

# Enhancing personal and planetary wellbeing: A comparative study of the "3 Good Things" and "3 Good Things in Nature" interventions

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**Abstract:** In this preregistered study, we compared the efficacy of the standard "Three Good Things" (3GT) intervention to a nature-based adaptation, "Three Good Things in Nature" (3GTiN), in enhancing well-being and nature-related outcomes. For one week, participants (N = 330) were randomly assigned to either note three good things that happened each day (3GT condition) or note three good things they noticed in everyday nature each day (3GTiN condition). Results revealed that 3GTiN was statistically equivalent to 3GT in boosting affect balance and life satisfaction, while also offering additional well-being benefits, namely greater transcendent connectedness (feeling connected to other humans, to nature, and to life in general) and elevation (a composite emotion which includes feeling deeply appreciative, profoundly touched, morally uplifted). Further, engagement in the 3GTiN intervention increased nature connectedness, which emerged as a strong predictor of intention to engage in pro-environmental behaviour. Levels of eco-anxiety did not significantly differ between the two conditions. Qualitative analyses of over 10,000 responses provided several additional insights, including nature being a prominent good thing mentioned in the standard 3GT intervention. The present research provides additional evidence of 3GTiN's potential for helping to promote aspects of both personal and planetary well-being.

**Keywords:** wellbeing, PPI, nature, three good things, three good things in nature, eco-anxiety

*"I feel a lot of gratitude for the nature that I experience and it feels central to my well-being"*  
(Participant 5075667)

## 1. Introduction

As evidenced by the wide variety of empirically-supported positive psychological interventions (PPIs), there are numerous pathways to boost wellbeing, including using character strengths, imagining one's best possible self, and practicing kindness (see mega-analysis by Carr et al., 2023). Of the numerous evidence-based PPIs available on the University of California, Berkeley's Greater Good Science Center's Greater Good in Action website (<http://ggia.berkeley.edu>) "Three Good Things" (3GT) is ranked as the most popular. Since its initial development by Seligman and colleagues in 2005, a multitude of researchers in

numerous studies have utilized 3GT to boost wellbeing in a variety of participant samples either by itself or as part of a wellbeing program (Adair et al., 2020; Bahnik et al., 2015; Baumsteiger et al., 2018; Carter et al., 2016; Frein & Ponsler, 2014; Killen & Macaskill, 2015; Krentzman et al., 2015; Luo et al., 2019; Mongrain & Anselmo-Matthews, 2012; Odou & Vella-Brodrick, 2013; Pietrowsky & Mikutta, 2012; Profit et al., 2021; Sekizawa & Yoshitake, 2015; Sexton & Adair, 2019; Uechi et al. 2024). Several adaptations of 3GT have also been developed and tested: three funny things (Gander et al., 2013; Proyer et al., 2014; Wellenzohn et al., 2016), three good financial things (Asbedo et al., 2016), and even three things you like about yourself in mathematics (JenBen, 2024). Clearly the basic structure of the 3GT intervention works.

There are, of course, other pathways to boosting wellbeing. Engaging with nature is one such pathway, which a growing body of consistent evidence demonstrates is effective (see reviews: Capaldi et al., 2015; Hunt et al., 2021; McMahan & Estes, 2015; Russell et al., 2013; Shanahan et al., 2019; Silva et al., 2023). Indeed, nurturing one's sense of nature connectedness—defined as "an emotional sensibility that one is part of the larger cycle of life and broader natural environment", Lambert, Lomas et al., 2020, p. 5)—is so consistently predictive of wellbeing (see meta-analyses: Capaldi et al., 2014; Pritchard et al., 2020), that relating to nature has been proposed as a basic psychological need (Baxter & Pelletier, 2019; Hurley & Walker, 2019).

Despite this evidence, nature has largely been ignored in positive psychology. As Passmore, Yang, and Sabine (2022) noted, not one of the seven meta-analyses published on individual PPIs or composite PPI programs includes a study which utilized a nature-based wellbeing intervention (Bolier et al., 2013; Carr et al., 2021; Hendriks et al., 2018; Sin & Lyubomirsky, 2009; van Agteren et al., 2021; Weiss et al., 2016). Nonetheless, awareness of the benefits of nature are becoming more prominent, particularly as environmental crises grow. Steger (2024) recently noted in his call for a Regenerative Positive Psychology, "without an environment that can sustain life, all other assumptions about the good life will be fundamentally senseless" (p. 8). Ryff (2022), in proposing pathways forward for positive psychology, advocated for a focus on nature-based PPIs as an important "domain for nourishing good lives, while also strengthening commitments to take care for our planet (p. 2)". Similarly, Steger (2024) argued for developing interventions which cultivate traits that make each of us positive caretakers of the systems that support wellbeing, and for assessing ecological behaviours as secondary outcomes of interventions.

A key trait that predicts pro-environmental behaviour is nature connectedness (Frantz & Mayer, 2014; Gosling & Williams, 2010; Hoot & Friedman, 2011; Jacobs & McConnell, 2022; Richardson et al., 2020; see also meta-analyses by Mackay & Schmitt, 2019; Whitburn et al., 2020). Yet, few studies have tested these associations experimentally; that is, by purposefully enhancing nature connectedness and then examining differential effects in wellbeing and pro-nature behaviours (e.g., Passmore et al., 2025).

### 1.1 *The current study*

The current study aimed to help address this gap. We manipulated nature connectedness via the Three Good Things in Nature intervention (3GTiN; Richardson & Sheffield, 2017), an adaptation of the 3GT PPI (Seligman et al., 2005). Originally developed as a nature connectedness intervention, 3GTiN has evidenced efficacy not only in boosting nature connectedness, it has also demonstrated efficacy at boosting wellbeing and pro-nature conservation behaviours (Pocock et al., 2023). In light of calls for positive psychology to focus attention on interventions that go beyond solely enhancing individual wellbeing (Ryff, 2022;

Steger, 2024), we chose the popular 3GT intervention as our comparison condition rather than using a wait-list or placebo control. This approach allowed us to examine the relative effectiveness of each intervention to boost wellbeing, *and* nature-related outcomes.

We also wished to examine the impact of these interventions on feelings of eco-anxiety: "persistent feelings of worry, anxiety, dread, or doom regarding environmental degradation and the impact and implications of climate change on our planet as a whole" (Passmore et al., 2023, p. 140). It is not surprising that rising awareness of environmental crises (United Nations, 2021) is also spawning rising levels of eco-anxiety, particularly among younger generations (Edwards et al., 2024; Galway & Field, 2023; Hickman, 2020; Whitmarsh et al., 2022; Wu et al., 2020) and that eco-anxiety is positively associated with pro-nature behaviour (Bouman et al., 2020; Curll et al., 2022; Galway et al., 2021; Lutz, Passmore et al., 2023; Lutz, Zelenski, & Newman, 2023; Whitmarsh et al., 2022). Nor is it surprising that nature connectedness and eco-anxiety are positively correlated (Curll et al., 2022; Galway et al., 2021; Lutz, Passmore et al., 2023; Whitmarsh et al., 2022; Wullenkord et al., 2024;). Essentially, we hurt for that to which we are connected.

Nonetheless, it is possible that short-term noticing of good things in nature may somewhat relieve eco-anxiety. Passmore and colleagues (2023) proposed that fostering a connection with nature may be an important aspect of coping with feelings of eco-anxiety, along with acknowledging one's feelings and pro-nature actions. Support for this proposition can be found in climate activist Naomi Klein's (2020) comment that an important way to deal with eco-anxiety is to prioritize "opportunities to connect with the natural world that are not all about peril", in the comments of Kelly's (2017) and Westoby et al.'s (2022) participants who wrote of how maintaining a connection with nature was vital to their coping with eco-anxiety, and in the eco-anxiety treatment plans of mental health practitioners interviewed by Baudon and Jachens (2021).

