Competing Psychological Pathways Linking Age and Individual and Collective Pro-Environmental Behavior Intentions: The Role of Conservatism

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Abstract

Promoting pro-environmental behavior (PEB) across the lifespan is critical for achieving an effective response to climate change. This may particularly be important in later life, as older adults hold substantial economic resources and electoral influence, enabling them to shape societal responses to environmental challenges. However, they have also been found to be more likely than younger adults to deny that climate change is real and human-caused, potentially reducing their engagement in climate action. At the same time, later life is characterized by generativity as a key developmental task, with concern for leaving a positive environmental legacy for future generations potentially motivating PEB in older age. The present study examines climate change denial and generativity as two opposing psychological mechanisms that may mediate the relationship between age and PEB intentions. We assessed PEB intentions at two distinct levels – individual and collective – both of which are critical for effective climate mitigation. In two cross-sectional studies of $N = 180$ adults in Study 1 ($M_{age} = 47.50$, $SD_{age} = 17.91$; age range = 19–91 years), and $N = 345$ adults in Study 2 ($M_{age} = 49.64$, $SD_{age} = 15.70$, age range = 20-97 years) we found mixed results for our hypotheses. Across both studies, denial was negatively associated with PEB intentions, whereas eco-generativity was positively associated with PEB intentions. Hypothesized opposing competing pathways of age to PEB intentions were confirmed only in Study 1 and proved less robust than initially assumed. Exploratory analyses instead revealed conservatism as the only consistent indirect correlate of age in PEB intentions across both studies, with higher age being associated with greater conservatism, which in turn was associated with lower individual and collective PEB intentions. These findings suggest the importance of ideological orientation as a pathway linking age and PEB, providing guidance for interventions aimed at increasing both individual and collective pro-environmental action across adulthood and in old age.

Keywords: climate change, age, denial, eco-generativity, PEB, conservatism

Introduction

Since the industrial revolution, human activities have been exerting profound and lasting impacts on the environment and ecosystems across the globe, with the pace of these transformations continuing to accelerate [1,2]. Anthropogenic climate change exerts severe negative effects on both ecosystems and human societies, including extreme weather events, loss of biodiversity and disruption of agriculture [3,4]. These and other consequences are anticipated to intensify over the coming decades [5]. In order to counter these harmful developments and to bring about societal transformations for climate protection, it is necessary to encourage both individual and collective pro-environmental behavior (PEB) of all members of society [6]. Older adults are largely overlooked in society's efforts to combat climate change [7], even though they might be an especially important group when it comes to climate mitigation efforts given their generative potential, accumulated knowledge and more available time and resources [8]. However, they have also been found to deny climate change and its consequences more often than younger generations [9]. At the same time, as generativity becomes a relevant developmental task in later life [10], older adults may be particularly motivated to preserve the environment for future generations through generative action [11]. Previous literature has identified both of these opposing tendencies as concurrent developmental changes that shape PEB in old age [12]. The present study aims to examine these opposing tendencies within a single empirical framework investigating generativity and denial as competing pathways in PEB intentions, both at the individual and collective level, in later life.

Climate Change Denial and Eco-Generativity

Despite a broad scientific consensus that climate change is real and human-caused [13,14], many people still do not believe that to be the case [15]. While some studies have

reported similar levels of climate change denial across age groups [16–18], several others reported that older adults tend to exhibit higher levels of climate change denial than younger adults [9,19–24]. Wahl and Budnick [12] proposed that a decrease in the significance and importance of climate issues with age is aligned with the predictions of socioemotional selectivity theory [25], which posits that, due to their increasingly limited future time perspective, older adults prioritize engaging in emotionally fulfilling domains and meaningful activities and relationships, while expressing less concern for topics and areas that are stressful and potentially threatening, such as environmental crises including climate change [26].

If older adults are motivated to avoid climate change as an emotionally negative topic, they may be more likely to selectively downplay or disregard information that would justify or require high concern and engagement with climate change [12,27]. Studies have shown belief in the reality of climate change to be one of key predictors of PEB [28–33], suggesting that older adults might engage less in PEB compared to younger adults. However, empirical evidence shows that older adults exhibit comparable or even higher levels of PEB compared to young adults [34–37].

Generativity, the developmental drive to create a lasting and meaningful legacy that transcends one's own life by caring for future generations and contributing to the continued well-being of society after one's own death [38–40] might represent a mechanism that drives PEB in older adults despite their reduced belief in the reality of climate change [12]. This generative motivation can also manifest itself in behavior that aims to care for the environment and to preserve it for future generations, which has previously been referred to as ecological or eco-generativity [41,42]. Previous research has consistently supported a positive relationship between age and generativity [26,43,44,45]. Moreover, multiple studies have also consistently shown that generativity predicts pro-environmental intentions across the lifespan,

including later life [46–49]. Thus, drawing on both socioemotional selectivity theory and the concept of generativity, we argue that while older adults may be more likely to deny the reality of climate change, their eco-generative potential still drives them to show a considerable amount of PEB.

The Present Study

As both theory and empirical research suggest that denial and generativity are associated with PEB in opposite directions, the aim of this study was to examine their competing pathways within a single model. While both individual PEB in the private sphere (e.g., sustainable consumption, energy conservation) and collective PEB aimed at societal and political change (e.g., participating in demonstrations, political advocacy) are needed for successful climate mitigation efforts [6], a previous review showed that research on older adults' climate action has mostly focused on individual forms of PEB [50: redacted for review]. Thus, the present study investigates the potential role of climate change denial and eco-generativity for both individual and collective PEB intentions in later life. Based on the reviewed literature, we hypothesize that age will be positively associated with both climate change denial and eco-generativity. Furthermore, we assume that denial is, in turn, will be negatively associated with individual and collective PEB, while eco-generativity will show a positive association with both dependent variables. Additionally, we propose that age will show a negative indirect effect on individual and collective PEB through climate change denial, and a positive indirect effect on individual and collective PEB through eco-generativity. The present research addresses this research question across two consecutive studies.

Given that previous studies consistently found a positive association between climate change denial and conservatism [51–54], conservatism is included as a control variable in all analyses. In this context, conservatism is conceptualized as an ideology that sees the

preservation of a shared culture and traditions, as well as the preservation of existing sociopolitical arrangements as central political goals [55]. Similarly, some scholars argue that kinship, defined by reproductive or genealogical ties, constitutes the primary foundation of generative behavior (also called "kinship premium") [56], as it provides the structure for the intergenerational transmission of values, resources, and identity [57–59]. Therefore, parental and grandparental status are also controlled in all analyses across both studies.

