiatry Reports*. https://doi.org/10.1007/s11920-024-01538-9. Advanced online publication.

Borre, A., & Kliewer, W. (2014). Parental strain, mental health problems, and parenting practices: A longitudinal study. *Personality and Individual Differences, 68*, 93–97. https://doi.org/10.1016/j.paid.2014.04.014

Bradshaw, E. L., Duineveld, J. J., Conigrave, J. H., Steward, B. A., Ferber, K. A., Joussemet, M., Parker, P. D., & Ryan, R. M. (2024). Disentangling autonomy-supportive and psychologically controlling parenting: A meta-analysis of self-determination theory's dual process model across cultures. *American Psychologist*. https://doi.org/10.1037/amp0001389

Burke, S., Sanson, A., & Van Hoorn, J. (2018). *Guide for parents on the climate crisis: An APS information sheet*. Australian Psychological Society.

Chan, H.-W., Lin, L., Tam, K.-P., & Hong, Y. (2024). From negative feelings to impairments: A longitudinal study on the development of climate change anxiety. *Journal of Anxiety Disorders, 107*, Article 102917. https://doi.org/10.1016/j.janxdis.2024.102917

Chan, H.-W., Tam, K.-P., & Clayton, S. (2024). Testing an integrated model of climate change anxiety. *Journal of Environmental Psychology, 97*, Article 102368. https://doi.org/10.1016/j.jenvp.2024.102368

Clayton, S. (2020). Climate anxiety: Psychological responses to climate change. *Journal of Anxiety Disorders, 74*, Article 102263. https://doi.org/10.1016/j.janxdis.2020.102263

Clayton, S., & Karazsia, B. T. (2020). Development and validation of a measure of climate change anxiety. *Journal of Environmental Psychology, 69*, Article 101434. https://doi.org/10.1016/j.jenvp.2020.101434

Crandon, T. J., Dey, C., Scott, J. G., Thomas, H. J., Ali, S., & Charlson, F. J. (2022). The clinical implications of climate change for mental health. *Nature Human Behaviour, 6*, 1474–1481. https://doi.org/10.1038/s41562-022-01477-6

Crandon, T. J., Scott, J. G., Charlson, F. J., & Thomas, H. J. (2022). A social–ecological perspective on climate anxiety in children and adolescents. *Nature Climate Change, 12*, 123–131. https://doi.org/10.1038/s41558-021-01251-y

Cruz, S. M., & High, A. C. (2022). Psychometric properties of the climate change anxiety scale. *Journal of Environmental Psychology, 84*, Article 101905. https://doi.org/10.1016/j.jenvp.2022.101905

Danner-Vlaardingerbroek, G., Kluwer, E. S., van Steenbergen, E. F., & van der Lippe, T. (2013). The psychological availability of dual-earner parents for their children after work. *Family Relations, 62*, 741–754. https://doi.org/10.1111/fare.12039

Dash, G., & Paul, J. (2021). CB-SEM vs PLS-SEM methods for research in social sciences and technology forecasting. *Technological Forecasting and Social Change, 173*, Article 121092. https://doi.org/10.1016/j.techfore.2021.121092

Doherty, T. J., & Clayton, S. (2011). The psychological impacts of global climate change. *American Psychologist, 66*, 265–276. https://doi.org/10.1037/a0023141

Drake, K. L., & Ginsburg, G. S. (2011). Parenting practices of anxious and nonanxious mothers: A multi-method, multi-informant approach. *Child & Family Behavior Therapy, 33*, 299–321. https://doi.org/10.1080/07317107.2011.623101

Dwairy, M. A. (2008). Parental inconsistency versus parental authoritarianism: Associations with symptoms of psychological disorders. *Journal of Youth and Adolescence, 37*, 616–626. https://doi.org/10.1007/s10964-007-9169-3

Epkins, C. C., & Harper, S. L. (2016). Mothers' and fathers' parental warmth, hostility/rejection/neglect, and behavioral control: Specific and unique relations with parents' depression versus anxiety symptoms. *Parenting: Science and Practice, 16*, 125–145. https://doi.org/10.1080/15295192.2016.1134991

Gago, T., Sargisson, R. J., & Milfont, T. L. (2024). A meta-analysis on the relationship between climate anxiety and wellbeing. *Journal of Environmental Psychology, 94*, Article 102230. https://doi.org/10.1016/j.jenvp.2024.102230

Galea, S., Brewin, C. R., Gruber, M., Jones, R. T., King, D. W., King, L. A., McNally, R. J., Ursano, R. J., Petukhova, M., & Kessler, R. C. (2007). Exposure to hurricane-related

stressors and mental illness after Hurricane Katrina. *Archives of General Psychiatry, 64*, 1427–1434. https://doi.org/10.1001/archpsyc.64.12.1427

