When Climate Change Skepticism Coexists with Environmental Activism: Organizational Engagement as a Boundary Condition among Indonesian Student Environmentalists

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Abstract

Climate change skepticism (CCS) is generally assumed to hinder pro-environmental behavior, yet empirical evidence suggests that this relationship is conditional rather than universal. This study examines the moderating role of organizational engagement (OE) in the relationship between CCS and environmental activism behavior (EAB) among active *Mahasiswa Pecinta Alam* (Mapala) members in Indonesia. Participants were 530 active Mapala members from six provinces in Java, Indonesia. Data were analyzed using latent moderated structural equations (LMS) to test the interaction between CCS and OE on EAB. Results showed organizational engagement significantly moderates the relationship between CCS and EAB. Organizational engagement strengthens the positive relationship between CCS and EAB. The positive association between CCS and EAB was significant across most levels of organizational engagement, except at very low levels. These findings suggest that organizational engagement constitutes a boundary condition of the association between climate change skepticism and environmental activism. Organizational experiences, group identity, and organizational norms may provide additional sources of motivation for environmental action, although these mechanisms were not directly examined. This study extends the literature on CCS and pro-environmental behavior, which has predominantly focused on Western contexts, by demonstrating that organizational engagement may provide an additional organizational context for environmental activism in a developing country context characterized by high skepticism.

Keywords: climate change skepticism, organizational engagement, environmental activism, moderation, latent moderated structural equations

1. Introduction

Climate change represents one of the most pressing global challenges of the 21st century. The Intergovernmental Panel on Climate Change (IPCC) report warns that between 2030 and 2040, global temperatures could exceed the 1.5°C threshold. In the absence of mitigation efforts, global temperatures are projected to surpass 2°C by 2050 and 3°C by the end of the

century, resulting in consequences such as food crises, floods, droughts, wildfires, and increased global mortality rates (IPCC, 2023). In addressing these threats, climate change mitigation relies not only on technological advancements but also on the willingness of individuals and communities to engage in concrete actions that support environmental sustainability (Steg, 2023).

Indonesia, despite being one of the countries with the highest carbon emissions globally, recorded the highest level of climate change skepticism among the 23 countries surveyed in the YouGov-Cambridge Globalism Project (YouGov, 2019). Similarly, the majority of the Indonesian population does not yet perceive climate change as a consequence of human activities (Development Dialogue Asia, 2022). This paradox establishes Indonesia as a critical context for examining how climate change skepticism interacts with contextual factors in shaping pro-environmental behavior.

1.1 Climate Change Skepticism and Environmental Action

Climate change skepticism (CCS) is a belief that rejects or doubts the scientific consensus regarding the reality, causes, and impacts of climate change (Dunlap, 2013; Whitmarsh, 2011). Several studies indicate that CCS is negatively associated with support for climate change mitigation policies (Akter et al., 2012; Engels et al., 2013). Conversely, a stronger acceptance of the reality and anthropogenic causes of climate change is positively associated with pro-environmental intentions and behavior (Hornsey, Fielding, et al., 2016). Based on these findings, individuals with higher levels of CCS are generally expected to be less supportive of actions explicitly linked to climate change mitigation.

Nevertheless, climate change skepticism is not always accompanied by a rejection of all forms of environmental concern or action. Indeed, several studies demonstrate that skeptical individuals may still engage in pro-environmental behavior driven by different motivations. Haltinner & Sarathchandra (2022) found that skeptical individuals' environmental concern tends to be higher regarding concrete issues such as air pollution, water pollution, and nature conservation, compared to issues explicitly related to climate change. Furthermore, Sarathchandra & Haltinner (2023) demonstrated that concern for concrete environmental issues can predict skeptical individuals' support for clean energy policies, even when distrust in science exerts a negative influence.

These findings indicate that CCS does not uniformly eliminate the motivation for environmental action. The behavioral consequences of CCS likely depend on how environmental issues are perceived and on the presence of alternative motivational sources

beyond individual beliefs regarding climate change. Such sources of motivation may include concern for local issues, the direct benefits of actions, group identity, and the behavioral norms cultivated within a community or organization. Therefore, the relationship between CCS and environmental action should be understood as conditional rather than universal.

1.2 Environmental Activism Behavior as Collective Action

Pro-environmental behavior is generally defined as actions that contribute to environmental sustainability by reducing negative impacts or providing benefits to the environment (Steg & Vlek, 2009). However, in the context of the climate crisis, behavioral change at the individual level alone is insufficient to generate systemic change. Efforts to address climate change also require collective and public actions capable of influencing policies, institutions, and social norms (Chater & Loewenstein, 2022).

One form of such action is environmental activism behavior (EAB). Stern (2000) conceptualizes environmental activism as a form of pro-environmental behavior that encompasses active involvement in environmental organizations and public actions to drive change.

While conceptually related to private-sphere pro-environmental behavior, EAB in the present study encompasses a broader range of environmentally oriented actions with social and public dimensions—from interpersonal advocacy and financial support for movements, to organized collective action and direct political engagement. This construct can encompass membership and active involvement in environmental groups, participation in political actions, attendance at public meetings, advocacy activities, and actions aimed at influencing policy decisions or environmental management (Edwards & Oskamp, 1992; Manzo & Weinstein, 1987; McFarlane & Hunt, 2006; Stern et al., 1995). Although operationalized through various indicators, the core of EAB is action directed toward social or structural change, encompassing a range of environmentally significant actions, from individual expressive behaviors to collective structural engagement.

This conceptualization acknowledges that environmental activism is not limited to high-threshold political actions alone. In the contemporary digital context, information dissemination through social media has been recognized as a form of environmental activism that contributes to public awareness, norm signaling, and collective identity expression within environmental movements (Ackland & O'Neil, 2011). Interpersonal advocacy—including discussing environmental issues with peers and family—constitutes an important mechanism

through which environmental norms and motivations diffuse across social networks (Nolan et al., 2008). Financial contributions to environmental movements represent a form of participatory support that enables collective environmental action (McCarthy & Zald, 1977). Purchasing products from environmentally conscious brands reflects political consumerism—a form of market-based political participation directed at influencing corporate behavior and environmental markets(Micheletti, 2003; Stolle & Micheletti, 2013). Interpersonal norm enforcement, such as politely challenging environmentally harmful behavior, reflects social sanctioning processes that sustain collective environmental norms within and beyond the organizational context (Schultz et al., 2007). Together, these behaviors form a continuum of activism that begins with expressive and interpersonal actions and extends to organized public and political engagement.