Study 1

Materials and Methods

Participants and Procedure

The study is part of a larger cross-sectional project "Climate change attitudes and behavior in different age groups" conducted between March 26 and May 5, 2025, with the aim of collecting data on different socio-psychological indicators of climate action across the lifespan. In total, $N = 232$ initial participants were recruited by students in a research seminar during the summer semester. Eligibility criteria required participants to be at least 18 years old and to have sufficient proficiency in the German language. Participants were required to provide written informed consent before starting the survey. Fifty-two individuals were excluded due to not answering any item on the individual and collective pro-environmental behavior intentions scales. The final sample consisted of $N = 180$ adults, aged 19–91 years ($M_{age} = 47.50$, $SD_{age} = 17.91$). Among the participants, 59.44% identified as female, 62.78% stated to have been born in Austria, and 43.89% reported having a university degree. Regarding parental and grandparental status, 53.33% reported having children and 20% grandchildren. Most participants (50.55%) were married at the time they completed the survey. Before data collection started, the project was granted ethical approval by (retracted for review).

Measures

Pro-Environmental Behavioral Intentions. A 15-item measure was used to assess pro-environmental behavioral intentions. Specifically, ten items capturing individual PEB intentions were adapted from an instrument measuring behavioral intentions for nature conservation [60] (Cronbach's α = .80). The items were presented as a list of specific behaviors under the common prompt "*How willing are you to…*", which appeared one at the top of the page. Responses were rated on a four-point Likert-type scale ranging from 1 (*not willing at all*) to 4 (*very willing*). A sample item is "... pay higher prices for green electricity if it means less destruction of landscape and nature?".

Collective PEB intentions were measured using five items adapted from the 18-item scale developed by Alisat and Riemer [61], with a Cronbach's α = .82. The response format was adjusted to match the intention-based format used for individual PEB intentions (sample item: "…participate in a protest or demonstration for environmental protection").

Climate Change Denial. To assess denial, four items from an 18-item scale compiled by Loram et al. [62] were selected for the present study (sample item: "Climate change is a scam."), with a Cronbach's α = .69. Items were answered on a seven-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), with higher values indicating greater denial. One item was reverse coded prior to analysis.

Eco-Generativity. Eco-generativity was measured using a 6-item scale adapted from the Social Generativity Scale [63] (Cronbach's α = .87). The items were modified in the present study to focus specifically on care for the ecological environment, and to better capture the motivational underpinnings of ecologically oriented generative concern (sample item: "I deliberately give up part of my daily comfort in order to preserve the environment for future generations."). No items were reverse-coded. Participants responded on a seven-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), with higher scores reflecting higher eco-generative concern.

Covariates. To measure conservatism, four items from the German Political Ideologies Scale [55] (Cronbach's α =.89) were employed (sample item: "The state should primarily focus on preserving our shared culture and traditions."). No items were reverse-coded. Items were rated on a four-point Likert scale ranging from 1 (*completely disagree*) to 4 (*completely agree*), higher scores indicate a stronger conservative orientation. As additional covariates, parental and grandparental status were assessed by asking participants whether they had children (including stepchildren) and whether they had grandchildren (including step-grandchildren).

Analyses

All analyses were conducted using R [64] within RStudio [65]. To conduct the mediation analysis, we followed the causal-steps approach using the R-package lavaan [66]. We performed the mediation analysis in two steps: Model 1 was estimated without covariates, whereas Model 2 additionally included conservatism, parental status, and grandparental status. In Model 1, we first separately regressed denial and eco-generativity on age. Following this, both individual and collective PEB were each regressed on age and both mediators within the same model. Lastly, we analyzed the indirect effects of age through denial and eco-generativity on both dependent variables, respectively. We repeated this same procedure in Model 2 while controlling for conservatism, parental and grandparental status in both steps. Furthermore, *p*-values were estimated using bootstrap estimations (5000 repetitions). A post-hoc power analysis was conducted after the data analyses (see Table S3 in the Supplementary Material).

Results

Descriptive Statistics

Means, standard deviations and internal consistency for all metric variables as well as bivariate correlations between all variables for Study 1 can be found in Table 1. The results

show that age was significantly and negatively related to collective PEB intentions, while showing no significant association with individual PEB intentions. However, age showed a significant positive correlation with all other study variables. Denial was positively and significantly associated with conservatism, as well as parental- and grandparental status, while being negatively correlated with individual and collective PEB. Eco-generativity showed a significant positive correlation with age and both forms of PEB, and a significant negative association with denial. Individual and collective PEB were significantly and positively intercorrelated, with each variable showing a strong negative association with conservatism. Lastly, both parental and grandparental status showed a significant positive correlation with both denial and conservatism.

Main Analyses

As reported in Table 2 and Figure 1, consistent with our hypotheses, the results indicated that age was positively associated with both climate change denial and eco-generativity. Moreover, climate change denial was significantly and negatively associated with both individual and collective PEB intentions, whereas eco-generativity showed a significant positive association with both individual and collective PEB intentions.

In Model 1, age was not significantly associated with individual PEB intentions at the total effect level ($b = -0.002$, $SE = 0.002$, CI = [-0.007, 0.002], $\beta = -.078$, $p = .312$). However, consistent with our hypotheses, age was indirectly associated with lower individual PEB intentions via higher climate change denial ($b = -0.002$, $SE = 0.001$, CI = [-0.004, -0.001], $\beta = -.069$, $p = .021$) and indirectly associated with higher individual PEB intentions via higher eco-generativity ($b = 0.004$, $SE = 0.001$, CI = [0.001, 0.006], $\beta = .113$, $p = .011$). The remaining direct effect of age was not significant.

For collective PEB intentions, the total effect of age was negative and significant ($b = -0.006$, $SE = 0.003$, CI = [-0.012, -0.000], $\beta = -.163$, $p = .035$). In line with our hypotheses,

age was also indirectly associated with lower collective PEB intentions via higher climate change denial (b = −0.002, SE = 0.001, CI = [-0.005, -0.000], β = -.059, p = .030) and indirectly associated with higher collective PEB intentions via higher eco-generativity (b = 0.005, SE = 0.002, CI = [0.001, 0.008], β = .116, p = .012). The direct effect of age was negative and significant (see Table 2 and Figure 1).

In Model 2, for individual PEB intentions, the total effect of age was not significant (b = 0.004, SE = 0.004, CI = [-0.003, 0.011], β = .141, p = .230). When controlling for conservatism, the indirect association between age and individual PEB intentions via climate change denial was no longer significant (b = −0.000, SE = 0.001, CI = [-0.002, 0.002], β = -.010, p = .759). In contrast, the indirect association via eco-generativity remained significant after accounting for parental and grandparental status (b = 0.006, SE = 0.002, CI = [0.002, 0.011], β = .196, p = .008). The remaining direct effect of age was also not significant in this model (see Table 2 and Figure 1).

