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THE ROOTS OF WELLBEING: POSITIVE EFFECTS OF NATURE WRITING

By
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A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of
the requirements of the Sally McDonnell Barksdale Honors College

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Approved by

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My Family,

for cultivating my love of learning, my passion for creativity, and my confidence to try without fear

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ABSTRACT

BARBARA TURNER: The Roots of Wellbeing: Positive Effects of Nature Writing

(Under the direction of Laura Johnson)

Fostering healthy relationships between humans and the environment is beneficial for people and for the natural world around us. Efforts to foster these relationships are more important now than ever before due to the rapid deterioration of the climate and the growing divide between people and nature. There is abundant research documenting the positive physical, psychological, and social effects of time spent in nature, such as positive mood, life satisfaction, connection to nature, pro-environmental behavior, and feelings of transcendence. However, actual experiences in nature may be inconvenient, inaccessible, or otherwise unavailable. Addressing this concern, researchers are now examining the possible outcomes of experiencing nature by proxy. One approach is through reflecting on and writing about significant life experiences in nature. This study of university students ($N = 42$) was designed to further investigate human-nature relationships, wellbeing, and sustainable behavior. In particular, it was hypothesized that writing about a positive childhood memory in nature would be associated with higher mood, nature connectedness, life satisfaction, and pro-environmental behavior. Mood outcomes were examined pre- to post intervention using a paired samples t-test followed by a one-way ANOVA. Nature connectedness, life satisfaction, and pro-environmental behavior were examined using a one-way ANOVA. The transcripts from the writing intervention were coded in a qualitative analysis to assess overall themes with particular interest in transcendent values. Results showed that mood was significantly increased from pre- to post intervention, but there was no significant difference between groups. In the test of group differences, the nature writing intervention had a significant effect only on aspects of pro-environmental behavior. In conclusion, this study confirms that autobiographical memory writing can boost mood and that nature writing is associated with environmental behavior intention and transcendence.

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THE ROOTS OF WELLBEING: POSITIVE EFFECTS OF NATURE WRITING

The human race is searching for ways to mitigate the ongoing climate crisis. The rapid rate of climate change is suggested to be a global emergency (Chao & Feng, 2018). Interactions between the urbanized world and the natural world have strained the resources of our planet, and an increasing amount of research is being dedicated to ways that people can be motivated to help save the planet. Studies have shown that nature exposure can increase sustainable intentions and behaviors (Capaldi et al., 2015) as well as contribute to wellbeing (Mayer et al., 2008; Selhub & Logan, 2014; Wells & Evans, 2003). However, actual contact with nature may not be an option for many individuals, and researchers are beginning to explore alternatives, such as nature writing. This thesis explores the effects of writing about a positive childhood experience in the natural world. It aims to explore how reflecting on a positive nature experience coupled with a brief, expressive writing exercise could increase mood, as well as be associated with nature connectedness, pro-environmental behavior, and life satisfaction. Additionally, it is expected that nature writing will contain descriptions of transcendence and other contributors to wellbeing, such as psychological benefits, social interactions, creativity, and adventure experiences.

Psychological and Environmental Benefits of Nature

Mental Health and Wellbeing. It should come as no surprise that interaction with nature can provide numerous benefits. There have been an abundance of studies suggesting positive effects of nature (Furnass, 1979; Kaplan & Kaplan, 1989; Kuo & Sullivan, 2001; Tennessen & Cimprich, 1995). Studies have shown that even brief exposure to natural settings can increase connectedness to nature and positive emotions

(Mayer et al., 2008) and can decrease stress (Ibes et al., 2018). Bratman et al. (2015) conducted an experiment in which half of the participants walked through a natural setting in California while the other half walked through an urban setting. The results showed that the natural setting group experienced decreased anxiety, rumination, and negative affect in comparison to the urban setting group. Nisbet and Zelenski (2011) have conducted research with results suggesting that not only do experiences in nature boost happiness, but that people also tend to significantly underestimate the amount of happiness they can potentially gain by immersing themselves in nature more frequently.