Empirical evidence indicates that individual characteristics alone are insufficient to explain EAB. A meta-analysis by Bamberg & Möser (2007) found that variables from the Norm Activation Theory and the Theory of Planned Behavior explained 52% of the variance in intention, but only 27% of the variance in actual environmental behavior. This gap suggests that the translation of intention into actual behavior is also influenced by social and contextual conditions. Wakefield et al. (2006) also demonstrated that social networks play a crucial role in encouraging participation in public meetings and environmental demonstrations.

The social movement perspective specifically conceptualizes environmental activism as an outcome of micromobilization processes. Tindall et al. (2003) demonstrated that network ties, communication frequency, movement identification, and organizational involvement collectively explain a greater proportion of the variance in environmental activism than demographic variables. Kempton & Holland (2003) also found that collective identity more strongly explains environmental citizenship actions, such as attending meetings and contacting public officials, compared to individual consumer behavior. However, when framed as political consumerism — market-based participation directed at structural change (Micheletti, 2003) — purchasing behavior may carry collective implications that extend beyond purely private consumption.

Overall, these findings indicate that EAB is a form of action embedded within social relationships, collective identities, and organizational contexts. Consequently, the relationship between individual beliefs, such as CCS, and EAB likely depends on the extent to which an individual is connected to and involved in an environmental organization.

1.3 Organizational Engagement as a Boundary Condition

The younger generation represents a group whose environmental values and beliefs are still developing, potentially making them more open to engaging in pro-environmental actions (Whitley et al., 2018). Within this demographic, university students occupy a crucial position as they represent an educated cohort with the potential to become future leaders and decision-makers, and have historically acted as agents of social change (Stephens et al., 2008). Nevertheless, students' environmental actions are determined not only by personal knowledge, attitudes, or values, but also by the social contexts within which they interact (Kurisu, 2015).

One relevant social context is student organizations. Through organizational involvement, students interact with other members and receive repeated exposure to group values, norms, and practices. In Indonesia, *Mahasiswa Pecinta Alam* or Mapala refers to student organizations focused on nature and environmental activities. Mapala can serve as a context for identity formation and environmental action through educational, advocacy, and conservation activities, as well as direct engagement with local environmental issues (Aswandi & Manda, 2023; Shadiqi et al., 2024). However, organizational membership status alone does not inherently imply a uniform level of involvement. Some members may only be registered administratively, whereas others invest time, energy, attention, and identity into organizational activities.

These differences can be explained using Student Involvement Theory. Astin (1984) defines involvement as the investment of students' physical and psychological energy in the educational experience and campus life. The development attained by students is posited to be proportional to the quality and quantity of their involvement. Subsequent conceptualizations view engagement as a multidimensional construct encompassing behavioral, affective, and cognitive investments (Steinhardt et al., 2022). Consequently, organizational engagement (OE) in this study refers not merely to membership status, but to the level of members' behavioral, affective, and cognitive investment in environmental organizations.

Organizational engagement can serve as a condition that modifies the relationship between CCS and EAB. Members with higher OE have greater opportunities to participate in organizational activities, interact with other members, and gain exposure to norms that support environmental action. Through this process, group identity and organizational norms can provide sources of motivation for EAB that are not entirely dependent on individual beliefs regarding climate change. This explanation aligns with the Social Identity Model of Pro-

Environmental Action, which posits group identity, collective norms, and beliefs regarding group efficacy as the foundation for collective pro-environmental action (Fritsche et al., 2018).

Among members with low OE, the relationship between CCS and EAB may primarily reflect personal beliefs and motivations. Conversely, among members with high OE, this relationship may alter because environmental action is also linked to organizational experiences, group norms, and collective identification. However, the extant literature does not provide an adequate basis to determine whether OE merely attenuates the negative relationship between CCS and EAB or alters the relationship into a different pattern. Therefore, while the presence of a moderating effect can be theoretically predicted, the specific direction of the interaction requires empirical testing.

1.4 Research Gap and the Present Study

Although the relationship between CCS and pro-environmental behavior has been extensively studied, at least four limitations exist in prior literature. First, previous studies have generally focused on the direct effects of CCS on policy support, intentions, or pro-environmental behavior. Second, relatively less attention has been directed toward EAB as a collective and public-oriented form of action. Third, the organizational conditions that may alter the relationship between climate change beliefs and environmental activism remain inadequately understood. Fourth, the majority of evidence concerning CCS originates from Western contexts; thus, it remains unknown whether similar relational patterns apply in developing countries with relatively high levels of skepticism, such as Indonesia (Hornsey, Harris, et al., 2016; Whitmarsh, 2011).

This study examines whether OE moderates the relationship between CCS and EAB among active Mapala members in Indonesia. Drawing on Student Involvement Theory (Astin, 1984) and the multidimensional conceptualization of engagement by Steinhardt et al. (2022) OE is operationalized as members' behavioral, affective, and cognitive investment in environmental organizations. By focusing on EAB, rather than merely personal-sphere environmental behavior, this study investigates whether organizational involvement constitutes a boundary condition linking personal climate change beliefs with collective environmental action. This study proposes the following non-directional hypothesis:

H1. Organizational engagement moderates the association between climate change skepticism and environmental activism behavior among active Mapala members.

1.5 Ethical Statement

The present study was reviewed and ethically approved by the Ethics Committee of the National Scientific Psychology Consortium (KPIN), protocol No. 314/2025 Etik/KPIN.

2. Methods

2.1 Participants

Participants were recruited through social media platforms using a convenience sampling technique through the researchers' personal and professional networks. Participants completed an online questionnaire and provided informed consent prior to participation. Information regarding the research objectives and participation procedures was provided before data collection. A total of 530 active undergraduate members of university environmental organizations, locally known as *Mapala*, from six provinces in Java, Indonesia, participated in the study. The average age of participants was 19.75 years (SD = 1.40), and 54.0% were female (n = 286). Data were collected over a six-month period, from September to January 2025.