A similar pattern was observed for collective PEB intentions: The total association between age and collective PEB intentions was not significant after including covariates (b = −0.001, SE = 0.005, CI = [-0.012, 0.009], β = -.025, p = .857). Moreover, the indirect association via climate change denial was no longer significant when accounting for conservatism (b = −0.000, SE = 0.001, CI = [-0.003, 0.002], β = -.009, p = .766). The indirect association via eco-generativity remained significant after accounting for parental and grandparental status (b = 0.008, SE = 0.003, CI = [0.002, 0.014], β = .203, p = .008). The remaining direct effect of age was also not significant (see Table 2 and Figure 1). For all main analyses, standardized regression coefficients are reported in the respective path model, while unstandardized regression coefficients are reported in the respective tables. For the results of covariates in Model 2, see Table S1 in the Supplementary Material.

Exploratory Analyses

Given that the indirect effect of age on both individual and collective PEB intentions through denial became insignificant after conservatism was added into the model, we conducted an exploratory analysis, in which conservatism replaced denial as a mediator alongside eco-generativity in the relationship between age and both individual and collective PEB (See Table 3). The results of this analyses show significant positive indirect effects of age through eco-generativity on both individual (b = 0.004, SE = 0.002, CI = [0.001, 0.007], β = .126, p = .012) and collective PEB (b = 0.005, SE = 0.002, CI = [0.001, 0.009], β = .127, p = .012), as well as significant negative indirect effects of age through conservatism on both individual (b = -0.004, SE = 0.001, CI = [-0.006, -0.002], β = -.110, p < .001) and collective PEB (b = -0.003, SE = 0.001, CI = [-0.006, -0.001], β = -.084, p = .006).

Discussion

The goal of Study 1 was to examine whether climate change denial and eco-generativity represent competing pathways in shaping the ambiguous relationship between age and both individual and collective PEB intentions. The results were consistent with this hypothesis in models that did not account for conservatism, indicating that age was differentially associated with PEB intentions via higher levels of climate change denial and eco-generativity. However, when conservatism was included in the model, the association between age and climate change denial, as well as the corresponding indirect effects of age on individual and collective PEB intentions were no longer statistically significant. This pattern suggests that the negative association between age and PEB intentions operates primarily through conservatism rather than denial per se, pointing to conservative ideological orientation as a more proximal correlate of lower PEB intentions at higher ages [67, 68]. In contrast, parental and grandparental status did not attenuate the positive indirect association between age and PEB intentions via eco-generativity. This finding does not support the kinship premium hypothesis [56].

In summary, Study 1 provided initial support for the hypothesis of opposing mechanisms of PEB intentions in older age. However, it is unclear whether the observed patterns extend beyond the present sample. Study 2 was conducted as a direct replication using a larger sample and with a more balanced distribution of age groups

Study 2

Materials and Methods

Procedure

A cross-sectional online study was conducted between October 7 and October 15, 2025, using the survey platform SoSciSurvey. Data was collected through the online recruitment platform Bilendi. Participants were recruited with an approximately distribution of young, middle-aged and older adults, with equal gender distribution within these age groups. Eligibility criteria required participants to be at least 18 years old, to live in Austria and to have sufficient proficiency in the German language. To be included into the final data set, participants also had to complete the full questionnaire and to pass two attention checks at the end of the survey (see Supplement A). After providing written informed consent, participants conducted the questionnaire, which was the same as in Study 1.

Participants

Out of 356 participants who completed the survey, 11 participants were excluded due to failing at least one of the attention checks. The final sample consisted of 345 participants, aged 20-97 years (M_{age} = 49.60, SD_{age} = 15.70). Among participants, 50.4% identified as female, while two participants reported a diverse gender identity. In total, 88.1% of participants stated that they were born in Austria, and 27.8% had a university degree. Regarding parental and grandparental status, 63.2% stated to have children, while 23.5% reported having grandchildren. Finally, 43.5% of participants were married at the time they completed the survey.

Measures

To ensure the comparability of both studies, participants completed the same measures as described for study 1. As for study 1, internal consistency was acceptable for all multi-item scales with Cronbach's $\alpha = .86$ for individual PEB intentions, $\alpha = .87$ for collective PEB intentions, $\alpha = .80$ for denial, $\alpha = .93$ for eco-generativity and $\alpha = .87$ for conservatism.

Analyses

Data analysis for Study 2 followed the same procedure as described for Study 1. The results of a post-hoc power analysis for Study 2 can be found in Table S4 in the Supplementary Material.

Results

Descriptive Statistics

Means, standard deviations and internal consistency for all metric variables as well as bivariate correlations between all variables for Study 2 can be found in Table 4. The results show that age was significantly and negatively correlated with both forms of PEB intentions, while being positively associated with conservatism as well as parental and grandparental status. Denial showed a significant negative association with eco-generativity and both forms of PEB intentions, while being positively related to conservatism. Conversely, eco-generativity was significantly and positively associated with both individual and collective PEB intentions. Both forms of PEB intentions showed a significant positive intercorrelation, and were both negatively associated with conservatism.

Main Analyses

For Study 2, we again found that age had a positive significant association with climate change denial. However, the association of age and eco-generativity was not significant. Also consistent with our hypotheses, data from Study 2 shows that climate change denial was significantly and negatively associated with both individual and collective PEB

intentions, and that eco-generativity was significantly and positively associated with both individual and collective PEB intentions (see Table 5 and Figure 2**)**.

In our first mediation analysis of Study 2 without the covariates (Model 3), we found a significant negative total effect of age on individual PEB intentions (b = -0.005, SE = 0.002, CI = [-0.010, -0.001], β = -.127, p = .027). However, in contrast to our hypotheses, we did not find any significant indirect effects of age on individual PEB intentions through either climate change denial (b = -0.001, SE = 0.001, CI = [-0.002, -0.000], β = -.025, p = .065) or eco-generativity (b = -0.002, SE = 0.001, CI = [-0.005, 0.001], β = -.045, p = .187). The remaining direct effect of age was also not significant (see Table 5 and Figure 2).

For collective PEB intentions, the total effect of age was again negative and significant (b = -0.007, SE = 0.003, CI = [-0.013, -0.002], β = -.147, p = .010). In contrast to our hypotheses, we also did not find any significant indirect effects of age on collective PEB intentions through either climate change denial (b = -0.001, SE = 0.001, CI = [-0.002, -0.000], β = -.021, p = .067) or eco-generativity (b = -0.002, SE = 0.002, CI = [-0.006, 0.001], β = -.044, p = .188). The remaining direct effect of age was negative and significant (see Table 5).

When conservatism, parental status and grandparental status included (Model 4), the total effect of age on individual PEB intentions was not significant (b = -0.005, SE = 0.003, CI = [-0.011, 0.002], β = -.118, p = .121). The indirect effects of age through climate change denial (b = -0.001, SE = 0.001, CI = [-0.002, 0.000], β = -.018, p = .160) and eco-generativity (b = -0.003, SE = 0.002, CI = -0.007, 0.002], β = -.059, p = 0.232) on individual PEB intentions, as well as the remaining direct effect of age were also non-significant (see Table 5 and Figure 2).