Connection to Nature. Research has shown that contact with nature can promote positive outcomes (Ballew & Omoto, 2018; McMahan & Estes, 2015). Related to immersive experiences in nature is the concept of nature connectedness, which can be considered as a measure of the extent to which an individual feels connected to the natural world (Mayer & Frantz, 2004). Connection to nature has been shown to promote wellbeing (Mayer & Frantz, 2004; Nisbet & Zelenski, 2013; Olivos & Clayton, 2017) and life satisfaction and meaning (Zylstra et al., 2014). Capaldi, Dopko, and Zelenski (2014) determined a positive relationship between being connected to nature and feeling happy, which suggests that nature connectedness promotes positive emotions. Martyn and Brymer (2014) studied the relationship between connectedness to nature and anxiety, showing qualitative results that significantly linked connection to nature with lower levels of anxiety. Nisbet and Zelenski (2014) note that nature relatedness can fluctuate due to exposure to the natural environment and that increased connection to nature promotes concern and protection of the environment.

Pro-Environmental Attitudes. In addition to positive mental health outcomes, nature experiences and a sense of connection to nature may be important for promoting pro-environmental attitudes and actions (Clayton & Myers, 2011; Keniger et al., 2013). Recent literature has more deeply examined possible connections between psychology and sustainable behavior (Kals & Maes, 2002; Kurz, 2002; McKenzie-Mohr, 2002). Kals et al. (1999) found that past and present experiences in natural settings create an emotional affinity towards nature, and that emotional affinity can help predict pro-environmental behavior. Verdugo (2012) studied the relationship between positive psychology and sustainable behavior, noting the possibility that these two realms of study could mutually benefit one another to use individuals' character strengths to enhance the human-nature relationship. Kasser (2009) argues that participation in pro-environmental behaviors leads to personal well-being because it satisfies psychological needs of feeling competent, which further suggests the benefits to both humans and nature when the two coexist positively.

Indirect Nature Experiences

While there is an abundance of support for the positive impact of direct nature exposure, contact with nature is not always available, accessible, or practical. As such, recent years have seen interest in alternative ways of experiencing nature, such as reflective, virtual, and other formats (Chang et al. 2008; Kahn et al. 2008; Laumann et al. 2003). For example, Browning et al. (2020) performed an experiment comparing six minutes of outdoor nature exposure to six minutes of exposure to a virtual reality nature video. The results showed that both experiences benefited positive mood levels and, compared to an indoor setting without nature, offered restorative properties. While

positive mood levels were boosted more for the outdoor exposure group, studies like these show promise in the power of simulated nature versus no nature exposure at all. Felsten (2009) performed a study that also supports this, asking college students about the type of environment they would find restorative on campus and finding that they were more interested in views of simulated nature than no nature at all. Individuals donating blood were more calm when viewing natural images than viewing images of a built environment (Ulrich et al., 2003).

Significant Life Experiences in Nature

In addition to virtual and simulated nature, studies about significant life experiences in nature point to the importance of developing alternative nature experiences. Moreover, reflecting on nature experiences can be another type of indirect exposure conferring positive results (Chawla, 1986, 1998). Generally, formative childhood experiences have shown to significantly impact individuals into adulthood (Bethell et al., 2017; Price-Robertson et al., 2010). For this reason, research has explored how childhood experiences could be related to nature connectedness and sustainability. Frankel et al. (2019) found in a large sample of fourth graders that regardless of cultural background or living situation (urban versus rural), time spent in the forest was the sole and universal variable to show a positive relationship with inclusion of nature in the self. Lieflander et. al (2013) found that environmental education provides a sustained increase in inclusion of nature in self scores for children, and Dopko, Capaldi, and Zelenski (2019) found that exposing children to nature provides psychological, social, and pro-environmental benefits. Furthermore, Barrera-Hernandez et al. (2020) suggests a positive

relationship between connection to nature, sustainable behaviors, and happiness in children.

Knowing that significant life experiences may be important in connectedness to nature and pro-environmental attitudes and/or behaviors later in life, research has investigated connections in autobiographical memories of childhood experiences in nature and present attitudes and behaviors (Tanner, 1980). Broom (2017) found a relationship between positive childhood experiences in nature and showing care towards the environment, as well as a relationship between loving nature and wanting to protect it. Palmer (1993) used autobiographical studies to suggest that “childhood experience in the outdoors is the single most important factor in developing personal concern for the environment” (p.29). Buell (2017) explored the uses of environmental memory, suggesting that, in such a time of rapid technological advancement, environmental memory can be used to keep individuals in perspective of how people and nature are so intertwined that denying the planet’s needs would simultaneously be denying us of our own needs.