Galway, L. P., & Field, E. (2023). Climate emotions and anxiety among young people in Canada: A national survey and call to action. *The Journal of Climate Change and Health, 9*, Article 100204. https://doi.org/10.1016/j.joclim.2023.100204

Gaziulusoy, A. I. (2020). The experiences of parents raising children in times of climate change: Towards a caring research agenda. *Current Research in Environmental Sustainability, 2*, Article 100017. https://doi.org/10.1016/j.crsust.2020.100017

Hair Jr, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: Updated guidelines on which method to use. *International Journal of Multivariate Data Analysis, 1*, 107–123. https://doi.org/10.1504/IJMDA.2017.087624

Hanetz-Gamliel, K., Levy, S., & Dollberg, D. G. (2021). Mediation of mothers' anxiety and parenting in children's behavior problems during COVID-19. *Journal of Child and Family Studies, 30*, 2732–2743. https://doi.org/10.1007/s10826-021-02115-x

Heeren, A., & Asmundson, G. J. (2023). Understanding climate anxiety: What decision-makers, health care providers, and the mental health community need to know to promote adaptative coping. *Journal of Anxiety Disorders, 93*, Article 102654. https://doi.org/10.1016/j.janxdis.2022.102654

Heeren, A., Mouguiama-Daouda, C., & McNally, R. J. (2023). A network approach to climate change anxiety and its key related features. *Journal of Anxiety Disorders, 93*, Article 102625. https://doi.org/10.1016/j.janxdis.202.102625

Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R. E., Mayall, E. E., Wray, B., Mellor, C., & Van Susteren, L. (2021). Climate anxiety in children and young people and their beliefs about government responses to climate change: A global survey. *The Lancet Planetary Health, 5*, e863–e873. https://doi.org/10.1016/S2542-5196(21)00278-3

Hodgins, H. S. (2008). Motivation, threshold for threat, and quieting the ego. In H. A. Wayment, & J. J. Bauer (Eds.), *Transcending self-interest* (pp. 117–124). Washington, DC: American Psychological Association.

Kay, A. C., Gaucher, D., Napier, J. L., Callan, M. J., & Laurin, K. (2008). God and the government: Testing a compensatory control mechanism for the support of external systems. *Journal of Personality and Social Psychology, 95*(1), 18–35. https://doi.org/10.1037/0022-3514.95.1.18

Landau, M. J., Kay, A. C., & Whitson, J. A. (2015). Compensatory control and the appeal of a structured world. *Psychological Bulletin, 141*(3), 694–722. https://doi.org/10.1037/a0038703

Larionow, P., Sołtys, M., Izdebski, P., Mudło-Głagolska, K., Golonka, J., Demski, M., & Rosińska, M. (2022). Climate change anxiety assessment: The psychometric properties of the polish version of the climate anxiety scale. *Frontiers in Psychology, 13*, Article 870392. https://doi.org/10.3389/fpsyg.2022.870392

Léger-Goodes, T., Malboeuf-Hurtubise, C., Hurtubise, K., Simons, K., Boucher, A., Paradis, P. O., … Généreux, M. (2023). How children make sense of climate change: A descriptive qualitative study of eco-anxiety in parent-child dyads. *PLoS One, 18*(4), Article e0284774. https://doi.org/10.1371/journal.pone.0284774

Lucas, R. E. (2023). Why the cross-lagged panel model is almost never the right choice. *Advances in Methods and Practices in Psychological Science, 6*(1), Article 25152459231158378. https://doi.org/10.1177/25152459231158378

Lykins, A. D., Bonich, M., Sundaraja, C., & Cosh, S. (2024). Climate change anxiety positively predicts antenatal distress in expectant female parents. *Journal of Anxiety Disorders, 101*, Article 102801. https://doi.org/10.1016/j.janxdis.2023.102801

Ma, T., Moore, J., & Cleary, A. (2022). Climate change impacts on the mental health and wellbeing of young people: A scoping review of risk and protective factors. *Social Science & Medicine, 301*, Article 114888. https://doi.org/10.1016/j.socscimed.2022.114888

Mabbe, E., Soenens, B., Vansteenkiste, M., van der Kaap-Deeder, J., & Mouratidis, A. (2018). Day-to-day variation in autonomy-supportive and psychologically controlling parenting: The role of parents' daily experiences of need satisfaction and need frustration. *Parenting: Science and Practice, 18*, 86–109. https://doi.org/10.1080/15295192.2018.1444131