For collective PEB intentions, the total effect of age remained negative and significant also when controlling for covariates (b = -0.009, SE = 0.004, CI = [-0.016, -0.002], β = -.172, p = .015). As in Model 3, the indirect effects of age through climate change denial (b = -

0.001, *SE* = 0.001, CI = -0.002, 0.000], β = -.013, p = .192) and eco-generativity (b = -0.003, *SE* = 0.002, CI = [-0.008, 0.002], β = -.057, p = .233) were not significant when covariates were included in the model. The remaining direct effect of age was negative and significant (see Table 5 and Figure 2). For the results of covariates in Model 4, see Table S2 in the Supplementary Material.

Exploratory Analyses

As in Study 1, we exploratively tested a model in which conservatism replaced denial as a mediator alongside eco-generativity in the relationship between age and both individual and collective PEB (see Table 6). While the results of this analysis in Study 2 showed non-significant indirect effects of age through eco-generativity on both individual (b = -0.002, *SE* = 0.002, CI = [-0.005, 0.001], β = -.050, p = .184) and collective PEB intentions (b = -0.003, *SE* = 0.002, CI = [-0.006, 0.001], β = -.048, p = .185), they again showed significant negative indirect effects of age through conservatism on both individual (b = -0.002, *SE* = 0.001, CI = [-0.003, -0.001], β = -.037, p = .003) and collective PEB intentions (b = -0.002, *SE* = 0.001, CI = [-0.004, -0.001], β = -.037, p = .006).

Overall analysis. To obtain more reliable estimates of the associations between age and PEB intentions through climate change denial, eco-generativity and conservatism, we pooled the data from both studies, resulting in a combined sample of N = 525. The analyses were conducted using the same analytic approach as in Studies 1 and 2. First, denial and eco-generativity were investigated as parallel mediators of age on both individual and collective PEB intentions. After that, denial was replaced by conservatism as mediator alongside eco-generativity. All pooled analyses were conducted while controlling for the source study. Across the combined sample, conservatism consistently emerged as a significant indirect pathway linking age to both individual and collective PEB intentions. In contrast, the indirect association through climate change denial was only evident in the model without covariates

and did not remain significant after accounting for conservatism, whereas eco-generativity did not emerge as a significant indirect pathway in the pooled analyses. For detailed results, see Table S5, S6 and S7 in the Supplementary material.

Non-linear relationship between age and eco-generativity. To examine whether the absence of a consistent linear association between age and eco-generativity could be explained by a non-linear relationship, we estimated quadratic regression models separately for Studies 1 and 2, as well as in the pooled dataset. Prior to analysis, age was mean-centered, and both linear and quadratic age terms were entered simultaneously. For the pooled analysis, source study was additionally included as a covariate. Across all analyses, the quadratic age term was consistently non-significant, providing no evidence that eco-generativity follows a non-linear trajectory across adulthood (for detailed results, see Supplementary material).

Discussion

The goal of Study 2 was to examine whether the findings from Study 1 could be replicated in a larger sample with a more balanced distribution of age groups. The results did not replicate the previously observed pathways via either climate change denial or eco-generativity. However, exploratory analyses in Study 2 again indicated that age was significantly and negatively associated with both individual and collective PEB intentions via conservatism. Moreover, in the overall analysis conservatism emerged as the only robust mediator of the association between age and both individual and collective pro-environmental behavior intentions, whereas climate change denial and eco-generativity did not show consistent indirect associations. These findings suggest that conservatism may represent a more robust correlate of age-related differences in PEB intentions than the pathways examined in Study 1.

General Discussion

The goal of the present studies was to examine whether opposing psychological pathways – climate change denial, reflecting avoidance of threatening climate information in old age, and eco-generativity, reflecting the developmental drive to protect future generations – can explain PEB intentions in later life.

Taken together, the present findings provide a nuanced and somewhat mixed picture regarding the psychological pathways underlying age-related differences in PEB intentions. In Study 1, the results were consistent with the idea of divergent pathways [12], suggesting that age may be associated with both higher eco-generativity – linked to greater PEB intentions, and higher climate change denial—linked to lower PEB intentions. However, this pattern was not replicated in Study 2. Moreover, in Study 1, once conservatism was accounted for, the associations between climate change denial and PEB intentions were no longer evident. Notably, the significant mediating role of conservatism instead of denial was replicated across both studies and in the overall analysis. Thus, our findings suggest that age-related increases in conservative ideology may serve as a more pivotal determinant of PEB intentions in later life and may potentially even account for age differences in denial and corresponding climate-related behavior. In line with this notion, previous studies have also found significant associations between age and both climate change beliefs and behavior, which became insignificant once conservatism was added to the statistical model [67, 68].

According to Wahl & Budnik [12], the age-related positivity bias postulated by socioemotional selectivity theory [25,69] may directly lead older adults to avoid information that demonstrates the reality of anthropogenic climate change, which could explain findings of increased climate change denial in later life [9]. However, based on our findings, age-related positivity bias may also encompass a tendency for a favorable perception of the overarching societal system and the political status quo, leading them to adopt system-preserving beliefs and ideology, such as conservatism [70, 71]. Our results are in line with

other research that has identified system-preserving ideology as a central negative antecedents for pro-environmental behavior [67, 72–75], but also extend the interpretation of socioemotional selectivity theory brought forward by Wahl & Budnik [12] suggesting that age-related changes in climate change beliefs may actually reflect a broader shift towards system-preserving ideology in later life, rooted in a positivity bias in the sociopolitical domain. Indeed, some longitudinal evidence suggests that people do become more conservative as they age, even when controlling for cohort and period effects [76,77]. Following this interpretation of age differences in conservatism and denial, our results suggest that an age-related tendency towards conservative ideology and corresponding climate beliefs may present a central hindrance for the formation of climate action intentions in later life.

Although it has been suggested that eco-generativity presents a key driver of climate action as a competing pathway to the effects of climate beliefs [12], we only found mixed evidence for this hypothesis. On the one hand, consistent with previous research [45,47,49], we did find a significant positive direct association of eco-generativity with individual PEB intentions in both studies, which further suggests that eco-generativity can generally serve as a strong driver of individual PEB. Moreover, our findings also demonstrate that these effects also apply to collective PEB, thereby extending previous research that has linked generativity to general political activism and civic engagement [78,79] by showing that this association may also encompass intentions action directed at systemic transformation. This supports the notion that preserving natural resources for future generations may constitute a broadly shared motivational basis for climate action, also across political spectrum [80,81].