Cobb (1977) extensively researched environmental memory and how formative childhood experiences in the physical world translated into adulthood. Chawla (1986) provided a thorough review of Cobb’s and others’ work, defining types of environmental memory and striving to create universalities among the literature. Chawla derived upon seven different types of environmental memory, with transcendence being a main focus. Those who wrote about transcendent experiences in the natural world wrote about freedom, inspiration, responsiveness, connectedness, etc, and Chawla coded for these defining themes. Rohde and Kendle (1994) looked at transcendental experiences in the

natural world and found that experiences in nature can invoke a sense of oneness with the natural world and the universe, which promotes feelings of transcendence. Self-transcendence and meaning in life have been looked at more closely with the growth of positive psychology (Frankl, 1946/2014; Smith, 2017; Wong, 2014; Zika & Chamberlain, 1992). Self-transcendence has been shown to correlate with wellbeing in studies involving unhealthy or troubled individuals (Coward, 1991; Ellermann & Reed, 2001; Runquist & Reed, 2007). Cloninger (2013) shows that self-transcendence is a trait that positively indicates health, happiness, and fulfillment in healthy people as well. Prior research studying the relationship between transcendence and nature suggest that recalling significant life experiences involving transcendence could be important in terms of wellbeing. In fact, it has been suggested that recalling positive memories of any kind can help boost an individual's mood as well (Josephson et al., 1996).

Writing and Reflecting on Nature

Unmediated reflection, or remembering and reviewing our personal experiences without the use of technology (Konrad et al., 2016) can increase perceived life satisfaction (Bryant et al. 2011). A mechanism of documenting these reflections is autobiographical emotional writing. Research has established that expressive writing offers a multitude of benefits (Baikie & Wilhelm, 2005; Pennebaker & Seagal, 1999; Smyth & Pennebaker, 2008). Research from Burton and King (2004) showed health benefits from writing about positive emotional experiences versus a control, and Burton and King (2008) showed benefits of a very brief writing exercise about an emotional experience.

Tanner (1980) sparked inspiration for studying autobiographical recollection in the context of environmentalism. Chawla (1986, 1994) investigated connections between already-written environmental pieces and how they represented themes, suggesting a need to use written accounts of significant experiences as methods for environmental research. Nisbet (2011) was the first to use a writing exercise to examine nature contact, connectedness, and sustainable behavior. She strived to create nature-based interventions in order to promote wellbeing and pro-environmental behavior, with one of the interventions being a writing exercise reflecting on past experiences in nature. While Nisbet's study did not produce significant results, she points to future directions and admits that her control prompt was misleading in providing an adequate contrast between nature versus non-nature instruction. Studies like this suggest the need for further investigation on how reflective writing interventions could promote connection to nature, pro-environmental behavior, and wellbeing.

Current Study

With the current threat of the climate crisis and the suggested psychological benefits, there is no time to waste in finding ways to boost pro-environmental attitudes and behavior. The literature shows links between significant childhood experiences in nature, sustainable behavior, and wellbeing. Furthermore, studies indicate that positive reflective writing has the potential to affect mood and commitment to the environment. The purpose of this study is to broaden the literature on methods of boosting pro-environmentalism and wellbeing. The study suggests that positively reflecting on and briefly writing about a significant childhood experience in nature could be an alternative method of nature exposure, promoting sustainable behavior and wellbeing. First, effects

of reflective writing will be assessed from pre- to post mood for nature writing and for an alternative writing intervention about a movie. Next, nature writing versus movie writing will be compared post-intervention for differences in nature connectedness, pro-environmental behavior, and life satisfaction. Lastly, writings from both interventions will be assessed for descriptions of transcendence and associated wellbeing characteristics.

Hypotheses

The following hypotheses are proposed: 1) positive autobiographical writing about a childhood experience (nature or movie) will increase mood from pre- to post writing intervention, with nature writing showing greater benefit; 2) the nature writing intervention will be associated with higher scores on post measures of nature connectedness, life satisfaction, and pro-environmental behavior; and, lastly 3) nature writing transcripts will include more reference to transcendent experiences than movie writing.

METHOD

Participants

Participants were students (N=42) at the University of Mississippi invited to participate in a brief, autobiographical writing study. No background or demographic data were collected. Results of an a prior power analysis using the software G Power indicated 56 as an acceptable number. However, the study required in-person writing, and the data collection was halted due to the Covid-19 pandemic.