Although sample size requirements in SEM depend on model complexity, estimation method, distributional characteristics, and parameter stability, sample size is often evaluated relative to the number of observed indicators. The present study had approximately 15 participants per indicator, exceeding commonly cited indicator-based recommendations of 5 to 10 cases per observed variable (Bentler & Chou, 1987; Nunnally, 1967; Wang & Wang, 2020).

2.2 Measures

2.2.1 Climate Change Skepticism (CCS)

CCS was measured using an adapted version of the Climate Change Skepticism Questionnaire (CCS-Q) from de Graaf et al. (2023). The cross-cultural adaptation adhered to the International Test Commission (ITC, 2017). guidelines. Following a forward-backward translation procedure, the initial 12 items were evaluated by a panel of five experts to ensure semantic equivalence and conceptual relevance, yielding a Scale-Content Validity Index (S-CVI) of 1.00. Participants responded on a 7-point Likert scale (1 = Strongly Disagree; 7 = Strongly Agree).

2.2.2 Organizational Engagement (OE)

Organizational Engagement (OE) was measured using an instrument developed by the researchers, based on the scale development guidelines by Boateng et al. (2018) and the engagement dimension framework by Steinhardt et al. (2022). Content validity was evaluated

through expert judgment by a panel of five experts, yielding a Scale-Content Validity Index (S-CVI) of 1.00 for the 15 items, all of which were retained. The instrument comprises 15 items utilizing a 5-point response scale (1 = Not at all descriptive; 5 = Highly descriptive).

2.2.3 Environmental Activism Behavior (EAB)

Environmental Activism Behavior (EAB) was measured using an instrument developed by the researchers, following the scale development procedures outlined by Boateng et al. (2018). This instrument was developed based on the public-sphere behavior dimension of Stern (2000) taxonomy of pro-environmental behavior, with particular reference to the public-sphere behavior dimension. The instrument was designed to capture a continuum of environmentally oriented behaviors, from interpersonal and expressive forms to organized collective and political actions, reflecting the range of engagement opportunities available to student activists in the Indonesian context. Content validity was evaluated through expert judgment by a panel of five experts, yielding a Scale-Content Validity Index (S-CVI) of 1.00. The instrument comprises 9 items utilizing a 5-point response scale (1 = Never; 5 = Always).

3. Data Analysis

The estimation procedure consisted of two main parts: the measurement model and the structural model (Maslowsky et al., 2015). First, confirmatory factor analysis (CFA) was conducted to evaluate the measurement model of each variable separately and the simultaneous measurement model. Second, following the latent moderated structural equations procedure, a main-effects model without the latent interaction term was estimated as Model 0. Then, a latent moderated structural equation model (LMS) (Klein & Moosbrugger, 2000) including the CCS × OE interaction term was estimated as Model 1 using the LMS approach. Because conventional fit indices are not available for LMS models with latent interactions, the fit of Model 1 was evaluated by comparing its loglikelihood with that of Model 0 using a log-likelihood ratio test (Maslowsky et al., 2015).

All analyses were performed using Mplus version 8.6 (Muthén & Muthén, 2021a). For the latent interaction model, the XWITH command was used to specify the interaction between CCS and OE. Because latent interaction models in Mplus require numerical integration, Model 1 was estimated using TYPE = RANDOM and ALGORITHM = INTEGRATION. Prior to estimating the LMS model, all observed indicators were standardized to facilitate the interpretation of model parameters (Muthén & Muthén, 2021b).

The MLR estimator was used because it provides robust standard errors and a scaled chi-square statistic (χ^2) that is less sensitive to violations of multivariate normality than conventional maximum likelihood estimation (Muthén & Muthén, 2021b; Rhemtulla et al., 2012; Satorra & Bentler, 1994). Although a non-significant χ^2 value is conventionally desirable, this criterion was interpreted cautiously because highly sensitive to large sample sizes(Kline, 2023). Therefore, model fit was evaluated using multiple fit indices, including the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA) with its 90% confidence interval, and Standardized Root Mean Square Residual (SRMR). CFI and TLI values of .90 or higher were considered acceptable, whereas RMSEA and SRMR values of approximately .08 or lower were considered acceptable (Bentler, 1990; Browne & Cudeck, 1992; Hu & Bentler, 1999; MacCallum et al., 1996).

Internal consistency was estimated using CFA-based reliability following Raykov's approach (Raykov, 1997, 2004) rather than relying solely on Cronbach's alpha (Cronbach, 1951). This approach was selected because Cronbach's alpha assumes tau-equivalence and uncorrelated measurement errors, assumptions that are often unrealistic in latent variable modeling (Cho & Kim, 2015; Lord & Novick, 2008; Raykov, 1997). Reliability coefficients of .70 or higher were interpreted as acceptable(Kaplan & Saccuzo, 2005).

4. Results

4.1 Descriptive statistics

Item-level descriptive statistics were evaluated prior to structural modeling. For the 11 CCS items (1–7 response scale), item means ranged from 2.06 to 3.26 (SD = 1.10–1.60). The items with the lowest means were C3 (M = 2.11, SD = 1.25), C6 (M = 2.38, SD = 1.28), C7 (M = 2.69, SD = 1.15), and C12 (M = 2.06, SD = 1.10). For the 15 OE items (1–5 response scale), item means ranged from 3.61 to 4.13 (SD = 0.76–0.87). Items O1 (M = 3.83, SD = 0.82) and O2 (M = 3.85, SD = 0.81) demonstrated similar mean and standard deviation values. Furthermore, for the 9 EAB items (1–5 response scale), item means ranged from 2.44 to 3.74 (SD = 0.85–1.33). Items E8 (M = 2.44, SD = 1.28) and E9 (M = 2.77, SD = 1.33) recorded the lowest means among all EAB items. Overall, the skewness and excess kurtosis values for all items were within acceptable limits; no items across the three scales exceeded the absolute thresholds of skewness > 2.0 or excess kurtosis > 7.0 (Finney & DiStefano, 2013).