## 1.2 Hypotheses

Compared to participants in the 3GT condition, we hypothesized that those in the 3GTiN condition would, at post-intervention, report significantly higher levels of nature connectedness (H1), transcendent connectedness (H2), and elevation (H3) We also hypothesized that those in the 3GTiN condition would report either significantly higher levels of net-positive affect and life satisfaction or that they would be significantly non-inferior to the 3GT on these variables (H4). Additionally, we hypothesized that participants in the 3GTiN condition would report significantly higher levels of intentions to engage in pro-nature behaviour (H5) and significantly lower levels of eco-anxiety (H6).

We also made several chain-of-event hypotheses, anticipating that participants in the 3GTiN condition would, at post-intervention, report the following: significantly higher levels of nature connectedness, which in turn would predict significantly greater levels of intentions to engage in pro-nature behaviour (H7); significantly greater levels of intentions to engage in pro-nature behaviour, which would in turn would predict significantly lower levels of eco-anxiety (H8); and significantly higher levels of nature connectedness, which would in turn predict significantly greater intentions to engage in pro-nature behaviour, and subsequently significantly lower levels of eco-anxiety (H9). All hypotheses and methods were pre-registered at [https://osf.io/63vu2/?view\\_only=aa28d0ff95c2402981380bdcdbdf7ce08](https://osf.io/63vu2/?view_only=aa28d0ff95c2402981380bdcdbdf7ce08). All instructions and questionnaires are also available at our OSF page, along with the dataset and analyses.

We report how we determined our sample size, data exclusions (if any), all manipulations, and all measures in the study (as per Simmons et al., 2012). We also note measures that were

completed at the same time as the current study but are not reported herein, as some data were collected for the purpose of a separate study and some data were collected for exploratory purposes.

## 2. Method

### 2.1 Recruitment and participants

Participants were recruited from two Canadian universities and a university in the United Kingdom, as well as from social media ads. The recruitment poster invited participants to “take part in a research study in which variations of a wellbeing intervention are being studied for their efficacy in enhancing wellbeing.” No mention of nature was made so as to avoid initial self-selection bias of participants who had greater affiliation with nature. All participants were fluent in written and spoken English. We aimed to recruit a total of 450 participants to provide adequate power to detect a medium effect size. A total of 506 participants were recruited. Of these, data from 176 participants were dropped, as per our pre-registration, for failing to complete the post-measures, failing either the pre- or post-measure attention check item, or for not engaging in their randomly assigned intervention task for a minimum of 6 out of the 7 days<sup>1</sup>. Thus, our final sample size consisted of 330 participants (see Table 1 for power sensitivity analysis). The mean age of participants was 23.12 years ( $SD = 8.67$ ,  $Median = 19.00$ ; range: 18-64); 61 participants identified as male, 256 as female, 1 as transgender, 1 checked “prefer not to say”, 11 did not complete this question. See Table 2 for breakdown by sample.

**Table 1.** Power sensitivity analysis

Power to Detect	$N = 330$
$\leq 50\%$	$0 < d \leq 0.216$
50% – 80%	$0.216 < d \leq 0.309$
80% – 95%	$0.309 < d \leq 0.398$
$\geq 95\%$	$d > 0.398$

Note. For our sample of  $N = 330$ , power to detect  $d = 0.25$  is 61.90%.

**Table 2.** Participant demographics by sample

Sample	$N$	Age	Gender
CDN University 1	138	$M = 19.44$ , $SD = 2.34$ , range: 18-36	$M = 18.12\%$ , $F = 81.16\%$ , $T = 0.72\%$
CDN University 2	120	$M = 21.27$ , $SD = 5.53$ , range: 18-52	$M = 19.30\%$ , $F = 80.70\%$ , $T = 0.00\%$
UK University	34	$M = 37.23$ , $SD = 11.69$ , range: 20-56	$M = 22.58\%$ , $F = 77.42\%$ , $T = 0.00\%$
UK Community	38	$M = 31.44$ , $SD = 11.91$ , range: 18-64	$M = 20.00\%$ , $F = 80.00\%$ , $T = 0.00\%$

Note. M = Male, F = Female, T = Transgender

<sup>1</sup> There was not a significant difference in number of participants who failed to engage in the 3GT vs 3GTiN a minimum of 6 out of the 7 days,  $t(47.00) = -0.99$ ,  $p = .323$ , nor for mean number of days,  $t(47) = 1.18$ ,  $p = .242$ .

## 2.2 Measures<sup>2</sup>

All measures were asked both pre- and post-intervention, with the exception of anxiety (which was only asked pre-intervention), and 'time in nature' and 'what did you learn' questions which were only asked post-intervention. All measures utilized were commonly used, previously validated assessments.

### 2.2.1 Wellbeing

*Positive and negative affect.* The 12-item Scale of Positive and Negative Experiences (Diener et al., 2010) includes six words pertaining to positive emotions (e.g., good, joyful) and six words pertaining to negative emotions (e.g., bad, sad). Respondents rate each item on a 5-point scale from 1 (*very rarely or never*) to 5 (*very often or always*) to indicate the extent to which they experience each of the listed emotions. A single index of affect balance, net-positive affect (netPA), was calculated. McDonald's  $\omega_t$  was .93.

*Satisfaction with life.* The Satisfaction with Life Scale (Diener et al., 1985) is a five-item scale that measures life satisfaction. Participants rate items (e.g., The conditions of my life are excellent) on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). McDonald's  $\omega_t$  was .94.

*Transcendent connectedness.* Six items were selected from the Metapersonal Self Scale (DeCicco & Stroink, 2007; see also Passmore, Yang, & Sabine, 2022; Passmore, Yargeau, & Blench, 2022) to assess the extent to which an individual feels connected to wider aspects of humankind and life in general. Items (e.g., "My sense of identity is based on something that unites me with all other people" and "I see myself as being extended into everything else") are rated on a 7-point scale with end points of 1= *strongly disagree* and 7 = *strongly agree*. McDonald's  $\omega_t$  was .92.

*Elevation.* Huta and Ryan's (2010) Elevating Experience Scale is a 13-item scale that assesses a variety of emotions (e.g., inspired, elevated, deeply appreciative, profoundly touched, emotionally moved). Items are rated using a 7-point scale with endpoints 1 (*not at all*) and 7 (*extremely*), according to the degree to which each item describes how the respondent typically feels. McDonald's  $\omega_t$  was .97.

### 2.2.2 Nature connectedness

Two measures were used to assess nature connectedness. The single-item Inclusion of Nature in Self scale (Schultz, 2001) is rated by choosing one of seven diagrams depicting increasing degrees of overlap between a circle labeled "Self" and one labeled "Nature". Mayer and Frantz's (2004) Connectedness to Nature Scale is composed of 14 items that assess a sense of oneness with the natural world (e.g., "I often feel a sense of oneness with the natural world around me"). Items are rated on a 5-point scale with endpoints 1 (*strongly disagree*) and 5 (*strongly agree*). McDonald's  $\omega_t$  was .92. A composite score was calculated by standardizing scores on both scales and calculating a mean. McDonald's  $\omega_t$  for this composite measure was .92.

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<sup>2</sup> As noted in our pre-registration, measures of environmental activism (Schmitt et al., 2019), cognitive alternatives to the status quo (Wright et al., 2020), politicized environmental identity (Schmitt et al., 2019), and climate change anxiety (Clayton & Karazia, 2020) were also included for purposes of a separate study or for possible exploratory analyses, as was social connection time; as such, these measures are not reported herein.