Procedures

The study was approved by the University of Mississippi Institutional Review Board. It was conducted in-person with an experimenter present. After completing and signing the consent form, the participant was given a computer with the experiment ready to be completed. The participants were recruited electronically through the University of Mississippi's SONA systems ($n = 26$) and through flyers, emails, social media, and personal invitations ($n = 16$) which totaled to $N=42$ participants.

The participants were recruited electronically through the University of Mississippi's SONA systems where they received 1 credit compensation for participation ($n = 26$). Participants from other sources participated voluntarily. The recruitment flyers were hung in various academic buildings around campus, and a PDF version was shared electronically. The recruitment advertisement efforts outside of SONA systems all followed the same script with a brief explanation of the study and times available for participation. The purpose of advertising outside of SONA systems was to ensure adequate participation to generate an analysis with enough power. The voluntary participants were invited to complete the study during walk-in hour opportunities or by appointment. Participants were invited to Peabody Hall Room 301 E to complete the study. The experimenter ensured that the participant completed and signed the informed consent document before supplying the participant with a computer to complete the study. Upon completion, the experimenter handed the participant a debriefing form.

Participants completed the pre-mood measure followed by the writing intervention, three additional measures, and the post-mood measure. The three additional measures (Satisfaction with Life Scale, The Inclusion of Nature in Self Scale, and the Pro-Environmental Behavior Measure) were given in randomized order.

Measures

Mood. Mood was assessed pre-test and post-test. To assess mood, this study used an adaptation of the Affective Mood Slider (Betella & Verschure, 2016). The Affective Slider (AS) has five levels, and the participants slid the slider to accurately reflect their current mood. The slider features an emoticon that looks like a face, with the lowest level (1) represented by a deep frown and the highest level (5) represented by a big smile. Betella and Verschure (2016) empirically suggest that the Affective Slider measure can replace outdated mood measures such as the Self-Assessment Manikin (Bradley & Lang, 1994). The AS is user-friendly and easily updateable due to its digital appearance and simplicity by nature.

Positive, Autobiographical Writing Stimulus. In order to elicit positive nature memories, a positive, autobiographical writing stimulus was introduced. In the nature group, the writing prompt was as follows: “Reflect on a childhood memory in which you had a positive experience while being in nature. Write about this experience, trying to remember as many details as possible about this positive childhood experience. You will have five minutes to complete this task.” The second group had an identical prompt, except the phrase “while being in nature” was replaced with “while watching a movie.” This stimulus followed the pre-mood measure and preceded all other measures.

Prior literature has noted the importance of childhood experiences in the natural world (Chawla & Cushing, 2007; Dopko et al., 2019; Hinds & Sparks, 2011), which is why childhood memories specifically were of interest for this study. Burton and King (2008) tested the effects of very brief exercises of emotional writing, finding that writing for just two minutes a day for two consecutive days (four total minutes) resulted in

positive effects. Because the current study was performed in only one sitting, it was decided that one additional minute be included to account for pre-writing reflection.

It was decided that writing about a positive experience while watching a movie could serve as an adequate counterpart to being in nature for the purpose of this study. This was decided because a positive movie experience could still produce similar wellbeing benefits in comparison to a positive nature experience, but a movie experience was not likely to have occurred in nature, as to avoid overlap. Nisbet (2011) also chose an alternative writing prompt that would hopefully promote an indoor experience, but the control group in her study was not designed to write expressively, so Nisbet's alternative prompt was not useful to the current study.

Inclusion of Nature in Self. To assess nature connectedness, the Inclusion of Nature in Self scale was used (INS, Schultz 2001). This is a graphical measure that evaluates the degree to which a person feels connected to nature. It is a single-item measure that features seven sets of overlapping circles labeled "self" and "nature." The circles' overlap begins as separate, and overlaps entirely by the seventh choice, as if the user perceives their self and nature as one entity. The participant was instructed to choose the relationship that best represents his or her connectedness with nature ("Please choose the picture below that best describes your relationship with the natural environment. How interconnected are you with nature?") The scales are 1 (no connection) to 7 (complete connection). Schultz et al. (2004) re-assesses the validity of the Inclusion of Nature in Self scale and deems it useful for measuring connectedness to nature, and Martin and Czellar (2016) asserts that the INS is a convenient and concise way to measure nature connectedness.