Marczak, M., Wierzba, M., Zaremba, D., Kulesza, M., Szczypiński, J., Kossowski, B., … Marchewka, A. (2023). Beyond climate anxiety: Development and validation of the inventory of climate emotions (ICE): A measure of multiple emotions experienced in relation to climate change. *Global Environmental Change, 83*, Article 102764. https://doi.org/10.1016/j.gloenvcha.2023.102764

Morsbach, S. K., & Prinz, R. J. (2006). Understanding and improving the validity of self-report of parenting. *Clinical Child and Family Psychology Review, 9*, 1–21. https://doi.org/10.1007/s10567-006-0001-5

Murayama, K., & Gfrörer, T. (2024). Thinking clearly about time-invariant confounders in cross-lagged panel models: A guide for choosing a statistical model from a causal inference perspective. In *Psychological methods*Advanced Online Publication. https://doi.org/10.1037/met0000647.

Murray, L., Creswell, C., & Cooper, P. J. (2009). The development of anxiety disorders in childhood: An integrative review. *Psychological Medicine, 39*, 1413–1423. https://doi.org/10.1017/S0033291709005157

Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide* (8th ed.). Los Angeles, CA: Muthén & Muthén.

Neerdaels, J., Teymoori, A., Tröster, C., & Van Quaquebeke, N. (2024). When lack of control leads to uncertainty: Explaining the effect of anomie on support for authoritarianism. In *Journal of personality and social psychology*Advanced Online Publication. https://doi.org/10.1037/pspi0000483.

Nylund-Gibson, K., & Choi, A. Y. (2018). Ten frequently asked questions about latent class analysis. *Translational Issues in Psychological Science, 4*(4), 440–461. https://doi.org/10.1037/tps0000176

Ogunbode, C. A., Doran, R., Hanss, D., Ojala, M., Salmela-Aro, K., van den Broek, K. L., Bhullar, N., Aquino, S. D., Marot, T., Schermer, J. A., Wlodarczyk, A., Lu, S., Jiang, F., Maran, D. A., Yadav, R., Ardi, R., Chegeni, R., Ghanbarian, E., Zand, S., Najafi, R., … Karasu, M. (2022). Climate anxiety, wellbeing and pro-environmental action: Correlates of negative emotional responses to climate change in 32 countries. *Journal of Environmental Psychology, 84*, Article 101887. https://doi.org/10.1016/j.jenvp.2022.101887

Ojala, M., & Bengtsson, H. (2019). Young people's coping strategies concerning climate change: Relations to perceived communication with parents and friends and proenvironmental behavior. *Environment and Behavior, 51*(8), 907–935. https://doi.org/10.1177/0013916518763894

Palinkas, L. A., & Wong, M. (2020). Global climate change and mental health. *Current Opinion in Psychology, 32*, 12–16. https://doi.org/10.1016/j.copsyc.2019.06.023

Parmentier, M. L., Weiss, K., Aroua, A., Betry, C., Rivière, M., & Navarro, O. (2024). The influence of environmental crisis perception and trait anxiety on the level of eco-worry and climate anxiety. *Journal of Anxiety Disorders, 101*, Article 102799. https://doi.org/10.1016/j.janxdis.2023.102799

Roemer, E. (2016). A tutorial on the use of PLS path modeling in longitudinal studies. *Industrial Management & Data Systems, 116*(9), 1901–1921. https://doi.org/10.1108/IMDS-07-2015-0317

Ryan, R. M., & Deci, E. L. (2008). A self-determination theory approach to psychotherapy: The motivational basis for effective change. *Canadian Psychology/Psychologie Canadienne, 49*(3), 186–193. https://doi.org/10.1037/a0012753

Sanson, A. V., Burke, S. E. L., & Van Hoorn, J. (2018). Climate change: Implications for parents and parenting. *Parenting: Science and Practice, 18*, 200–217. https://doi.org/10.1080/15295192.2018.1465307

Schelhas, I., & Gast, M. (2024). "I owe it to my daughter": How parents deal with the climate crisis. Psychodynamic interviews with parents committed to climate protection. *Psychoanalytic Study of the Child, 77*, 402–414. https://doi.org/10.1080/00797308.2023.2287384

Schnelle, C., Baier, D., Hadjar, A., & Boehnke, K. (2021). Authoritarianism beyond disposition: A literature review of research on contextual antecedents. *Frontiers in Psychology, 12*, Article 676093. https://doi.org/10.3389/fpsyg.2021.676093