### 2.2.3 Anxiety/concern regarding the environment and climate change

*Eco-anxiety.* A composite measure was created comprising 8 items adapted from various measures (Ballew et al., 2019; Berenguer et al., 2005; Helm et al., 2018; Homburg et al., 2007; Verplanken & Roy, 2013) to assess eco-anxiety. Example items are: "To what extent are you concerned about the situation of the environment in general?"; "How worried are you about biodiversity loss and extinction of species?"; "How often do you have thoughts about the environment, which you find worrying, uncomfortable, or upsetting?" Rating of items differed across items; all ratings were made on Likert-type scales with higher numbers indicating greater eco-anxiety, for example, a 5-point scale with endpoints 1 (*not at all stressed*) to 5 (*extremely stressed*), and a 4-point scale with endpoints 1 (*not at all worried*) to 4 (*very worried*). To create the composite measure, scores were standardized and the mean computed. McDonald's  $\omega_t$  was .97.

### 2.2.4 Anxiety

The anxiety subscale of the Depression, Anxiety, and Stress Scale (Henry & Crawford, 2005) contains 7 items, such as, "I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)." Participants were asked to report how often they experience the symptoms, listed on a scale from 0 (*never*) to 3 (*almost always*). McDonald's  $\omega_t$  was .83.

### 2.2.5 Intention to engage in pro-environmental behaviours

Two scales were used to assess the degree to which participants intended to engage in pro-environmental behaviours over the next two years. The Pro-Environmental Consumer Behaviours Scale (Schmitt et al., 2019) is a 16-item measure which assesses the degree to which individuals engage in (intend to engage in) several pro-environmental behaviours. Example items are: "I will eat more plants (such as vegetables, fruits, legumes, and grains) and less meat."; "I will reduce my consumption overall (having fewer material goods)." McDonald's  $\omega_t$  was .95. The Pro-nature Conservation Behaviour Scale – Short Form (Barbett et al., 2020) is an 8-item measure that assesses the degree to which individuals engage in (or intend to engage in) behaviours that promote biodiversity. Example items are: "I will get in touch with local authorities on nature conservation issues.", "I will plant pollinator-friendly plants." Items for both scales were rated on a 7-point scale with endpoints of 1 (*strongly disagree*) to 7 (*strongly agree*). McDonald's  $\omega_t$  was .93. A composite score was calculated by taking the average of the scores from both scales, given that both scales used the same 7-point response scale. McDonald's  $\omega_t$  for the composite measure was .97.

### 2.2.6 Time in nature

At the end of the study, participants were asked to estimate (in hours) how much time they had spent in nature over the past week. The question noted that 'nature' was defined as "any area that is predominantly not human-built. This could be a back yard or front yard garden, an urban green-space park, sitting by a river even if in an urban built area. etc."

### 2.2.7 Open-ended question

At the end of the study, all participants were asked to comment on what they learned or gained from participating in the study.<sup>3</sup>

### 2.3 Procedure

After reading the ad and consenting to participate, participants entered their email address, which triggered an automatic email from the system (Qualtrics). This email included a randomly-generated participant ID code and a personalized link to Part 1 of the study, along with instructions to plan for 40 minutes of uninterrupted time in quiet space before clicking on the link. Responses throughout the study were only identified with the anonymous ID number and were not linked to any personally identifying information. In Part 1, participants completed the pre-measures and were then randomly assigned to engage in one of two variations of the Three Good Things wellbeing intervention: (1) a slightly modified 'standard' Three Good Things intervention (3GT) wherein participants notice and log three good things that happened each day over seven days, or (2) the Three Good Things in Nature (3GTiN) intervention wherein participants notice and log three good things encountered in everyday nature each day over seven days. Participants received a daily email for the next seven days reminding them of their assigned intervention to engage in, along with a personalized link to log their respective three good things (Part 2 of the study).

On the eighth day, participants received an email with a personalized link to Part 3 of the study; participants were asked to block off about 40 minutes of uninterrupted time in quiet space before clicking on the link within the next 48 hours. Participants answered the post-measures (same as the pre-measures), plus the study's open-ended qualitative questions, and the demographic questions. After completing the questionnaires, participants were debriefed and asked if they would like to withdraw their responses from the study. Participants were then redirected to a separate Qualtrics page where they entered their identifying information so that the researchers could grant points/credits (for university students). Non-university participants had an opportunity to enter their email address, which entered them into a draw to win one of ten Amazon gift vouchers.

## 3. Quantitative results

### 3.1 Hypothesis tests

All analyses were conducted using jamovi (v. 2.5.5) or SPSS (v 27). Hypotheses regarding differences between the 3GT ( $n = 170$ ) and the 3GTiN ( $n = 160$ ) conditions were tested via a series of ANCOVAs conducted using pre-measure scores as a covariate in each analysis.<sup>4</sup> Assumptions were met for conducting ANCOVAs. HC3 method was used to estimate significance levels. This method utilizes heteroskedasticity-consistent standard error estimators and produces resultant significance values (see recommendation by Hayes & Cai, 2007). For detailed statistics of all ANCOVAs for H1 through H6, see Table 3 (below).

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<sup>3</sup> For exploratory purposes for a different study, participants were asked to respond yes/no if eco-anxiety was something they experienced. For those who responded "yes", open-ended questions were asked regarding which aspects of the global environmental situation, and which daily experiences, give rise to/provoke their eco-anxiety, as well as what helpful strategies had they engaged to cope with their eco-anxiety.

<sup>4</sup> This is a departure from our pre-registration wherein we, in error, stated that  $t$ -tests would be used.

### 3.1.1 H1, 2, 3: Nature connectedness, transcendent connectedness, and elevation

Post-intervention levels of nature connectedness (H1), transcendent connectedness (H2), and elevation (H3) were, as hypothesized, significantly higher in the 3GTiN condition ( $d_{\text{Nature Connectedness}} = 0.27, 0.28, 0.29$ ;  $d_{\text{TranscendentConnectedness}} = 0.29$ ;  $d_{\text{Elevation}} = 0.40$ ).

**Table 3.** Hypothesis tests: ANCOVAs for H1 to H6

	3GT <i>n, M (SE)</i>	3GTiN <i>n, M (SE)</i>	ANCOVA	<i>d</i> [95% CI]
H1. Composite Nature Connectedness	163, -0.48 (.27)	145, 0.44 (.29)	$F(1, 305) = 5.39, p = .021$ ; HC3: $p = .022$	0.27 [0.04, 0.49]
Connectedness to Nature Scale	169, 68.20 (.49)	152, 70.01 (.52)	$F(1, 318) = 6.37, p = .012$ ; HC3: $p = .013$	0.28 [0.06, 0.50]
Inclusion of Nature in Self	164, 3.61 (.08)	145, 3.90 (.08)	$F(1, 306) = 6.53, p = .011$ ; HC3: $p = .010$	0.29 [0.07, 0.52]
H2. Transcendent Connectedness	168, 28.06 (.32)	151, 29.26 (.34)	$F(1, 316) = 6.51, p = .011$ ; HC3: $p = .012$	0.29 [0.06, 0.51]
H3. Elevation	168, 57.28 (.71)	149, 60.95 (.76)	$F(1, 314) = 12.48, p < .001$ ; HC3: $p = .001$	0.40 [0.17, 0.62]
H4. Affect Balance	167, 4.98 (.29)	151, 4.65 (.30)	$F(1, 315) = 0.63, p = .428$ ; HC3: $p = .435$	0.09 [-0.31, 0.13]
H4. Satisfaction with Life	168, 23.27 (.29)	151, 23.01 (.31)	$F(1, 316) = 0.38, p = .540$ ; HC3: $p = .546$	0.07 [-0.29, 0.15]
H5. Composite Intention to Engage in PEB	162, 5.03 (.04)	149, 5.09 (.04)	$F(1, 308) = 1.32, p = .252$ ; HC3: $p = .254$	0.13 [-0.09, 0.35]
Pro-Environmental Consumer Behaviours	166, 86.57 (.63)	151, 87.89 (.66)	$F(1, 314) = 2.08, p = .150$ ; HC3: $p = .152$	0.16 [-0.06, 0.38]
Pro-Nature Conservation Behaviours	164, 33.92 (.43)	149, 34.51 (.45)	$F(1, 310) = 0.91, p = .341$ ; HC3: $p = .349$	0.11 [-0.12, 0.33]
H6. Eco-anxiety	169, -0.18 (.34)	151, 0.33 (0.36)	$F(1, 317) = 1.10, p = .296$ ; HC3: $p = .301$	0.11 [-0.11, 0.33]