Satisfaction with Life Scale. To assess satisfaction with life, the Satisfaction with Life Scale (SWLS; Diener et al., 1985) was used. It is used to measure perceived life satisfaction (e.g. “The conditions of my life are excellent.”). The scale consists of five measures using Likert-style responses measuring from 1 (strongly disagree) to 7 (strongly agree). To assess a participant’s score, each item was summed to produce a total score with a maximum of 35. This scale has successfully shown convergent validity with other scales (Pavot & Diener; 1993), a reported coefficient alpha of 0.87 (Adler & Fagley, 2005), and test-retest reliability coefficient of 0.84 over a one-month interval (Pavot et al., 1991).

Pro-Environmental Behavior Measure. To assess pro-environmental behavior, an adapted pro-environmental behavior measure from Pan et al., 2018 was used. With interest to this particular study, only the questions about Environmental Sensitivity and statements about Environmental Behavior Intention were necessary. The Environmental Sensitivity questions measured personal concern and interest in nature (e.g. “What are the levels of my appreciation, passion, and concern for nature?”). The Environmental Behavior Intention statements measured willingness to practice sustainable behavior [e.g. “I am willing to adopt environmental actions in daily life to protect the environment (e.g., saving water and electricity, taking low carbon transportation producing less detrimental effect on the environment)”]. The participants were instructed to answer as follows: “Read carefully and decide where you stand on these statements, with 1 being the least and 5 being the most”. Pan et al. (2018) drew on Chawla (1998) and her notions of environmental sensitivity and environmental behavior to support their hypothesis that environmental sensitivity would have positive effects on behavioral intentions.

The environmental sensitivity scale is a 4-item scale from Hsu and Roth (1998) with Hsu (2004) re-testing its validity in measuring care and empathy for the environment. The environmental behavior intention scale originated with Hungerford et al. (1980) to measure willingness of engagement in sustainable behaviors, and it was revised and re-tested by Hsu and Roth (1998) and Erdogan, Ok and Marcinkowski (2012).

Data Analysis

Analyses for the results of Hypotheses 1 and 2 were conducted using statistical software SPSS. Prior to analyzing results, data normality was tested and cleaned by reviewing skewness and kurtosis. Multivariate outliers were tested for using Mahalanobis distance, and no outliers were identified. Descriptive statistics were calculated, and the variable mean was used to replace a missing data item. The total number of participants was $N = 42$, meaning an even 21 participants in each condition (nature or movie). To examine pre- to post- mood difference regardless of condition, a paired-samples t-test was conducted. Then, a one-way ANOVA was conducted to determine if the pre- to post-difference was dependent on condition.

A one-way ANOVA was conducted to compare post-test scores on the measures of nature connection, satisfaction with life, and pro-environmental behavior (defined by environmental sensitivity and environmental behavioral intention).

For qualitative analysis of Hypothesis 3, transcripts were first viewed independently and jointly (self and advisor) to assess incidences of transcendence (an a priori category) and to generate additional categories arising from the data (Huberman & Miles, 2009). In addition to clear and complete descriptions of transcendence, categories

for coding included partial transcendence, mental health/wellness, social, creativity, and activity/adventure. Next, two independent raters received instructions and coded movie and nature transcripts for units of meaning reflecting these categories. Transcripts were reviewed and compared jointly by initial reviewers for areas of agreement and disagreement. When coders disagreed, definitions were referred to and issues were easily resolved.

Results

Descriptive Statistics

Descriptive statistics can be found in Table 1. The pre-mood to post-mood scores show that the total pre-mood ($M = 3.86$, $SD = .79$) to post-mood ($M = 4.17$, $SD = .73$) increased due to the intervention. The variables did not show significant differences for the nature group compared to the movie group. Table 1 shows the mean differences for each of the post-test scores as well: satisfaction with life (nature: 26.48 (4.33); movie: 25.38 (6.25)); nature connectedness (nature: 3.67 (1.32); movie: 3.48 (1.54)); environmental sensitivity (nature: 4.02 (.80); movie: 3.84 (.65)); and environmental behavior intention (nature: 3.86 9 (.89); movie: 3.16 (.83)).