4.2 Measurement model

Table 1 presents the fit indices of the measurement models evaluated in this study. For CCS, both the one-factor and four-factor models showed inadequate fit to the data. Therefore, a bifactor model was considered by specifying a general CCS factor and an additional method-effect factor for the reversed items, namely items 3, 6, 7, and 12. This bifactor specification improved the model fit substantially, although the 12-item solution still did not fully meet the expected criteria. After removing item 1, which had the lowest standardized factor loading, the 11-item bifactor model demonstrated acceptable fit.

Table 1. *Fit Indices of the Measurement Models*

Model	Scaled χ^2 (*df*)	RMSEA [90% CI]	CFI	TLI	SRMR
CCS					
1 factor (12 items)	452.751 (54)***	.118 [.108, .128]	.770	.719	.080
4 factor (12 items)	426.433 (48)***	.122 [.111, .133]	.782	.700	.080
Bifactor (12 items)	220.502 (50)***	.080 [.070, .091]	.902	.870	.054
Bifactor (11 items)	108.078 (40)***	.057 [.044, .070]	.956	.940	.035
OE					
3 factors (15 items)	200.614 (87)***	.050 [.041, .059]	.961	.953	.032
1 factor + 1 C.E (15 items)	246.235 (89)***	.058 [.049, .066]	.946	.936	.036
EAB					
1 factor (9 items)	212.265 (27)***	.114 [.100, .128]	.907	.876	.047
1 factor + 1 C.E (9 items)	108.945 (26)***	.078 [.063, .093]	.958	.942	.035
Simultaneous model					
CCS, OE, and EAB (35 items)	1263.106 (551)***	.049 [.046, .053]	.915	.908	.067

Note: χ^2 S-B = MLR-scaled chi-square statistic; df = degree of freedom; C.E = correlated error; RMSEA [90% CI] = root mean square error of approximation with 90% confidence interval; SRMR = standardized root mean square residual; CFI = comparative fit index; TLI = Tucker–Lewis index; * = $p < .05$; ** = $p < .01$; *** = $p < .001$

For OE, the three-factor model showed acceptable global fit. However, the correlations among the three factors were very high, with AE–EE = .888, AE–BE = .906, and EE–BE = .861, exceeding the commonly used threshold for discriminant validity (Brown, 2015). This indicated that the proposed OE factors were not sufficiently differentiated in the present data. Therefore, a more parsimonious unidimensional OE model with one correlated error between item 1 and item 2 was retained for subsequent analyses. For EAB, the initial one-factor model did not provide adequate fit. After allowing the residuals of E8 and E9 to correlate, the revised one-factor model showed acceptable fit. Thus, the revised unidimensional EAB model was retained for the structural analyses.

Finally, the final measurement models for CCS, OE, and EAB were estimated simultaneously. This simultaneous measurement model incorporated the 11-item bifactor CCS structure with a method-effect factor for reversed items, the unidimensional OE model with

one correlated error, and the unidimensional EAB model with one correlated error. The simultaneous model showed acceptable fit, supporting the adequacy of the final measurement structure before testing the structural model.

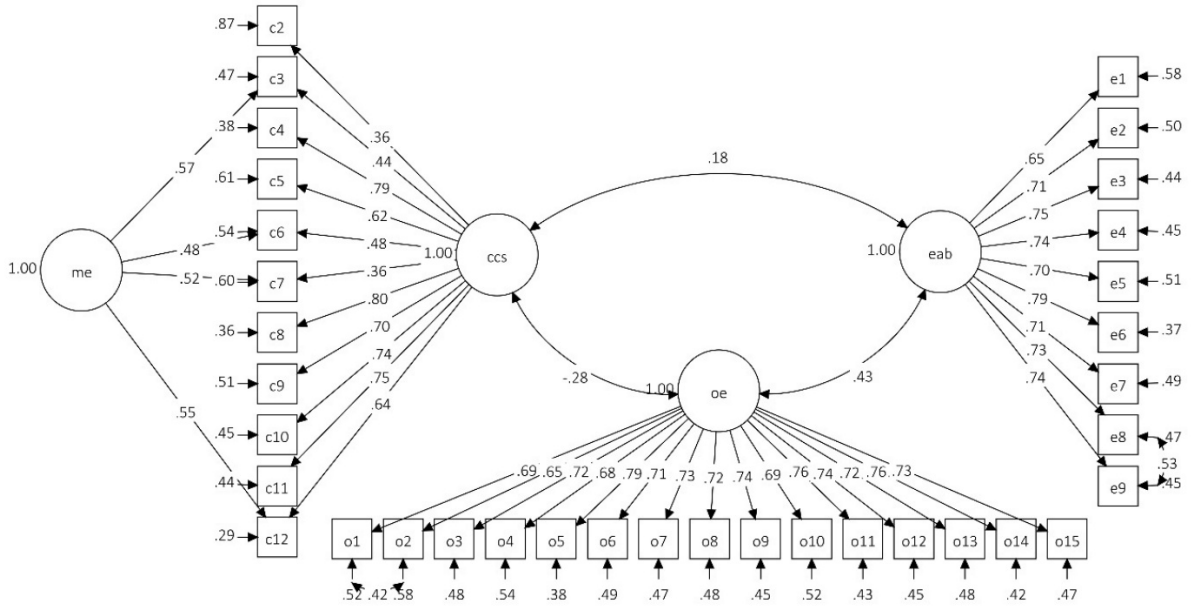


Figure 1. *Final Measurement Model of CCS, OE, and EAB*

CFA-based reliability and average variance extracted (AVE) were calculated from the standardized factor loadings of the final measurement model. Because the retained CCS model included a method-effect factor for reversed items, reliability was estimated for the general CCS factor after accounting for the method factor. CCS showed acceptable reliability, ρ = .816, although its AVE was below the conventional .50 threshold, AVE = .394. OE and EAB showed high reliability and adequate convergent validity, with ρ = .939, AVE = .523 for OE and ρ = .900, AVE = .528 for EAB. Overall, OE and EAB met both reliability and convergent validity criteria, whereas CCS showed acceptable reliability but modest convergent validity.