*Note.* pre-scores were controlled for in all analyses. Anxiety was used as an additional covariate in the analysis of eco-anxiety. Individual scales which comprised the two composite measures are included for thoroughness. Means reported are estimated marginal means controlling for pre-scores. PEB = Pro-Environmental Behaviours

\*Results remained virtually the same in significance and effect size when also controlling for age, social contact, and time in nature

### 3.1.2 H4: Affect balance and satisfaction with life

Our hypotheses H4a and H4b were that affect balance and satisfaction with life would either be significantly higher in the 3GTiN condition or statistically equivalent<sup>5</sup> to the 3GT condition. Given that the ANCOVA tests were non-significant ( $d_{\text{affectbalance}} = .09$ ;  $d_{\text{satisfactionwithlife}} = 0.09$ ), equivalence tests were conducted (see Lakens, 2017; Lakens et al., 2018) utilizing the TOSTER module (v. 0.4.0) for jamovi (v. 2.5.5).

Equivalence (or non-inferiority) testing is used to determine if new interventions are at least as good as—that is, equivalent or non-inferior to—standard interventions. Lower ( $-\Delta_l$ ) and upper ( $\Delta_u$ ) boundary values are calculated for the smallest effect size of interest (i.e., a mean

<sup>5</sup> This is a departure from our pre-registration wherein we, in error, stated significantly higher or “statistically non-inferior” rather than statistically higher or “statistically equivalent”.

difference in effect considered meaningful). Boundary values can be stated as effect sizes or the equivalent raw value of scores. An equivalence test examines whether an intervention effect is inside the prespecified equivalence margin  $[-\Delta_l, \Delta_u]$ . A non-inferiority test examines whether an intervention effect is at least above a prespecified non-inferiority margin  $-\Delta_l$ . Thus, such testing examines whether one can reject the hypothesis that the mean difference in effects between groups is extreme enough to be considered meaningful.

Specifically, the TOST (Two One-Sided Test) method involves two separate hypothesis tests: First, pertaining to the upper level boundary where:

$H_0$ : The difference between the two groups is  $\geq \Delta_u$ .

$H_a$ : The difference between the two groups is  $< \Delta_u$ .

Second, pertaining to the lower-level boundary where:

$H_0$ : The difference between the two groups is  $\leq -\Delta_l$ .

$H_a$ : The difference between the two groups is  $> -\Delta_l$ .

A conclusion of statistical equivalence requires that both the upper- and lower-bound tests are rejected, such that the 90% CI around the observed estimate falls within the lower- and upper-boundary levels. A conclusion of statistical non-inferiority requires only the lower-bound hypothesis to be rejected, such that the 90% CI around the observed estimate falls in the area above the lower-boundary value and crossing over the upper-boundary level. (See Lakens et al., 2018 for further explanation.) A conclusion of either statistical equivalence or statistical non-inferiority provides support for the new intervention being meaningfully equivalent to, or not less effective than, the standard intervention to which it is being compared.<sup>6</sup>

Lakens et al. (2018) noted that one method to setting boundary levels for the smallest effect size of interest is to base this on the mean effect sizes reported in relevant literature. Following this, we looked to recent meta-analyses of the efficacy of PPIs. Effect sizes of  $d = 0.36$  (Carr et al., 2023),  $d = 0.33$  (Hendriks et al., 2018) and  $d = 0.20$  (van Agteren et al., 2021) were reported for the impact of single component PPIs. Based on these findings and to be somewhat conservative, boundary levels of  $d = -0.25$  and  $d = 0.25$  were used.

Difference scores (post-measure minus pre-measure) were used in these analyses since the TOSTER module is not able to accommodate covariates. The TOST procedure based on Welch's  $t$ -test indicated statistical equivalence for both affect balance and satisfaction with life (all upper- and lower-boundary  $ps < .05$ , 90%CI  $ds$  within  $-0.25, 0.25$ ), thus supporting our hypothesis of no meaningful difference in affect balance or satisfaction with life between the 3GT and 3GTiN conditions. (See Figure 1.)

### 3.1.3 H5, 6: Intentions to engage in pro-environmental behaviour, and eco-anxiety

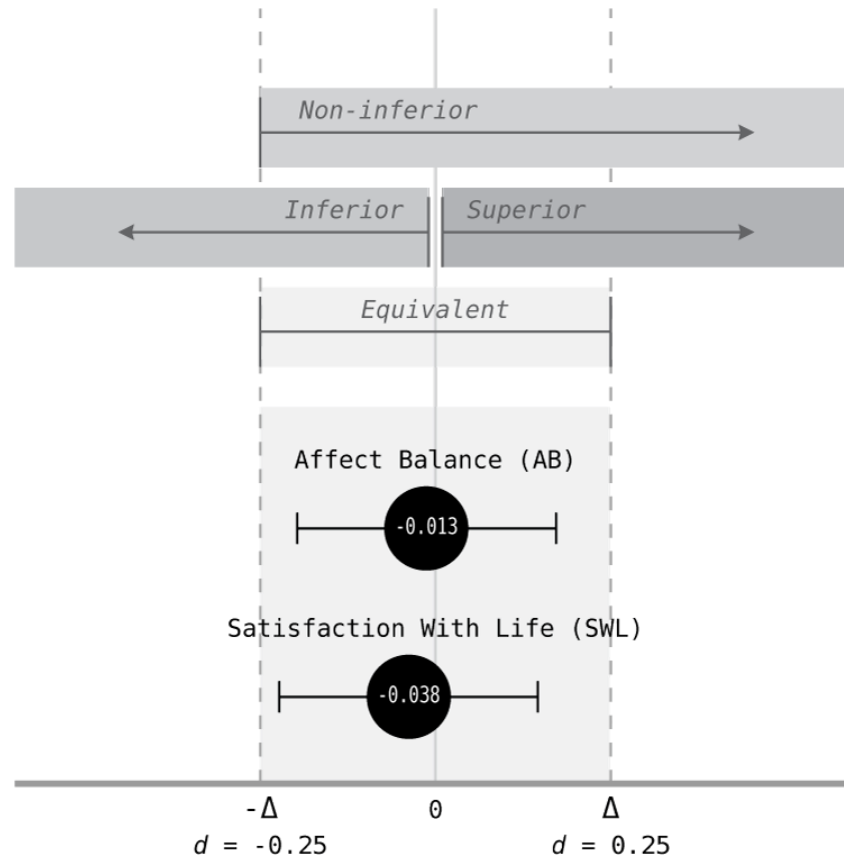
Post-intervention levels of intentions to engage in pro-environmental behaviours (H5) and eco-anxiety (H6) were hypothesized to be significantly higher in the 3GTiN compared to the 3GT condition. ANCOVAs were conducted with pre-measure scores as a covariate. When testing

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<sup>6</sup> A conclusion of statistically inferior indicates that mean difference in effect is larger than what is considered meaningful, with the 90% CI falling in the area below zero and extending beyond the lower-boundary value. Conversely, a conclusion of superiority also indicates that the mean difference in effect is larger than what is considered meaningful, but here the 90% CI falls in the area above zero and extends beyond the upper-boundary level. Support for the new intervention being meaningfully less effective than the standard intervention is provided by a conclusion of statistical inferiority; conversely, a conclusion of statistical superiority provides support for the new treatment being meaningfully more effective than the standard treatment.

differential levels of eco-anxiety, the pre-intervention score of anxiety was used as an additional co-variate in order to filter out possible effects of general anxiety. This hypothesis was not supported; ANCOVAs were non-significant ( $d_{\text{Intentions to engage in PEB}} = 0.13, 0.15, 0.11, d_{\text{eco-anxiety}} = 0.11$ ).