Table 1.
Descriptive statistics of measured variables

Variables	Scale	Mean(M)	Standard Deviation (SD)
Pre-Mood	1 – 5		
Nature Writing		3.8571	.79282
Movie Writing		3.7143	.84515
Total		3.7857	.84515
Satisfaction with Life Scale (SWLS)	5 – 35		
Nature Writing		26.4762	4.3315
Movie Writing		25.3810	6.2488
Total		25.9286	5.3392
Inclusion of Nature in Self Scale (INS)	1 – 7		

	Nature Writing		3.6667	1.3166
	Movie Writing		3.4762	1.5369
	Total		3.5714	1.4167
Environmental Sensitivity		1 – 5		
	Nature Writing		4.0238	.80197
	Movie Writing		3.8373	.65486
	Total		3.9305	.72927
Environmental Behavioral Intention		1 – 5		
	Nature Writing		3.8571	.89176
	Movie Writing		3.1587	.83413
	Total		3.5079	.92317
Post-Mood		1 – 5		
	Nature Writing		4.1905	.67964
	Movie Writing		4.1429	.79282
	Total		4.1667	.72974

Hypothesis One: Effects of Writing on Mood

A paired samples t-test was conducted to determine if there was a significant pre- to post change in mood following the writing intervention. Results indicated a significant difference in participants overall post-mood scores in comparison to their pre-mood scores (see Table 2). Participants reported higher overall mood following participation in the writing intervention, $t(41) = 3.736, p < .01$.

Table 2.
Hypothesis 1 Paired Sample T-Tests

Post and Pre-Test Scores Compared	Mean	SD	SE	95% CI	<i>t</i>	<i>df</i>	<i>p</i>
Mood	0.38	0.66	.10	.17, .59	3.736	41	*.001

Note. * = $p \leq .01$.

Supplemental analyses were conducted to explore the differences in pre- to post-mood by condition (nature writing or movie writing). Results of a one-way ANOVA did not indicate a significant difference between groups pre-mood ($F(1,40) = .319, p > .05$) or post-mood ($F(1,40) = .044, p > .05$).

Hypothesis Two: Post Writing Differences

A one-way ANOVA was used to determine if there was a significant difference between groups for each of the four dependent variables (see Table 3). Results indicated a significant difference for only one of the variables, environmental behavior intention ($F(1,40) = 6.87, p < .05$). There were no significant results for satisfaction with life ($F(1,40) = .436, p > .05$), inclusion of nature in the self ($F(1,40) = .186, p > .05$), or environmental sensitivity ($F(1,40) = .682, p > .05$). See Table 3.

Table 3.
Analysis of Variance Results for Satisfaction with Life, Inclusion of Nature in Self, Environmental Sensitivity, and Environmental Behavior Intention

	SS	df	MS	F	p
SWLS					
Between Groups	12.595	1	12.595	.436	.513
Within Groups	1156.190	40	28.905		
Total	1168.786	41			
INS					
Between Groups	.381	1	.381	.186	.669
Within Groups	81.905	40	2.048		
Total	82.286	41			
Environmental Sensitivity					
Between Groups	.365	1	.365	.682	.414
Within Groups	21.440	40	.536		
Total	21.805	41			
Environmental Intention					
Between Groups	5.122	1	5.122	6.87	*.012
Within Groups	29.820	40	.746		
Total	34.942	41			

Note. * = $p \leq .05$

Hypothesis Three: Comparing Writing Samples for Transcendence

Tables indicating qualitative results, including categories and sample quotes, can be found in Tables 4 through 6. In the review of writing transcripts, only the nature

writing showed clear and full descriptions of transcendence, as defined by Chawla (1986):

“Transcendence: memory of a dynamic relationship with the outer world, of a profound continuity with natural processes. It transcends social consciousness through a feeling on one-to-one communion with the environment; inspires long descriptions richly evocative of all five senses, detailing everything in the setting. Most commonly, it involves elation, a sense of exuberance or enveloping calm, of timelessness, boundlessness, or radiance; intense responsiveness to the environment/identification with it; a sense of relationship with nature and enduring inspiration...freedom, solitude, an opportunity to feel that the environment was one’s own.” (37-38).