These associations were also unaffected and remained significant when we controlled for parental and grandparental status in both models. While some previous studies showed that people direct more pro-social behavior towards their biological relatives [56,82,83], our findings do not support the notion of a kinship premium in eco-generative concern and

subsequent pro-environmental behavior. However, given that a significant indirect effect of generativity between age and PEB intentions emerged only in Study 1 and not in Study 2 or the overall analysis, eco-generativity is most likely not exclusively driving PEB in later life. Instead, it may promote PEB intentions across adulthood irrespective of age. This interpretation is consistent with evidence suggesting that, although some forms of generativity (e.g., biological or technical generativity) are particularly characteristic of midlife and later adulthood [84], eco-generativity may be similarly relevant among younger adults [85–88]. Supporting this notion, concern for future generations has become increasingly salient among younger cohorts, with adolescents surveyed in 2020 identifying future generations as a major concern, whereas adolescents surveyed a decade earlier rated them as only a minor concern [89]. Other research has demonstrated that the association of age and generativity is likely non-linear, showing that levels of social generativity (care for future generations) peak in midlife, with no further increases into high or very high age [43,44,90]. However, our analyses provided no evidence that this non-linear pattern also applies to eco-generativity. Thus, the urge to preserve nature and the environment for future generations may constitute a motivational resource for climate engagement across adulthood, rather than one that is specific to midlife or older adulthood or contingent on having children or grandchildren.

Limitations

Despite the previously described insights that our study provides, we also must acknowledge some meaningful limitations to our study. First, although we tried to recruit an approximately even distribution of age and gender for the sample of Study 2, this sample still presents a convenience sample, and we cannot claim generalizability for the results of either study. Moreover, due to the different sampling strategies, we must consider that each sample represents a different segment of the investigated population, thereby limiting the comparability of the findings in Study 1 and 2. For instance, we recruited more participants

with a university degree and more female participants in Study 1, while participants in Study 2 were more likely to be born in Austria and to have children. Moreover, some participants in Study 1 resided in German-speaking countries other than Austria, which, despite being culturally similar, may differ sufficiently in relevant contextual (e.g., environmental or political) factors to further limit comparability between the two studies. In addition to these limitations, both studies were underpowered for some of the investigated hypotheses (see Tables S3 and S4). To attain more reliable evidence for the investigated relationships, future research should examine these relationships in larger samples. Another limitation is that we used a scale to measure eco-generativity which was not previously validated but adapted from a scale that originally measured social generativity [63]. While we argue that this adapted scale better encompasses the developmental aspect of eco-generativity compared to existing validated measures of eco-generativity (e.g., [41]) and was thus chosen for our analyses, future research is needed that investigates the role of eco-generativity for PEB in later life using validated scales.

Furthermore, due to the correlational design of our study, we cannot make any causal interpretations of the associations that we investigated. Thus, the relationships that we investigated may also reflect another causal structure than the one we hypothesized, especially concerning the causality that is implied by the examined indirect effects [91]. Given that we investigated cross-sectional data, we also have to consider that the found age differences may also be attributable to generational rather than aging effects. Although the theoretical and empirical literature discussed above supports our interpretations, our data and study design prevent us from drawing any definitive inferences. Due to these limitations, our results only point in the direction of the plausibility of the investigated relationships, and future longitudinal and experimental studies are necessary to validate our findings.

We also cannot conclude that the associations we found for individual and collective pro-environmental intentions also extend to actual behavior. Although behavioral intentions present a strong, proximal determinant for behavior [92], there still remains a well-established intention-behavior gap [93, 94] that has also been show for pro-environmental intentions and behavior [95–97].

Implications and Future Directions

The present findings point to two complementary avenues for promoting PEB (intentions) across adulthood. First, if conservatism represents an important pathway through which age is associated with lower PEB intentions, climate communication targeting older adults may need to engage more directly with conservative values. Rather than framing environmental protection primarily in progressive or transformative terms, campaigns could emphasize the preservation of natural resources and ways of life that have long been valued and are worth conserving. Presenting environmental stewardship as an act of continuity and responsibility may therefore help reduce ideological barriers to climate action [80]. Second, the absence of a consistent age-related increase in eco-generativity suggests that concern for future generations may constitute a motivational resource across adulthood rather than one that is specific to later life. This motivation could therefore be leveraged in interventions and public campaigns aimed at promoting environmental action among people of all ages. Such efforts might emphasize the protection of natural resources for future generations, without necessarily restricting this appeal to biological descendants.

Future research should also examine whether these pathways operate differently across specific forms of PEB. In the present studies, the indirect associations of age with individual and collective PEB intentions followed similar patterns, irrespective of whether they involved climate change denial, eco-generativity, or conservatism. Although this suggests that the interpretations outlined above may apply broadly to both private-sphere and

collective forms of PEB, prior research indicates that age differences vary across different environmental behaviors [37,98]. Differential indirect effects may therefore emerge when more specific behaviors are considered. Given the importance of political and institutional action for climate change mitigation, as well as the central role of political ideology in shaping PEB, future studies should place particular emphasis on collective and political forms of engagement, including protest participation, support for environmental policies, and voting behavior.

Conclusion

Overall, rather than providing clear support for stable and opposing pathways, the findings suggest that the role of eco-generativity and climate change denial may be more context-dependent or less robust than initially assumed. At the same time, the consistent involvement of conservatism across both studies underscores its potential importance in understanding age-related differences in environmental engagement. While we found some evidence that eco-generativity may function as a resource for PEB intentions in later life, its role as a pathway to PEB intentions among older adults was not consistently supported across studies. These results point to the need for a more integrative perspective that considers ideological factors alongside developmental processes when examining both individual and collective pro-environmental behavior across the lifespan.

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Table 1

Means, Standard Deviations and Correlations for All Variables in Study 1

	M	*SD*	1.	2.	3.	4.	5.	6.	7.	8.
1. Age	47.50	17.91	-							
2. Denial	2.24	1.17	.19**	-						
3. Eco-Generativity	4.57	1.21	.22**	-.23**	-					
4. Individual PEB	2.81	0.58	-.07	-.47***	.55***	-				
5. Collective PEB	2.52	0.72	-.16*	-.45***	.53***	.72***	-			
6. Conservatism	2.54	0.82	.33***	.32***	.02	-.34***	-.30***	-		
7. Parental Status	-	-	.73***	.21**	.10	-.10	-.17*	.31***	-	
8. Grandparental Status	-	-	.60***	.19*	.05	-.16*	-.13	.25***	.43***	-

Note. PEB = Pro-Environmental Behavior Intentions, M = Mean, SD = Standard Deviation

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 2

Results With Unstandardized Regression Coefficients for Study 1 Without and With Covariates