**Figure 1.** TOST plots for affect balance and satisfaction with life for H4



Note. Affect Balance: ( $t_{\text{upper-boundary}(310.91)} = -2.34, p = .010; t_{\text{lowerboundary}(310.91)} = 2.11, p = .018; d$  boundary levels:  $-0.25, 0.25; 90\%CI [-0.198, 0.173]$ ; raw scores boundary levels:  $-0.992, 0.992; 90\%CI [-0.785, 0.685]$ ). Satisfaction With Life: ( $t_{\text{upper-boundary}(310.60)} = -2.57, p = .005; t_{\text{lowerboundary}(310.60)} = 1.89, p = .030; d$  boundary levels:  $-0.25, 0.25; 90\%CI [-0.223, 0.146]$ ; raw scores boundary levels:  $-0.986, 0.986; 90\%CI [-0.881, 0.580]$ ).

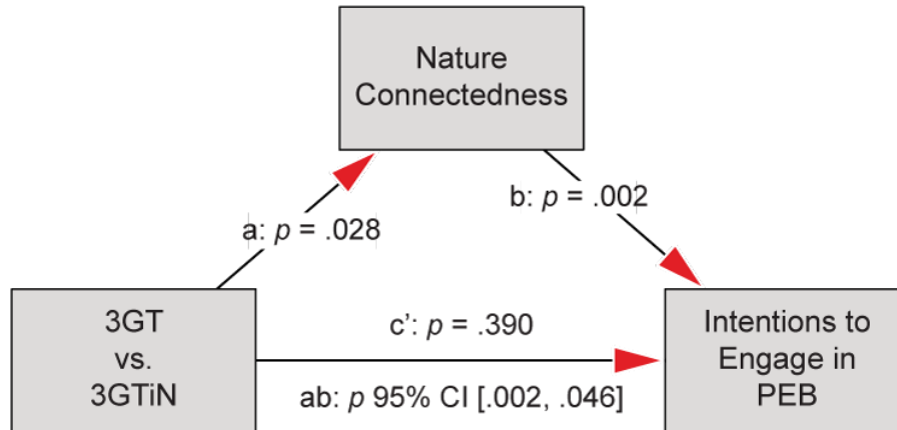
### 3.1.4 H7, 8, 9: Chain-of-events hypotheses

We hypothesized three differing chain of event pathways to explain the relationship between the 3GT vs. 3GTiN conditions, nature connectedness, eco-anxiety, and intentions to engage in pro-environmental behaviour. Analyses were conducted with Hayes' (2022) PROCESS macro (v4) for SPSS (v. 27). Model 4 was specified with HC3 standard error estimates, 95% confidence intervals were computed using 10,000 bootstrap samples (as per standards, Agler & De Boeck, 2017; Hayes, 2009) for testing of indirect effects.

Our first chain-of-events hypothesis (H7) was that engaging in the 3GTiN (vs. 3GT) intervention would lead to greater nature connectedness ( $X \rightarrow M$ ) which in turn would boost intentions to engage in pro-environmental behaviour ( $M \rightarrow Y$ ). It is important to note that although results of the ANCOVA (Table 3) did not reveal a significant impact of condition on intentions to engage in pro-environmental behaviours (i.e., a direct relationship of  $X \rightarrow Y$ ), "a non-significant relationship does not exclude the possibility that there is a true and perhaps mediated relationship between  $X$  and  $Y$ " (Agler & De Boeck, 2017, p. 5; Hayes, 2009; MacKinnon et al., 2002). Thus, we proceeded to test H7. As shown in Figure 2, analysis

supported our hypothesis revealing that variance between conditions in intentions to engage in pro-environmental behaviour could be attributed to a significant indirect (95%CI [.002, .046]) effect of nature connectedness.<sup>7</sup>

**Figure 2.** Chain-of-events model for H7



Note. Difference scores for *M* and *Y* were used.

Our second chain-of-events hypothesis (H8) was that engaging in the 3GTiN (vs. 3GT) intervention would in turn lead to greater intentions to engage in pro-environmental behaviour ( $X \rightarrow M$ ), which in turn would lead to lower eco-anxiety ( $M \rightarrow Y$ ). As per ANCOVA findings (Table 3), intentions to engage in pro-environmental behaviour did not significantly differ between the 3GT and the 3GTiN conditions ( $p = .254$ ); more importantly, our supposition for this hypothesis was contradicted in that intentions to engage in pro-environmental behaviour was positively correlated with eco-anxiety ( $r = .619, p < .001^8$ ; Table 4). Thus, there were no grounds for further analyses, as the combined ANCOVA and correlational findings indicated that H8 was not supported.

Lastly, combining H7 and H8, we hypothesized (H9) that engaging in the 3GTiN (vs. 3GT) intervention would lead to greater nature connectedness ( $X \rightarrow M_1$ ), which in turn would lead to greater intentions to engage in pro-environmental behaviour ( $M_1 \rightarrow M_2$ ), resulting in lower eco-anxiety ( $M_2 \rightarrow Y$ ). Given that the relationship between intentions to engage in pro-environmental behaviours and eco-anxiety was positive (rather than negative as we had predicted), no grounds existed for this analysis, as H9 was clearly not supported.

### 3.2 Exploratory quantitative analyses

#### 3.2.1 Time in nature

There was not a significant difference between conditions in the amount of time participants spent in nature over the week of the study,  $t(315) = 1.33, p = .185, d = 0.15, 95\%CI [-0.07, 0.37]$ . We also examined if either the amount of time participants spent in nature over the course of the study or participants' initial levels of nature connectedness moderated the impact of condition

<sup>7</sup> When no direct relationship exists between *X* and *Y* but significant indirect relationships are evident, Mathieu and Taylor (2006) recommend using term 'indirect effects' (as opposed to referring to 'mediation') when explaining a sequenced chain of events whereby  $X \rightarrow M \rightarrow Y$ . That is, when it is of interest to examine the extent to which variance in *Y* can be attributed to the indirect effect of *X*.

<sup>8</sup> See Lutz et al. (2023) for discussion and findings regarding different measures of eco-anxiety and the web of correlations with well-being, nature connectedness, and pro-environmental orientation.

on transcendent connectedness and elevation. The medmod (v. 1.1.1) module for jamovi was employed for these moderation analyses using 1,000 bootstrap samples. As shown in Table 5, neither time in nature nor initial levels of nature connectedness emerged as a significant moderator of the impact of condition (3GT vs. 3GTiN) on transcendent connectedness ( $ps = .760, .891$ ) or elevation ( $ps = .677, .276$ ).