Table 4. Transcendence in Nature Writing

...my friend and I went beyond the little field because we were following this butterfly. It flew into the wooded area that stopped the big yard space...I remember looking up and wondering how the world could be so beautiful. I saw the clear blue sky there were few clouds but some were still present, though it wasn't even the sky that drew me the most. What drew me was the way I was able to see the sky through the tips of the trees. It smelt like fresh air, and even though I lost the butterfly, I will always remember that wonderful feeling nature gave me.
While I was a child there was a tree at my grandma’s house that I used to climb day in and day out. The tree reached far into the sky, higher than I could imagine. the leaves were bigger than average leaves and were prosperous along the side the whole tree. As I would climb the long branches I felt the wood caress my skin and it was cool to the touch. When I was high enough I could feel the cool wind breeze along my face.
When we finally got tired, we just laid on top of the trampoline looking at the stars.... The feeling of the wind in our hair as we jumped up and down. The smell of the trees around us in my backyard. The sun setting in the background. It all made for a beautiful memory that I will treasure.
...the sun was about to come up and it was cold as ever. My Dad and I walked to the tree stand, and I just remember my hands being so cold as well as my toes were too...he turned on the heaters and the wave of heat the hit was so nice and refreshing...it was as sunny as ever and I could see my breath...

I remember not having to worry about anything...I remember feeling the cold air on my face as I was speeding down the hill.

As seen in sample quotes (Table 4), participants used vivid language reflecting different senses and sensations (“cool wind breeze along my face”), a feeling of oneness (“what drew me was the way I was able to see the sky from the tips of the trees”), and a feeling of complete freedom (“I remember not having to worry about anything”). In addition to these full descriptions of transcendence, there were several descriptions of partial transcendence (“this was always one of my favorite times of the summer because I love being outside and getting fresh air”).

Nature writing transcripts also showed more examples of wellbeing aspects: mental health/wellness, social, creativity, and activity/adventure. Sample quotes from each category are exhibited in Table 5.

Table 5. Aspects of Wellbeing in Nature Writing

Mental Health/Wellness Examples: psychological benefits, positivity
Growing up in X was a really positive experience. My most happy memories were playing with my brothers in nature. We were so carefree and innocent and had no worries. I reflect on it now an again and feel happy when I recall those past memories and wish my kids experienced it.
It may seem a bit dumb, but we had the most fun we could ever have outside with just ourselves and nature.
...I was hiking with my dad in the Smokey Mountains...it was one of the best ways to spend the day and we watched the sunset over the many peaks of the mountain ranges in front of us... I felt so accomplished to be able to be there and experience it.
This was a peaceful and exciting break from my normal school schedule so I was always excited for the trip.
A very positive childhood experience would have to be when I was about eight years old, I remember not having to worry about anything...we always managed to play outside and enjoy the nature.
Social Examples: interacting with others, social wellbeing

<p>One particular time I was there with all my cousins and my Grandparents and we played hide and go seek among the rocks as it was growing dark...it's one of my favorite memories because all my people were there. I was loved...</p>
<p>...Moreover, thinking about being in the backyard one day when it was snowing reminds me of being together with my grandparents and my parents... all shared the surprise of seeing the snow out in the yard...we all also shared in the enjoyment of being together and appreciating the natural landscape of the open space.</p>
<p>During the days we would go to the huge lake and go out in our boat on the water with all of our friends and family. ...There is nothing better than being in nature with your loved ones having fun.</p>
<p>Creativity Examples: constructing, using tools, narrative play</p>
<p>The woods were an undeveloped part of my neighborhood and we really enjoyed going into the woods and claiming sections of it to be our "homes." ...we scavenged the woods in search of other types of fallen debris and sticks that we could use to make makeshift homes or really just areas...I loved the task oriented part of this as well as the aspect where I was in control of making something perfect with only the tools and things around me.</p>
<p>We would pretend to play house and gather from the bushes and improvise with things.</p>
<p>...me and my friends would spend hours outside pretending that we were living in "old times" and would gather leaves and wild berries outside. We would pretend that we were building houses, making meals, and creating an entire society out of just what we were finding outside.</p>
<p>Activity/Adventure Examples: jumping, running around, exploration</p>
<p>We would get a cabin in the woods and go hiking, go to the lake, do s'mores around the campfire, and play outside.</p>
<p>We would complete hikes each morning and then go grill out by the river. While at the river, my sister and I would play with the rocks and try to cross the river by navigating the huge boulders.</p>
<p>...we would never have any shoes on and would run around the neighborhood...we spent most of our time in nature and outside exploring and trying to make a bridge across the narrow river at the back of our neighborhood to connect to another friend's house.</p>

As seen in sample quotes (Table 5), participants contributed wellbeing to significant life experiences in nature relating to wellness (“we had the most fun we could ever have outside with just ourselves and nature”), social contact (“we all also shared in

the enjoyment of being together and appreciating the natural landscape of open space”), creativity (“we would pretend that we were building houses, making meals, and creating an entire society out of just what we were finding outside”), and activity (“my sister and I would play with the rocks and try to cross the river by navigating the huge boulders”).