4.3 Structural model

Model 0, which included the main effects of CCS and OE on EAB, showed acceptable fit to the data, $\chi^2(551) = 1263.106$, $p < .001$, RMSEA = .049, 90% CI [.046, .053], CFI = .915, TLI = .908, and SRMR = .067. The loglikelihood value for Model 0 was -21514.157, with AIC = 43256.313, BIC = 43743.421, and sample-size adjusted BIC = 43381.553. In this model, both CCS and OE significantly predicted EAB, with standardized coefficients of β = .328, $p <$ .001, and β = .522, $p < .001$, respectively. Model 0 explained 28.5% of the variance in EAB.

Model 1 added the latent interaction term CCS × OE using the LMS approach. The number of free parameters increased from 114 in Model 0 to 115 in Model 1, indicating that one additional parameter, the latent interaction effect, was estimated. Model 1 yielded a loglikelihood value of -21508.731, with AIC = 43247.461, BIC = 43738.842, and sample-size adjusted BIC = 43373.799.

The log-likelihood ratio test indicated that adding the latent interaction significantly improved model fit relative to Model 0, $D = 10.852$, $\Delta df = 1$, $p \approx .001$. Thus, the model including the CCS × OE latent interaction provided a significantly better representation of the data than the main-effects-only model.

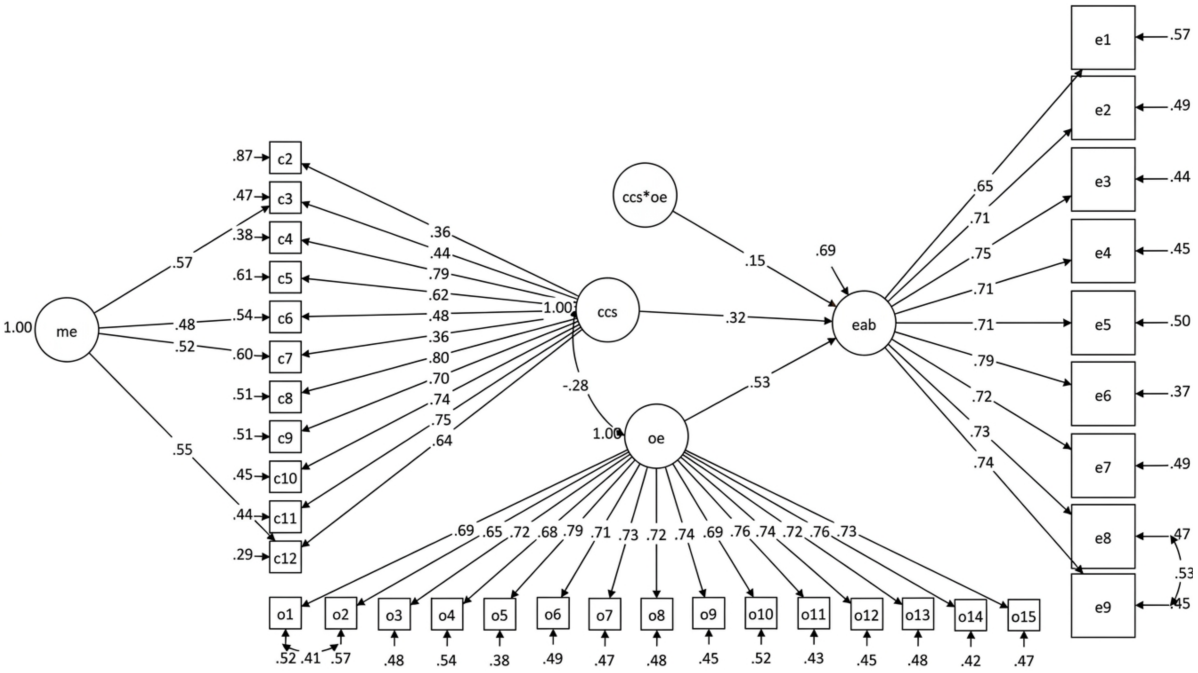
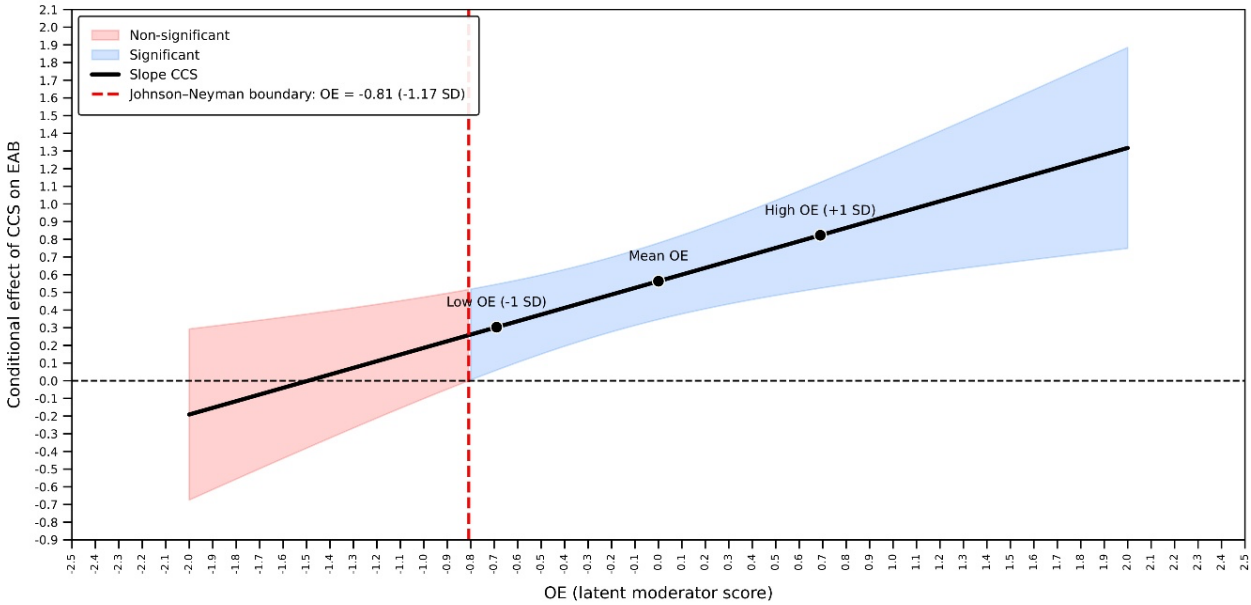


Figure 2. *Latent Moderated Structural Equation Model*

In Model 1, CCS significantly predicted EAB, $B = .563$, SE = .110, $p < .001$, $\beta = .316$, and OE also significantly predicted EAB, $B = .504$, SE = .057, $p < .001$, $\beta = .532$. Importantly, the CCS × OE latent interaction was significant, $B = .377$, SE = .123, $p = .002$, $\beta = .146$. The positive interaction indicates that the association between CCS and EAB became stronger as OE increased.