**Table 4.** Correlation table: All dependent variables

	Nature Connected	Transc. Connect	Elevation	Affect Balance	Satisfaction w/Life	Intentions PEB
<b>Nature Connect</b>	—					
<b>Transc. Connect</b>	.771, $p < .001$	—				
<b>Elevation</b>	.690, $p < .001$	.731, $p < .001$	—			
<b>Affect Balance</b>	.285, $p < .001$	.342, $p < .001$	.374, $p < .001$	—		
<b>Satisfaction w/Life</b>	.234, $p < .001$	.306, $p < .001$	.392, $p < .001$	.650, $p < .001$	—	
<b>Intentions PEB</b>	.528, $p < .001$	.438, $p < .001$	.402, $p < .001$	.147, $p = .009$	.126, $p = .026$	—
<b>Ecoanxiety</b>	.510, $p < .001$	.296, $p < .001$	.356, $p < .001$	.026, $p = .640$	.098, $p = .082$	.619, $p < .001$

Note. Connected = Connectedness; Transc. = Transcendent; PEB = pro-environmental behaviours

**Table 5.** Moderation analyses

	Moderator: Time in nature						Moderator: Nature connectedness					
	est.	SE	95% CI		Z	p	est.	SE	95% CI		Z	p
			Lower	Upper					Lower	Upper		
<b>transcendent connect.</b>												
3GT vs 3GTiN	1.23	0.50	0.25	2.14	2.48	0.013	1.30	0.51	0.30	2.26	2.54	.011
Moderator	-0.03	0.03	-0.08	0.05	-0.85	0.394	-0.04	0.05	-0.14	0.06	-0.77	.439
Interaction	0.02	0.07	-0.13	0.11	0.31	0.760	0.01	0.10	-0.18	0.21	0.14	.891
<b>elevation</b>												
3GT vs 3GTiN	3.80	1.15	1.43	6.08	3.32	< .001	3.80	1.09	1.58	5.88	3.49	< .001
Moderator	-0.01	0.09	-0.14	0.23	-0.12	.914	-0.04	0.11	-0.26	0.17	-0.35	.727
Interaction	-0.07	0.14	-0.51	0.21	-0.42	.677	0.24	0.22	-0.20	0.67	1.09	.276

Note. est. = estimate; transcendent connect. = transcendent connectedness

## 4. Qualitative Findings

### 4.1 Participant's daily logs of three good things

Combined, participants in the 3GT and 3GTiN conditions submitted a total of 10,036 valid entries of three good things in their day (3GT condition = 4,917, 3GTiN condition = 5,119). Responses for each condition were coded separately, by the second and third co-authors.<sup>9</sup> Inter-rater reliability was strong for coding of themes in each of the conditions ( $k = .82, .83$ ).

#### 4.1.1 3GTiN condition

To code responses in the nature condition, we utilized themes from Richardson et al. (2015) and from Hatty et al. (2022), in addition to unique themes that were prevalent in the current data set, for a total of 17 categories. Several aspects of nature were noted as a good thing about the day. Top categories included flora ( $n = 1,103$ ; e.g., "leaves changing colour", "green grass", "colourful flowers", "pine trees"), wildlife and pets ( $n = 1,099$ ; e.g., "magpies chasing each other", "fluffy dogs", "wild rabbit crossing the street", "birds chirping", "ladybug on a flower"), weather ( $n = 1,041$ ; e.g., "cold breeze", "heavy drops of rain", "I can hear the wind", "cold weather"), and the sun and sky ( $n = 878$ ; e.g., "warmth of the sun", "sun shining through the fog", "cloud patterns", "many stars in the sky", "the sky at sunset"). See Table 6 (below) for full list of themes and counts.

**Table 6.** Themes from 3GTiN condition responses

Theme/Category	Description	Count
Flora	trees, flowers, plants, grass, leaves, bushes,	1103
Wildlife and Pets	birds, rabbits, squirrel, ladybugs, pets	1099
Weather	snowfall, wind, temperature, rain, sandstorm, fog, ice	1041
Sun/Sky	sun, moon, stars, sky, clouds, planets	878
Colours	colours of nature	426
Sensation	scents, sounds, tactile	411
Growth	seasonal changes, changes to flora	244
Beauty/Wonder	beauty, awe, magic, fascination	170
Water	rivers, oceans, ponds, lakes, waterfalls	124
Food	fruits, vegetables	122
Miscellaneous	peaceful views, good lighting, clear roads	96
Feelings/Emotions	calmness, joy, peace, mood, pleasant, comfort, thankfulness, excitement	89
Specific Aspect of Nature	puddles, pebbles, sand, benches, rocks	79
Terrestrial	mountains, grasslands, hills, fields	71
Air	air	32
Activities	walking, building snowmen, hiking, sledding, biking	27
Ground	dirt, mud, soil	23

<sup>9</sup> Several entries contained more than one theme, particularly entries in the 3GTiN condition.

#### 4.1.2 3GT condition

Conventional content analysis (Hsieh & Shannon, 2005), wherein coding categories are derived directly from participant-generated data, was used to identify the prevalent themes within participants' responses. Two raters (the second and third co-authors) first independently read all responses and generated global themes found within responses. Next, the raters met and collaboratively winnowed themes into 23 categories to reduce redundancy. The theme of food was most common ( $n = 728$ ; e.g., "I baked a cake", "ate good food", "successfully made dinner for the family", "tried new food"). Themes of socializing ( $n = 590$ ; "friends came over", "talking with my dad", "video call with friends") and nature  $n = 588$ ; e.g., "my plants", "sunshine", "it snowed today!", "singing birds", "my dog") were essentially tied for second place. These were followed by a category of academic ( $n = 562$ ; "finished my paper", "did well on a quiz", "learned interesting things today from my classes", "got lots of studying done"). See Table 7 (below) for full list of themes and counts.

**Table 7.** Themes from 3GT condition responses

Theme/Category	Description	Count
Food	eating, homemade meals, restaurants, baking, cooking	728
Socializing	video call, conversations, facetime, phone call, emailing	590
Nature	gardening, flowers, the sun, weather, animals, beaches, lakes, nature-related sensations	588
Academic	exams, papers, labs, class, studying, research, grades, notes, homework	562
Amusement	shopping, playing games, piercing, reading, arts and crafts, road trips	466
Daily Living	haircuts, pedicures, cleaning, hygiene, sleep, shower, waking up, tanning	382
Physical Activity	walking, running, sports, hiking, physical activity	317
Miscellaneous	political views, avoiding a breakup, being alone, good vibes	191
Work / Employment	volunteering, work, new jobs,	181
Health	good health, not feeling sick	153
Personal Care	taking a break, self-care, journaling	126
Assisting Others	chores, assignments, making people smile, jobs, moving	121
Movies	Netflix, TV, movie platforms	118
Affection	physical affection, conversation, appreciating another person, receiving compliments and appreciation	94
Holidays	advent calendar, birthday, pumpkin carving, Easter egg hunt, decorating	86
Errands	groceries, fixing items, organizing, planning, going to the bank, packing	61
Religious/Spiritual	praying, church	40
Driving	driving and vehicle related items	29
Pro-Environmental Actions	saving electricity, composting, reducing waste	27
Comfort	heat, air conditioning, wearing comfortable clothes, and beds.	22
Money	selling items, winning bets, stocks, and receiving money	18
Weekend	terms related to the weekend, such as listing the weekend days	10
Achievement	specific achievements, receiving positive feedback, beginning to achieve goals	9
Learning	learning something new	8

#### 4.2 Post-intervention comments

Following the post-intervention measures, participants were asked what they had learned or gained from participating in the study. Of our final sample of 330 participants, only 23 (7%) did not answer this question<sup>10</sup>, and only 18 (5.5%) reported that they did not learn anything<sup>11</sup>. Many participants in the 3GT condition commented on how noting three good things about their day boosted their appreciation of everyday details, and/or how this boosted their mood (42.4%); for example: "I learned that there are a lot more good things about my day than I thought", "I gained a more positive outlook because I was required to list 3 good things that day.". Paralleling this finding, over half of the participants in the 3GTiN condition (55.6%) commented on how noting three good things in nature a day boosted their personal awareness of nature, and/or how this boosted their mood; for example: "I learned to appreciate the little things about nature that make it beautiful.", "To be mindful of the benefit of nature to my well being".