	Model 1 (without covariates)			Model 2 (with covariates)		
Path	*b* (SE)	95% CI	*p*	*b* (SE)	95% CI	*p*
Age → Denial	0.003 (0.008)	[-0.014, 0.017]	.750	**0.013** (0.005)	[0.003, 0.022]	.007
Age → Eco-Generativity	**0.026** (0.009)	[0.007, 0.043]	.004	**0.015** (0.006)	[0.004, 0.026]	.008
Age → Individual PEB	-0.001 (0.003)	[-0.008, 0.004]	.640	-0.004 (0.002)	[-0.008, 0.000]	.063
Denial → Individual PEB	**-0.127** (0.030)	[-0.187, -0.072]	<.001	**-0.168** (0.029)	[-0.228, -0.113]	<.001
Eco-Generativity → Individual PEB	**0.237** (0.031)	[0.175, 0.299]	<.001	**0.237** (0.032)	[0.177, 0.301]	<.001
Age → Collective PEB	-0.009 (0.005)	[-0.018, 0.000]	.059	**-0.009** (0.003)	[-0.014, -0.004]	.001
Denial → Collective PEB	**-0.137** (0.050)	[-0.238, -0.041]	.007	**-0.180** (0.048)	[-0.270, -0.084]	<.001
Eco-Generativity → Collective PEB	**0.307** (0.038)	[0.235, 0.383]	<.001	**0.305** (0.037)	[0.235, 0.380]	<.001

Note. Significant Estimates are printed bold. Standardized regression coefficients are presented in Figure 2 CI = Bootstrap confidence intervals (5000 simulations). PEB = Pro-Environmental Behavior Intentions. For the coefficients of covariates, see Supplement A.

Table 3

Full Results for The Exploratory Model with Conservatism and Eco-Generativity as Mediators in Study 1

Path	*b* (SE)	95% CI	β	*p*
Age → Conservatism	**0.015** (0.003)	[0.009, 0.021]	.334	<.001
Age → Eco-Generativity	**0.015** (0.006)	[0.004, 0.026]	.219	.008
Age → Individual PEB	-0.003 (0.003)	[-0.007, 0.001]	-.092	.153
Conservatism → Individual PEB	**-0.232** (0.047)	[-0.325, -0.141]	-.330	<.001
Eco-Generativity → Individual PEB	**0.274** (0.032)	[0.211, 0.338]	.576	<.001
Age → Collective PEB	**-0.008** (0.003)	[-0.013, -0.003]	-.202	.002
Conservatism → Collective PEB	**-0.221** (0.063)	[-0.340, -0.095]	-.251	<.001
Eco-Generativity → Collective PEB	**0.345** (0.038)	[0.271, 0.418]	.580	<.001

Note. Significant Estimates are printed bold. CI = Bootstrap confidence intervals (5000 simulations). PEB = Pro-Environmental Behavior Intentions.

Table 4

Means, Standard Deviations and Correlations for All Variables in Study 2

	M	*SD*	1	2	3	4	5	6	7	8
1. Age	49.64	15.70	-							
2. Denial	3.08	1.54	0.10	-						
3. Eco-Generativity	4.20	1.60	-0.07	-0.44***	-					
4. Individual PEB	2.45	0.70	-0.12*	-0.49***	0.70***	-				
5. Collective PEB	2.22	0.84	-0.14**	-0.45***	0.67***	0.74***	-			
6. Conservatism	2.92	0.78	0.18**	0.30***	0.00	-0.21***	-0.22***	-		
7. Parental Status	-	-	0.40***	0.05	-0.01	-0.01	-0.02	0.17	-	
8. Grandparental Status	-	-	0.61***	0.03	-0.03	-0.07	-0.04	0.17	0.41	-

Note. PEB = Pro-Environmental Behavior Intentions, *M* = Mean, *SD* = Standard Deviation

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 5

Results with Unstandardized Regression Coefficients for Study 2 Without and With Covariates

	Model 3 (without covariates)			Model 4 (with covariates)		
Path	*b* (SE)	95% CI	*p*	*b* (SE)	95% CI	*p*
Age → Denial	0.010 (0.006)	[-0.002, 0.023]	.113	**0.010** (0.005)	[0.000, 0.020]	.044
Age → Eco-Generativity	-0.009 (0.008)	[-0.024, 0.006]	.230	-0.007 (0.005)	[-0.018, 0.004]	.186
Age → Individual PEB	-0.002 (0.002)	[-0.006, 0.002]	.388	-0.002 (0.002)	[-0.005, 0.001]	.132
Denial → Individual PEB	**-0.075** (0.024)	[-0.122, -0.027]	.002	**-0.101** (0.025)	[-0.148, -0.053]	<.001
Eco-Generativity → Individual PEB	**0.274** (0.021)	[0.233, 0.316]	<.001	**0.262** (0.021)	[0.222, 0.304]	<.001
Age → Collective PEB	**-0.005** (0.003)	[-0.010, -0.000]	.039	**-0.004** (0.002)	[-0.008, -0.000]	.044
Denial → Collective PEB	**-0.067** (0.028)	[-0.120, -0.012]	.014	**-0.103** (0.027)	[-0.155, -0.047]	<.001
Eco-Generativity → Collective PEB	**0.321** (0.025)	[0.271, 0.372]	<.001	**0.306** (0.025)	[0.255, 0.356]	<.001

Note. Significant Estimates are printed bold. Standardized regression coefficients are presented in Figure 2. CI = Bootstrap confidence intervals (5000 simulations). PEB = Pro-Environmental Behavior Intentions. For coefficients of covariates, see Supplement A.

Table 6

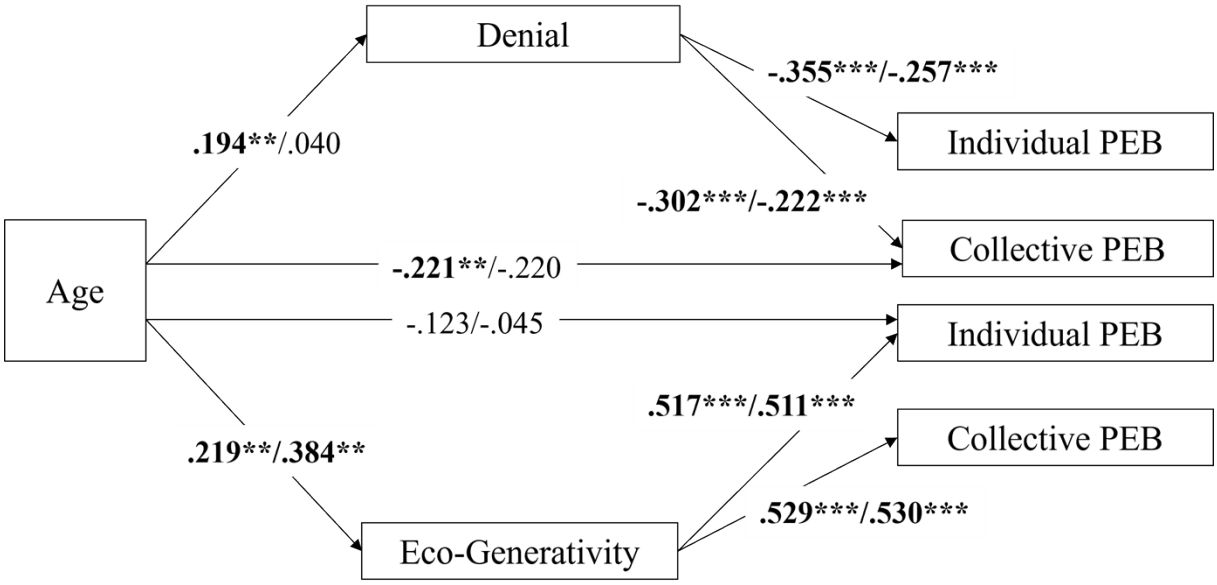
Full Results for The Exploratory Model with Conservatism and Eco-Generativity as Mediators in Study 2