To evaluate the size of the latent interaction effect, the explained variance in EAB was compared between Model 0 and Model 1. Model 0 explained 28.5% of the variance in EAB, whereas Model 1 explained 31.2%. Subtracting the R^2 value of Model 0 from that of Model 1



yielded $\Delta R^2 = .027$. Thus, the CCS × OE latent interaction accounted for an additional 2.7% of the variance in EAB beyond the main effects of CCS and OE.

Figure 3. *Johnson–Neyman Plot of the Conditional Effect of CCS on EAB Across OE*

The Johnson–Neyman plot was used to probe the significant latent interaction by examining the conditional effect of CCS on EAB across different levels of OE. The plot showed that the conditional effect of CCS on EAB increased as OE increased. The Johnson–Neyman boundary was located at approximately OE = -.81 on the latent moderator scale, corresponding to about -1.17 SD below the mean of OE. Below this value, the effect of CCS on EAB was not statistically significant. Above this value, the effect of CCS on EAB became significantly positive. These findings indicate that OE strengthens the positive association between CCS and EAB.

5. Discussion

Overall, the findings suggest that the association between climate-related beliefs and environmental activism cannot be understood exclusively as a direct individual-level relationship. Rather, its strength varied according to members' engagement in their environmental organization. This boundary-condition perspective is consistent with increasing recognition that climate beliefs and environmental action are embedded in social identities, group memberships, and organizational contexts, rather than being determined solely by individual knowledge or attitudes (Fritsche et al., 2018; Hornsey & Lewandowsky, 2022).

Measurement-model findings

The measurement-model findings provide an important context for interpreting the structural results. The original four-factor structure of the CCS questionnaire was not supported in the present Indonesian adaptation. Instead, the responses were better represented by a general CCS factor comprising 11 items and an orthogonal method-effect factor for the four positively worded items that required reverse scoring. The emergence of this method factor suggests that items 3, 6, 7, and 12 shared variance associated with their wording direction beyond the substantive variance explained by the general CCS factor. Studies comparing alternative item-wording formats have similarly found that psychometric structures can differ according to whether reverse direction is created through negation or polar-opposite wording (Alvarado-Leiton et al., 2026).

Accordingly, the method factor should not be interpreted as a separate substantive dimension of CCS. Rather, the bifactor specification allowed variance attributable to item direction to be separated from the common climate-skepticism construct. Such an approach is consistent with recommendations to represent systematic wording-related covariance through a method factor rather than treating it as unexplained error or as evidence of an additional substantive construct (Brown, 2015; Schweizer et al., 2024). The finding also highlights the need to evaluate mixed-worded scales carefully in cross-cultural adaptations because reverse-worded items may not function equivalently across linguistic and cultural contexts (Wong et al., 2003).

Item 1, which expressed doubt about whether climate scientists tell the truth, was removed because it had the weakest contribution to the general factor. Unlike the other items, which focused primarily on the reality, causes, seriousness, consequences, or tractability of climate change, item 1 explicitly assessed distrust of climate scientists. Its weaker performance may indicate that distrust in scientific actors is related to, but not entirely interchangeable with, skepticism regarding climate change itself. Contemporary accounts similarly conceptualize climate skepticism as a heterogeneous phenomenon that may include doubts about scientific claims, distrust of scientists and institutions, ideological opposition, or skepticism toward proposed solutions (Dunlap, 2013; Hornsey & Lewandowsky, 2022; Leka & Furnham, 2024). Nevertheless, this interpretation remains tentative because the present study did not directly examine the source of the item's differential functioning. Future studies could use cognitive

interviewing or item-level invariance analyses to determine whether Indonesian respondents interpret distrust in climate scientists differently from skepticism about climate change.

The measurement findings also did not support sufficiently distinct behavioral, affective, and cognitive dimensions of OE. Although the proposed three-factor model showed adequate global fit, the correlations among the dimensions were very high, indicating substantial conceptual overlap. For active Mapala members, participating in organizational activities, feeling emotionally attached to the organization, and investing cognitive effort in organizational goals may represent closely connected expressions of a broader organizational-engagement orientation. This interpretation is compatible with Astin (1984) view of involvement as the amount of physical and psychological energy students devote to their collegiate experience. Astin's framework also treats active participation in student organizations and interaction with other members as central manifestations of involvement rather than as completely independent experiences.

The residual association between O1 and O2 is also substantively plausible because both items specifically assess the regular allocation of time to organizational activities: attending meetings or routine activities and setting aside weekly time for organizational responsibilities. Therefore, the correlation was interpreted as localized item-level overlap rather than as evidence of an additional substantive OE factor. Nevertheless, residual associations should be theoretically justified and interpreted conservatively because purely data-driven modifications may reduce the replicability of a measurement model.

In contrast, the unidimensional structure of EAB was generally supported, indicating that the nine behaviors reflected a common tendency toward environmentally oriented action spanning interpersonal, expressive, and collective-political forms. The residual association between E8 and E9 may reflect their shared emphasis on overt, politically oriented forms of activism. Contacting public officials and participating in peaceful demonstrations both involve communicating environmental concerns directly to political or institutional targets and may require greater willingness to express those concerns publicly than sharing information, discussing environmental issues, donating, or volunteering. This distinction is consistent with theoretical accounts that differentiate low-threshold and high-threshold forms of collective action, where direct engagement with political authorities represents a qualitatively distinct level of commitment beyond broader activism participation (van Zomeren et al., 2008).

Accordingly, the residual covariance does not necessarily undermine the unidimensional interpretation of EAB but suggests that the two items share a specific political-action component beyond the broader activism factor. Conceptualizing such residual covariance as an

item-level method or content effect is consistent with recent measurement literature, provided that the shared content can be substantively justified (Brown, 2015; Schweizer et al., 2024).