### 5. Discussion

While 3GTiN and 3GT were statistically equivalent for boosting affect balance and satisfaction with life, added benefits were observed for participants engaging in the 3GTiN intervention. In comparison to those in the 3GT condition, participants noting three good things in the everyday nature they encountered experienced significantly boosted feelings of transcendent connectedness (feeling connected to other humans, to nature, and to life in general; Yaden et al., 2017) and the composite emotion of elevation (which includes feeling inspired, morally elevated, deeply appreciative, profoundly touched, spiritually uplifted, enriched, in wonder, and feeling like one is in the presence of something grand; Huta & Ryan, 2010). This parallels recent research findings wherein a nature-based PPI was equivalent to 3GT in boosting positive affect, but statistically superior to 3GT in boosting transcendent connectedness and elevation (Passmore et al., in press).

These findings are important because experiencing such transcendent emotions has been related to reduced self-centeredness and greater pro-social and pro-environmental motivations (Pizarro et al., 2021; Schnall et al., 2010; Thomson & Siegal, 2017; van Kleef & Lelieveld, 2022; Zelenski & Desrocher, 2021). Self-centeredness is of increasing concern in our largely urban capitalistic lifestyles, as many people feel increasingly separate from the larger human and natural systems we are a part of (Varley, 2024). Such a view not only reduces our individual well-being, self-centeredness is also related to minimizing, and even disregarding, one's impact on the well-being and life-sustaining systems which we are, in fact, a part of (Cacioppo et al., 2017; Dambrun, 2017; Pizarro et al., 2021; Steger, 2024; Stellar et al., 2017).

Relatedly, a decade ago, Zylstra and colleagues (2014) cautioned that people were increasingly suffering from "inattention nature blindness" due to a bombardment of stimuli in built urban environments. Such "inattention nature blindness reinforces peoples' perception as being separate from nature, since ecological phenomena no longer form a part of the experiences which shape consciousness" (p. 123). Results from the current study suggest that engaging in the 3GTiN intervention can help combat this inattention nature blindness and help reconnect people to nature. Relative to the 3GT condition, participants engaging in the 3GTiN intervention reported significantly higher levels of nature connectedness. Qualitative data support these findings, with numerous participants noting how the intervention enhanced their appreciation of everyday nature. For example, "There are a variety of things that I've seen in nature

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<sup>10</sup> Not significantly different across conditions,  $X^2(1, N = 330) = 1.52, p = .218, RR = 1.04, 95\%CI [0.98, 1.10]$ .

<sup>11</sup> Not significantly different across conditions,  $X^2(1, N = 330) = 1.75, p = .186, RR = 0.97, 95\%CI [0.92, 1.02]$ .

*on a daily basis that I would simply just look past so this study allowed me to actually see and connect to the world around me and actually take it the observations of nature I see on a daily basis and actually think about how wonderful it is." and "I was able to really observe the nature around me in a more detailed and thoughtful way".*

Our qualitative findings also showed that nature is an important and prominent good thing in one's day. In the 3GT condition, nature tied for second place (with socializing) among categories of good things mentioned. Indeed, within this condition, nature was mentioned as a good thing in one's day by 72% of participants, consistent with recent findings of Passmore et al. (in press) wherein 67% of participants engaging in the 3GT intervention mentioned nature a good thing in their day. Plants, sunshine, snow, and birds were a few of the aspects of nature participants noted as making their day good and boosting their mood. These findings are consistent with theoretical frameworks speaking to nature's inherent appeal to us, including the biophilia hypothesis (Wilson, 1984), Perceptual Fluency Account (Joye & van den Berg, 2011), and the Eco-Existential Positive Psychology framework (Passmore & Howell, 2014a). Our findings are also consistent with previous studies testing the Noticing Nature Intervention PPI (NNI; Passmore & Holder, 2017; Passmore, Yargeau, & Blench, 2022) wherein the majority of participants randomly assigned to a control condition of noticing everyday built objects still commented on the impact of nature on their emotional wellbeing.

Although there was not a direct relationship between engaging in the 3GTiN versus the 3GT intervention and increased intentions to engage in pro-environmental behaviours, a significant indirect relationship was revealed, wherein engaging in the 3GTiN intervention boosted nature connectedness, which in turn predicted significantly higher levels of intentions to engage in pro-environmental behaviour. We do, though, recommend caution when interpreting this finding given the concurrent timing of the assessments of nature connectedness and intentions to engage in pro-environmental behaviour. Nonetheless, these findings are consistent with previous research suggesting that nature connectedness is a key driver of pro-nature behaviour (Mackay & Schmitt, 2019; Whitburn et al., 2020).

These added nature-related benefits of the 3GTiN intervention—along with the earlier noted findings regarding experiences of transcendence and elevation—are of vital importance in addressing the environmental crises we face today, outcomes which both Ryff (2022) and Steger (2024) argued should be of primary importance to positive psychology and when developing PPIs. Follow-up studies are recommended to examine if these boosted intentions transform, over time, into actual actions.

It is important to note that the wellbeing and nature-related benefits of engaging in the 3GTiN intervention were not a result of these participants having spent significantly more time in nature. This is consistent with results from several studies evidencing that boosts to wellbeing can be garnered from merely noticing how the nature encountered in one's everyday routine makes one feel (Passmore et al., in press; Passmore & Holder, 2017; Passmore, Yang, & Sabine, 2022; Passmore, Yargeau, & Blench, 2022) or from identifying character strengths in nature and using character strengths to connect more with everyday nature (Passmore et al., 2025). Moreover, Richardson and colleagues (2021) found that, when considered together, it is nature connectedness, not time in nature, that emerges as the main contributor to wellbeing.

The majority of our hypotheses were, therefore, supported. That is, engaging in 3GTiN yielded wellbeing benefits equal to 3GT, in addition to boosting transcendent connectedness, elevation, and nature connectedness, with a cautious suggestion that greater nature connectedness subsequently predicted greater intentions to engage in pro-environmental behaviour. Our hypotheses with respect to eco-anxiety were not, however, supported. We had

proposed that noticing good things in nature would reduce eco-anxiety, given that previous research supports fostering a connection with nature as important in coping with distressing feelings regarding degradation of the natural world (Baudon & Jachens, 2021; Kelly, 2017; Klein, 2020; Westoby et al., 2022). Although a few participants made comments indicating that noting good things in nature did help them cope with eco-anxiety (e.g., "*I think this study has shown me that I don't have to be so pessimistic all the time about the state of the world. There are still so many amazing things in nature, and they can get better with our help. I remembered that nature is resilient and that we truly can make a change.*"), engaging in the 3GTiN (vs. 3GT) intervention did not significantly impact levels of eco-anxiety.