Schwartz, S. E., Benoit, L., Clayton, S., Parnes, M. F., Swenson, L., & Lowe, S. R. (2023). Climate change anxiety and mental health: Environmental activism as buffer. *Current Psychology, 42*(20), 16708–16721. https://doi.org/10.1007/s12144-022-02735-6

Skinner, E., Johnson, S., & Snyder, T. (2005). Six dimensions of parenting: A motivational model. *Parenting: Science and Practice, 5*, 175–235. https://doi.org/10.1207/s15327922par0502_3

Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine, 166*, 1092–1097. https://doi.org/10.1001/archinte.166.10.1092

Sweeney, S., & Wilson, C. (2023). Parental anxiety and offspring development: A systematic review. *Journal of Affective Disorders, 327*, 64–78. https://doi.org/10.1016/j.jad.2023.01.128

Tam, K. P., Chan, H. W., & Clayton, S. (2023). Climate change anxiety in China, India, Japan, and the United States. *Journal of Environmental Psychology, 87*, Article 101991. https://doi.org/10.1016/j.jenvp.2023.101991

Tunstall, S., Tapsell, S., Green, C., Floyd, P., & George, C. (2006). The health effects of flooding: Social research results from England and Wales. *Journal of Water and Health, 4*, 365–380. https://doi.org/10.2166/wh.2006.031

van der Kaap-Deeder, J., Vansteekiste, M., Soenen, B., & Mabbe, E. (2017). Children's daily well-being: The role of mothers', teachers', and siblings' autonomy support and psychological control. *Developmental Psychology, 53*, 237–251. https://doi.org/10.1037/dev0000218

van Dijk, S., van Schie, K., Smeets, T., & Mertens, G. (2025). Limited consensus on what climate anxiety is: Insights from content overlap analysis on 12 questionnaires. *Journal of Anxiety Disorders, 109*, Article 102957. https://doi.org/10.1016/j.janxdis.2024.102957

Van Valkengoed, A. M., Steg, L., & De Jonge, P. (2023). Climate anxiety: A research agenda inspired by emotion research. *Emotion Review, 15*(4), 258–262. https://doi.org/10.1177/17540739231193752

Wang, J., Kaufamn, T., & Branje, S. (2023). Longitudinal associations of parental psychological control and friend support with autonomy during early adolescence. *Journal of Research on Adolescence, 33*, 999–1010. https://doi.org/10.1111/jora.12851

Wang, Q., Pomerantz, E. M., & Chen, H. (2007). The role of parents' control in early adolescents' psychological functioning: A longitudinal investigation in the United States and China. *Child Development, 78*, 1592–1610. https://doi.org/10.1111/j.1467-8624.2007.01085.x

Whitlock, J. (2023). Climate change anxiety in young people. *Nature Mental Health, 1*, 297–298. https://doi.org/10.1038/s44220-023-00059-3

Whitmarsh, L., Player, L., Jiongco, A., James, M., Williams, M., Marks, E., & Kennedy-Williams, P. (2022). Climate anxiety: What predicts it and how is it related to climate action? *Journal of Environmental Psychology, 83*, Article 101866. https://doi.org/10.1016/j.jenvp.2022.101866

Wortzel, J. D., Denga, V. S., Angrish, J., Dooley, L., Manjón, I., Shabdar, S., Lykins, A. D., Cosh, S., Pain, P. A., Olagunju, A. T., & McKowen, J. (2024). Pediatric climate distress: A scoping review and clinical resource. *The Journal of Climate Change and Health, 20*, Article 100349. https://doi.org/10.1016/j.joclim.2024.100349

Wullenkord, M. C., Johansson, M., Loy, L. S., Menzel, C., & Reese, G. (2024). Go out or stress out? Exploring nature connectedness and cumulative stressors as resilience and vulnerability factors in different manifestations of climate anxiety. *Journal of Environmental Psychology, 95*, Article 102278. https://doi.org/10.1016/j.jenvp.2024.102278

Xu, F., Cui, W., & Lawrance, P. J. (2020). The intergenerational transmission of anxiety in a Chinese population: The mediation effect of parental control. *Journal of Child and Family Studies, 29*, 1669–1678. https://doi.org/10.1007/s10826-019-01675-3

Yaffe, Y. (2021). A narrative review of the relationship between parenting and anxiety disorders in children and adolescents. *International Journal of Adolescence and Youth, 26*, 449–459. https://doi.org/10.1080/02673843.2021.1980067

Yang, B., Chen, B.-B., Qu, Y., & Zhu, Y. (2021). Impacts of parental burnout on Chinese youth's mental health: The role of parents' autonomy support and emotional regulation. *Journal of Youth and Adolescence, 50*, 1679–1692. https://doi.org/10.1007/s10964-021-01450-y