Overall, the measurement findings support the use of general CCS, OE, and EAB factors in the structural analysis, while also indicating several measurement qualifications. Specifically, CCS responses contained wording-related method variance, OE was more parsimoniously represented as a general engagement orientation, and two EAB items shared a more specific political-action component. These qualifications are relevant because latent-variable modeling permits structural associations to be estimated after separating substantive common variance from item-specific and method-related variance.

Organizational engagement as a boundary condition

Against this measurement background, the structural findings indicate that OE functions as a boundary condition of the association between CCS and EAB. The inclusion of the latent interaction explained additional variance in EAB beyond the main effects of CCS and OE. Although the incremental contribution was modest, interaction effects are often smaller than main effects because they represent systematic variation in the strength of an association rather than the overall contribution of a predictor. More importantly, the result suggests that the behavioral implications of CCS were not uniform across Mapala members but differed according to how strongly members invested behavioral, affective, and cognitive energy in their organization.

The Johnson–Neyman analysis further clarified the nature of this interaction. The positive association between CCS and EAB was not statistically significant at very low levels of OE but became significant above approximately 1.17 SD below the OE mean and grew stronger as OE increased. Thus, the CCS–EAB association was significant across most of the OE range rather than only among members with exceptionally high engagement. This distinction is important because the interaction should not be interpreted simply as evidence that highly engaged members behaved differently from everyone else. Instead, very low organizational engagement represented the range in which CCS was unrelated to EAB, whereas increasing organizational engagement was associated with an increasingly positive CCS–EAB relationship.

The positive association between CCS and EAB contrasts with the dominant literature linking climate skepticism to weaker support for mitigation policies, lower climate-action intentions, and less pro-environmental behavior (Akter et al., 2012; Engels et al., 2013; Hornsey, Harris, et al., 2016; Whitmarsh, 2011). Yet climate skepticism is not necessarily equivalent to indifference toward all environmental problems. CCS encompasses a spectrum

of doubts concerning the existence, anthropogenic causes, severity, consequences, or proposed responses to climate change, and these doubts may coexist with concern about pollution, ecosystem degradation, deforestation, or local conservation (Dunlap, 2013; Leka & Furnham, 2024). Research involving self-identified climate skeptics similarly indicates that many skeptics retain pro-environmental views and support measures addressing air pollution, renewable energy, reforestation, and environmental preservation (Haltinner & Sarathchandra, 2020, 2022).

The present findings may therefore reflect a distinction between skepticism toward global climate-change claims and concern about concrete environmental problems. Mapala members may question particular claims regarding the causes, urgency, or consequences of climate change while continuing to value conservation and environmental protection. This interpretation is consistent with evidence that climate skeptics do not constitute a homogeneous group and that skepticism regarding anthropogenic climate change can coexist with support for policies that have immediate environmental or social benefits (Haltinner & Sarathchandra, 2020, 2022; Sarathchandra & Haltinner, 2023). It also suggests that researchers should avoid treating climate-change beliefs as a complete proxy for broader environmental concern.

Psychological distance offers one possible explanation. Climate change is often perceived as spatially distant, temporally remote, socially removed, or uncertain, which may reduce its immediate motivational relevance. A systematic review found that perceiving climate change as more proximal and concrete was generally associated with stronger mitigation and adaptation behavior, although the evidence was not completely uniform across studies(Maiella et al., 2020). Experimental evidence indicates that reducing the psychological distance of climate change can increase willingness to exert effort for mitigation (Cutler et al., 2025). Complementary qualitative evidence suggests that direct exposure to locally salient environmental events may shape psychological distance, climate attitudes, and pro-environmental behavior (Miller & Rice, 2024).

For Mapala members, local environmental issues and organizational activities may be more concrete than global climate-change discourse. Conservation activities, environmental education, tree planting, clean-up activities, advocacy, and direct observation of local environmental degradation can provide immediate and observable reasons for action. Consequently, skepticism toward a psychologically distant global phenomenon may coexist with activism directed at tangible environmental conditions. Research on climate communication also suggests that local impacts, shared values, and co-benefits may be more

engaging than abstract global framing for audiences whose climate beliefs are uncertain or skeptical (Bain et al., 2012; Hornsey & Lewandowsky, 2022).

The collective and publicly oriented nature of EAB may further explain why the present pattern differs from findings concerning private-sphere behavior or climate-policy support. Environmental activism is socially embedded: participation is facilitated by networks, communication, organizational opportunities, shared goals, and collective identities. Environmental movements use organizational and communication networks to exchange practical and symbolic resources, define common problems, and coordinate collective action (Ackland & O'Neil, 2011). Recent evidence also indicates that environmentalist identification is associated with participatory and leadership forms of environmental action, particularly among individuals involved in politicized environmental groups (Hrabetz et al., 2024).

This interpretation is also consistent with the Social Identity Model of Pro-Environmental Action, which proposes that group identification, perceived group norms, and collective efficacy can motivate pro-environmental action (Fritsche et al., 2018). Recent organizational applications of this framework have shown that organizational identification, perceived environmental norms, and organizational environmental efficacy are associated with voluntary environmental behavior in organizational contexts (Guenthner et al., 2025). Similarly, research integrating social identity and social exchange perspectives has found that green organizational identity helps explain voluntary environmental contributions within organizations (Liu & Qi, 2022).

From the perspective of Student Involvement Theory, members with higher OE invest more physical and psychological energy in organizational experiences, including participation in activities, interaction with other members, and cognitive engagement with organizational goals (Astin, 1984). Greater involvement may therefore increase exposure to conservation practices, environmental discussions, activist opportunities, and behavioral expectations. These organizational experiences may provide sources of motivation for EAB that are not entirely dependent on personal acceptance of climate-change claims.

However, the observed pattern appears to extend beyond a simple buffering explanation. A simple buffering account would predict that OE weakens an expected negative association between CCS and EAB, potentially bringing the relationship closer to zero at higher levels of OE. Instead, the CCS–EAB relationship became increasingly positive as OE increased. This suggests that the organizational context may not merely compensate for the presumed adverse consequences of skepticism but may be associated with how climate-related beliefs are behaviorally expressed. In an environmental organization, activism can carry meanings beyond

climate mitigation, including protecting local ecosystems, fulfilling organizational responsibilities, maintaining solidarity with other members, or contributing to a collective environmental mission.