In retrospect, we should have given more careful thought to the difference between "lowering levels of eco-anxiety" and "coping with eco-anxiety". Eco-anxiety is a healthy, rational response to the rising threats the natural world, including humanity, is facing (Buzzell & Chalquist, 2019; Kurth & Pihkala, 2022; Pihkala, 2020). Therefore, looking to reduce levels of eco-anxiety may not only be unrealistic, doing so may also be detrimental. Future research could examine how engaging in the 3GTiN and other nature-based PPIs can enhance one's emotional coping abilities in this respect. For example, rather than simply assessing levels of eco-anxiety directly, a Likert-type scale could be used to ask participants to rate the extent to which they felt emotionally capable of coping with their feelings of eco-anxiety. Drawing on research investigating cognitive restoration and emotional regulation resulting from interacting with nature would be helpful in this regard (see Bratman et al., 2024; Bratman et al., 2021; see also Ford et al., 2018 on accepting negative emotions).

Baudon and Jachens (2021) reported that encouraging pro-nature action is a common approach among practitioners when working with clients' eco-anxiety. Passmore and colleagues (2023) suggested that, as per Acceptance and Commitment Therapy (Hayes et al., 2006), acknowledging emotions of eco-anxiety and then committing to pro-nature behaviours and acting upon them would help ease one's feelings of eco-anxiety. Based on such research, in the current study we hypothesized that greater intentions to engage in pro-environmental behaviour would reduce eco-anxiety. This was not supported. In retrospect, our hypothesis was, perhaps, overly ambitious, given that we measured intentions to engage in pro-environmental behaviours, and not change in actual pro-environmental behaviours. It stands to reason that merely intending to do something, while a necessary and important first step, would not impact feelings of eco-anxiety; rather, the benefit (to oneself, and obviously to nature as well) is in the doing. Moreover, our study was only a week long; participants did not realistically have time to manifest their commitment to pro-nature behaviour.

### 5.1 Limitations and future research directions

As with all studies, the current study had limitations. Although a small number of participants were from a community sample, the sample primarily consisted of undergraduate students. All findings did, however, remain the same even when controlling for sample. Our study drew on a sizeable sample of 330 participants. Nonetheless, replication studies utilizing similarly large community samples from varying cultures and countries are needed to further test the impact of engaging in the 3GTiN intervention on wellbeing and nature-related outcomes. While our sample was not balanced across genders, results remained virtually the same when controlling for gender (i.e., significant results remained significant with all  $ps < .050$ , non-significant results remained  $p > .050$ ). Nonetheless, it is possible that results may not be generalizable to samples with different gender makeup; future studies should aim to collect a more gender-balanced sample.

One important limitation to the design of the current study was the concurrent assessment of nature connectedness and intentions to engage in pro-environmental behaviour at the end of the 7-day study period. Although our chain-of-events analysis does suggest an indirect effect of nature connectedness predicting pro-environmental intentions across groups, future studies need to assess these at different time points. That is, assessing nature connectedness at Time 2 post-intervention, and subsequently assessing intentions to engage in pro-environmental behaviour at Time 3, a day or a week or more afterwards.

The current study, as noted above, assessed levels of eco-anxiety and intentions to engage in pro-environmental behaviour; utilizing measures of emotion regulation and ability to cope with eco-anxiety in future studies would be more suitable. As noted above, future studies should also include follow-up assessments (e.g., at intervals of 1 month to 6 months) to examine if intentions to engage in pro-environmental behaviour manifest into actions, and if those actions do indeed help people cope with feelings of eco-anxiety.

Participants in both conditions commented on how engaging in the intervention enhanced their appreciation of how important paying attention to the good in the mundane has for boosting wellbeing. Self-concordant motivation and person-activity fit are important facets to consider when developing PPIs (Lyubomirsky et al., 2005; Sheldon & Lyubomirsky, 2006). Given the inherent appeal that nature has for humans, and previous research findings demonstrating that nature involvement is highly self-concordant (Passmore & Howell, 2014b), it would be interesting in future studies to examine if any difference occurs long term in the duration of continued engagement in the 3GTiN versus 3GT interventions. Additionally, it would be interesting to test a dose-response relationship for engaging in the 3GTiN intervention (e.g., examining long an individual needs to engage in the 3GTiN intervention in order to yield practical and maximum well-being benefit).

## 5.2 Implications

Especially combined with results from other nature-based intervention studies and research on the importance of nature connectedness for both human's and nature's well-being (as presented earlier), findings from our study have important practical implications. At an individual level, engaging in the 3GTiN is an activity that people can easily add to their daily routine to boost their well-being. Mental health therapists could consider adding the 3GTiN intervention to their toolbox of easy, yet efficacious, activities to assign to their clients to help boost overall well-being (see Burns, 1998), particularly as the well-being boosts evidenced in our study for those engaging in the 3GTiN intervention were not dependent on spending additional time in nature. At the same time, it may be that engaging in the 3GTiN activity would, downstream, nudge people to experience more nature as part of their daily routine, thus boosting their connection to nature and pro-nature activities (Prévoit et al., 2018).

Given the robust associations between nature connectedness and pro-environmental behaviours, groups aiming to enhance engagement in pro-environmental behaviours may want to consider incorporating the 3GTiN activity into their programmes to boost their participants' connection to nature. As others have noted, programmes and interventions which target boosting nature connectedness can have wide-ranging implications including pro-sociality with respect to humans and the beyond-human natural world (Lambert, Warren et al., 2020; Richardson, Dobson et al., 2020). Doing so also has the added benefit of enhancing individuals' well-being.

Numerous researchers have called for positive psychology and well-being researchers to widen their perspective beyond targeting standard aspects of individual well-being. For

example, Lambert, Lomas et al. (2020) called for a more inclusive measure of global well-being which includes nature connectedness; Martela (2024) argued for a theory of well-being that includes our relationship to the natural world. Both Ryff (2022) and Steger (2024) have called for well-being researchers to focus on interventions that go beyond boosting individual well-being alone, but rather that also target aspects of nature-related well-being. Findings from the current study are important in showing that this is possible, and that incorporating a "nature" aspect to PPIs can, indeed, accomplish this goal.

## 6. Conclusion

This study is only one of two, to our knowledge, to directly compare a standard PPI to a nature-based PPI (the other being Passmore et al., in press). Findings from the current study closely parallel those of Passmore et al. (in press) wherein a nature-based PPI was compared to 3GT. In the current study, the nature-based PPI (3GTiN; noting three good things in one's day), was equivalent in efficacy to the standard PPI (3GT; noting three good things in one's day) on affect balance and satisfaction with life, while also yielding additional benefits to transcendent aspects of wellbeing, and the nature-related outcome of enhanced nature connectedness. Analyses also suggested that nature connectedness, in turn, may have predicted greater intention to engage in pro-environmental behaviour. Moreover, in the standard 3GT condition, nature tied for second place (with socialization) as a category of good things in one day. Clearly nature is an important, and good, thing in one's day.

Steger's (2024) proposed Regenerative Positive Psychology demands that PPIs should aim to regenerate individuals while also striving to regenerate the broader natural environment. Results from the current study suggested that engaging in the 3GTiN intervention may do just that. As one participant noted, "*A routine of repeatedly doing the same thing on 7 days can change one's thoughts on things. The more I was asked to think about the good things in nature and environment, the more I had intentions to protect the environment.*" (Participant 2762721)

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AM, TD: qualitative analysis  
HAP: writing - original draft  
HAP, AM, MR, AJH, PKL: writing - review & editing

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### **Conflict of interest statement**

The authors report no conflicts of interest.

### **Data availability statement**

All data and materials are available at: [https://osf.io/sjzy5/?view\\_only=3accf15f09db40f09de489f0ff72d5fb](https://osf.io/sjzy5/?view_only=3accf15f09db40f09de489f0ff72d5fb)

### **Ethics**

All participants signed consent forms prior to beginning the study. These studies were approved by the Research Ethics Boards of the universities of the authors.

### **AI statement**

All analyses and writing were performed by the authors. AI was not used in any stage of study development, data analysis, or writing.

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