Path	*b* (SE)	95% CI	β	*p*
Age → Conservatism	**0.009** (0.002)	[0.004, 0.014]	.179	<.001
Age → Eco-Generativity	-0.007 (0.006)	[-0.018, 0.004]	-.071	.186
Age → Individual PEB	-0.001 (0.002)	[-0.005, 0.002]	-.033	.359
Conservatism → Individual PEB	**-0.185** (0.034)	[-0.256, -0.120]	-.205	<.001
Eco-Generativity → Individual PEB	**0.306** (0.016)	[0.273, 0.337]	.696	<.001
Age → Collective PEB	-0.003 (0.002)	[-0.007, 0.001]	-.055	.170
Conservatism → Collective PEB	**-0.224** (0.050)	[-0.324, -0.127]	-.207	<.001
Eco-Generativity → Collective PEB	**0.350** (0.020)	[0.311, 0.389]	.666	<.001

Note. Significant Estimates are printed bold. CI = Bootstrap confidence intervals (5000 simulations). PEB = Pro-Environmental Behavior Intentions.

Figure 1

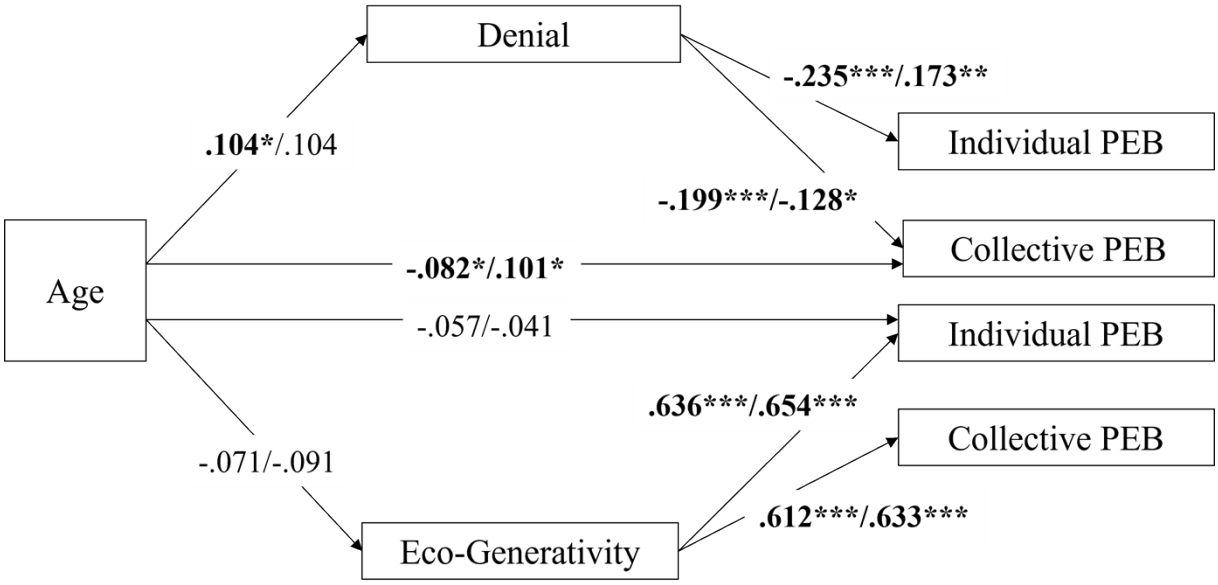
Direct Paths with Standardized Regression Coefficients for Study 1 Without and With Covariates (Model 1 and Model 2)



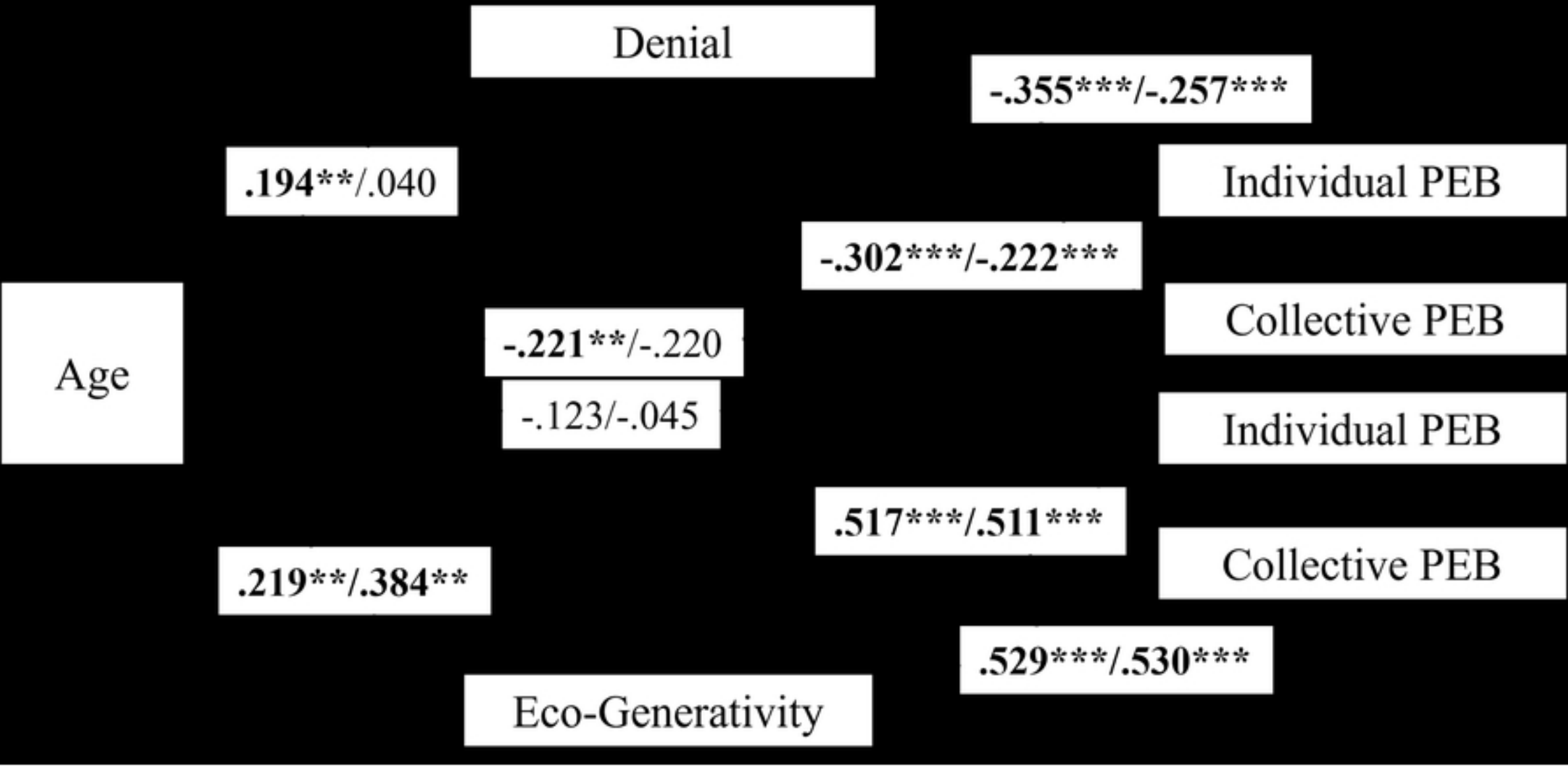
Note. Standardized coefficients are reported as Model 1 (without covariates) / Model 2 (with covariates). PEB = Pro-Environmental Behavior Intentions. Significant coefficients are printed bold. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Figure 2