One possible interpretation is that highly engaged members differentiate between skepticism about climate-change discourse and commitment to environmental protection. Such members may reject or question particular climate claims while maintaining a strong identity as nature-oriented or environmentally responsible individuals. The coexistence of skepticism and activism may be especially plausible in Mapala because the organization's activities involve direct relationships with natural environments rather than climate advocacy alone. Evidence that social and environmental identities predict demanding forms of environmental participation supports the possibility that collective identity may sustain environmental action even when individual climate beliefs are ambivalent (Hrabetz et al., 2024; Liu & Qi, 2022).

Another possibility is that participation repeatedly exposes members to visible organizational norms and opportunities for collective action. Behaviors that are publicly observable—such as volunteering, joining campaigns, contacting officials, or participating in demonstrations—may become normative expressions of organizational membership. Consistent with this possibility, longitudinal organizational research has linked organizational identification and environmental efficacy perceptions with subsequent voluntary environmental behavior (Guenthner et al., 2025). Nevertheless, the present study did not directly measure organizational identity, group norms, collective efficacy, *shared reality*, or normative pressure; therefore, these mechanisms should be treated as theoretically plausible explanations rather than demonstrated mediators.

Theoretical contributions

The present study makes three principal theoretical contributions. First, it supports a boundary-condition perspective on CCS. Rather than assuming that skepticism has a uniform negative association with all environmental outcomes, the findings indicate that its relationship with EAB varies according to organizational engagement. This perspective is consistent with contemporary accounts emphasizing that climate beliefs are heterogeneous and embedded in identities, values, trust, and group contexts (Hornsey & Lewandowsky, 2022; Leka & Furnham, 2024).

Second, the study emphasizes the value of capturing a continuum of environmental action, from interpersonal and expressive behaviors to public collective activism, rather than focusing exclusively on private-sphere pro-environmental behavior. EAB in this study particularly

foregrounds behaviors with social, organizational, and public dimensions. EAB involves public expression, organizational participation, advocacy, and collective action. These behaviors may be more strongly shaped by interpersonal networks, group identification, collective efficacy, and organizational opportunities than individual behaviors such as household energy conservation or green consumption. Previous evidence linking environmental identity and politicized group involvement with participatory and leadership environmental action supports this distinction (Hrabetz et al., 2024).

Third, the study extends a literature that has largely been developed in Western contexts by examining members of environmental student organizations in Indonesia. The findings illustrate that climate skepticism may operate differently among individuals who are already situated within a social environment oriented toward nature and environmental protection. This difference does not imply that climate literacy is irrelevant; rather, it suggests that the behavioral consequences of climate beliefs depend partly on the social setting and the type of environmental outcome being examined.

Practical implications

The findings suggest that environmental organizations may provide an important point of entry for involving individuals whose climate beliefs are uncertain or skeptical. Communication strategies do not necessarily need to rely exclusively on global climate-risk messages. Activities focused on locally observable environmental problems, conservation benefits, community welfare, and concrete opportunities for participation may engage members across different levels of climate-change acceptance. Research on climate skepticism and psychological distance similarly points to the value of trusted messengers, locally relevant impacts, shared values, and tangible co-benefits (Hornsey & Lewandowsky, 2022; Maiella et al., 2020).

This implication should not be interpreted as a reason to disregard climate education. Instead, organizations may combine climate literacy with direct environmental experiences. Linking scientific information to conservation, local ecological changes, and collective organizational activities may make climate change less abstract while avoiding communication that defines skeptical members solely by their doubts. Research suggests that bringing climate impacts psychologically closer and framing climate action in terms of valued identities can increase willingness to undertake effortful environmental action (Cutler et al., 2025).

6. Limitations and future directions

Several limitations should qualify these interpretations. First, the cross-sectional design does not establish the temporal or causal direction of the associations. High OE may contribute to EAB, but members who are already environmentally active may also become more engaged in Mapala. Longitudinal and experimental designs are needed to determine whether organizational engagement precedes changes in activism and whether organizational experiences modify the behavioral expression of climate skepticism.

Second, all substantive variables were measured through self-report, which may introduce shared-method variance and socially desirable responding. The method factor identified for CCS and the residual associations observed in OE and EAB also indicate that item wording and content overlap influenced the measurement structure. Future studies should combine self-reports with behavioral indicators, organizational participation records, peer reports, or observed activist behavior.

Third, the sample consisted of active Mapala members from six provinces in Java and was recruited through convenience sampling. The results therefore should not be generalized directly to Indonesian university students, environmental activists outside Mapala, or the general population. Replication is required among individuals with lower initial environmental involvement and in different cultural and organizational settings.

Fourth, the proposed mechanisms were not measured directly. Future research should examine organizational identification, perceived environmental norms, collective efficacy, *shared reality*, local environmental concern, psychological distance, and climate-science trust as potential mediators or additional moderators. Such research would clarify whether OE changes the behavioral implications of CCS through social identification, repeated exposure to organizational practices, concrete environmental experiences, or other mechanisms.

Fifth, the EAB measure in the present study operationalizes environmental activism broadly, encompassing behaviors ranging from interpersonal discussion and financial support to organized public action and political engagement. While this breadth reflects the diverse forms of environmental participation available to student activists in Indonesia, future research should examine whether these behaviors form a hierarchical or multidimensional structure, with some forms representing higher-threshold collective activism and others representing lower-threshold everyday or expressive engagement. A more granular operationalization would

enable cleaner separation between the effects of individual climate beliefs and organizational engagement on different types of environmental action.

7. Conclusion

The present study indicates that climate change skepticism does not necessarily correspond to lower environmental activism among members of an environmental organization. The association between CCS and EAB varied according to organizational engagement and became increasingly positive as OE increased. The findings therefore position environmental organizations not only as settings in which activism occurs but also as social contexts associated with how personal climate beliefs are translated into collective environmental action. Understanding environmental activism consequently requires attention both to what individuals believe about climate change and to the groups, identities, and organizational practices through which they participate.

CRediT authorship contribution statement

Funding

Declaration of competing interest None.

Appendix A. Supplementary data Supplementary data to this article can be found online at [....]

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