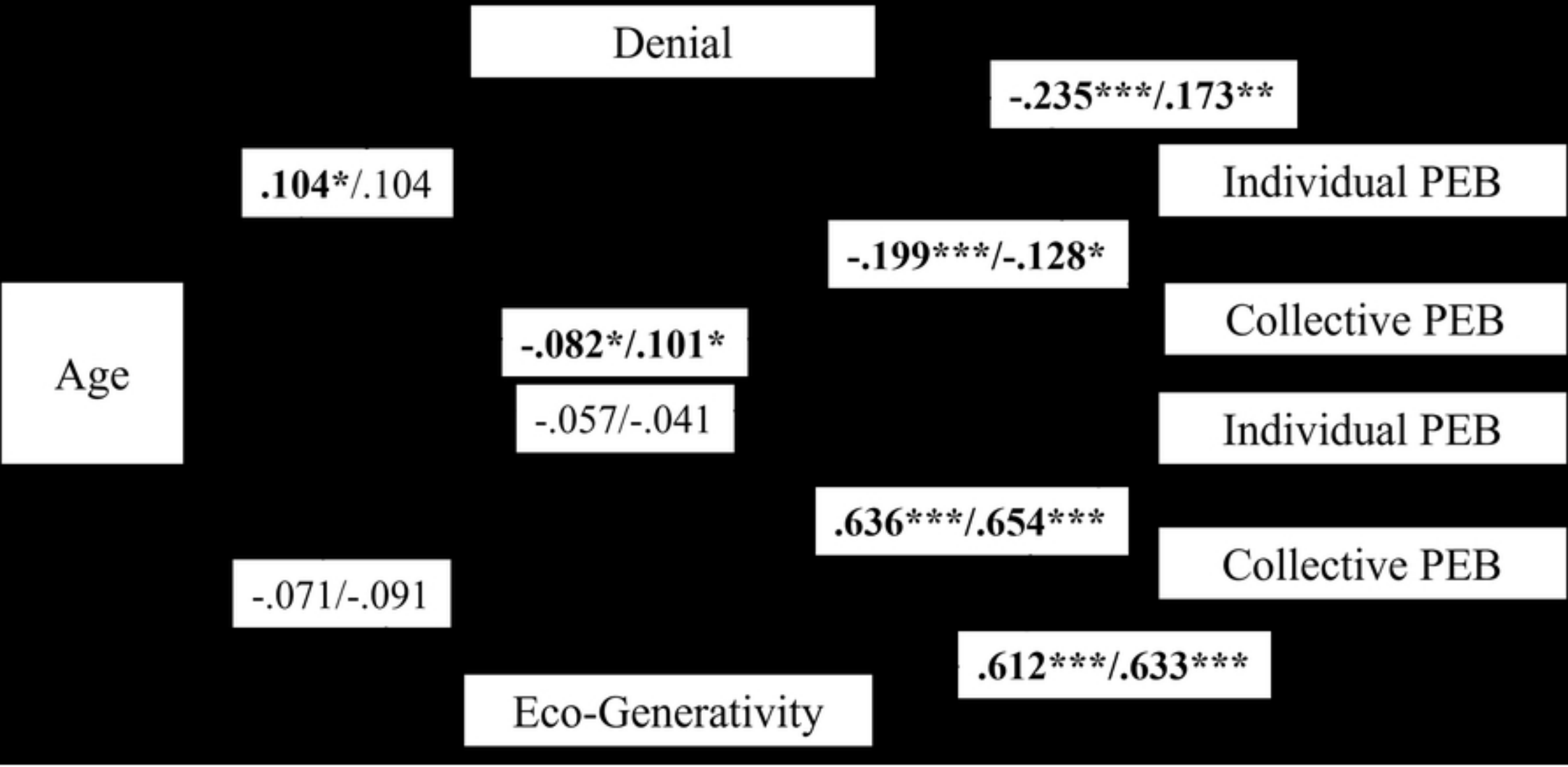
Direct Paths with Standardized Regression Coefficients for Study 2 Without and With Covariates (Model 3 & Model 4)



Note. Standardized coefficients are reported as Model 3 (without covariates) / Model 4 (with covariates). PEB = Pro-Environmental Behavior Intentions. Significant coefficients are printed bold. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.


Denial
-.355***/-.257***
.194**/.040
Individual PEB
-.302***/-.222***
Collective PEB
Age
-.221**/-.220
-.123/-.045
Individual PEB
.517***/.511***
.219**/.384**
Collective PEB
.529***/.530***
Eco-Generativity

Figure


Denial
-.235***/.173**
.104*/.104
Individual PEB
-.199***/-.128*
Collective PEB
Age
-.082*/.101*
-.057/-.041
Individual PEB
.636***/.654***
Collective PEB
-.071/-.091
.612***/.633***
Eco-Generativity

Figure