The movie writing transcripts showed no examples of complete transcendence. However, there were a few examples of partial transcendence as defined above (Chawla, 1986) such as, “I loved every moment of this movie while I silently took in every scene that came across the screen”.

The movie writing transcripts were also coded for identical categories of wellbeing as the nature writing: mental health/wellness, social, creativity, and activity/adventure. There was a decrease in the amount of wellbeing examples in the movie group compared to the nature group, especially in categories like creativity and adventure. The movie group did exhibit a decent amount of social examples. See Table 6.

Table 6. Aspects of Wellbeing in Movie Writing

Mental Health/Wellness Examples:
I felt inspired to do anything after this movie. It taught me to go after your dreams, and don't let anybody stop you from doing so. It also taught me to keep going with whats in my heart, and pay attention to what I had going on for myself.
I still watch Princess and the frog for motivation and for me to go on about my dreams...I feel as if this movie had a major reflection on my life, and I will keep watching the movie and will keep on being inspired it.
This was one of the first movies I remember seeing and was also one of my favorites. I was just a little kid happy watching a movie...
Social Examples:
I remember in that moment looking around at my family and smiling because I understood how blessed I was to have them in my life. I know that many people do not have very close family relationships, and to have a family that values each other and quality time together is always a blessing.

The mom in the movie was like the "glue to the family" in the movie and really held them together; which is so similar to my family. I love watching movies with my family because it brings us all together in the same room, doing the same activity and makes us bond.
We invited over all of our neighbor kids, dressed up, and ate themed food. I remember there being a ton of kids sitting on my couch while we anticipated what would come next on the screen.
Each of us four could quote the movie pretty much in its entirety. Those were the few moments from my childhood that everyone got along, just for the duration of this movie. No one fought, no one argued, no one had anything negative to say to another.
Creativity Examples:
I used to pretend I was on a magic carpet ride with our rug at home. I always dreamed of flying on a magic carpet and the whole movie made me so excited...
Activity Examples:
One time as a kid I was roller skating and I fell and I quoted "I think I broke my ass!" Like from the movie.
For each song, everyone would get up to dance around...it was so much fun to pretend we were in the movie.

Overall, qualitative analysis supports the hypothesis that the nature writing group would produce more transcendent accounts than the movie writing group. The analysis also suggests that memories of significant childhood experiences in both groups contributed to wellbeing. The nature writing group had more instances of wellbeing as defined by the categories of mental health/wellness, social, creativity, and activity/adventure.

Discussion

The symbiotic benefits of human-nature interaction and the ongoing climate crisis exhibit the importance for environmentalism. While spending time in natural settings promotes wellbeing (Kaplan & Kaplan, 1989; Parsons, 1991; Ulrich et al., 1991) and sustainable behavior (Bosch and Depledge, 2015; Rosa et al., 2018), the urbanization of

environments is relatively new to the human population (Gullone, 2000), which means that people are spending less time in nature and, thus, suffering the consequences of nature deprivation. This urges researchers to investigate alternative ways of “experiencing” nature and to get creative in nature-based interventions. The purpose of this study was to explore the possible benefits of environmental memory and positive nature experiences through the medium of autobiographical writing. The study tested mood, connection to nature, life satisfaction, and pro-environmental behavior. Overall, the hypotheses were partially supported.

Effect of Nature Writing on Mood

The overall prediction of increased mood due to the writing intervention was supported, yet there was no significant difference for the nature group. The overall enhancement of mood following recall of a positive autobiographical experience aligns with prior studies on mood and autobiographical memory (Bower, 1981; Josephson et al., 1996; Speer et al., 2014) as well as with studies on positive writing (Smith, 2001; Suhr et al., 2017). It was predicted that participants in the nature writing group would show a significant increase in mood when compared to the movie writing group, but this was not the case. This prediction came from the notion that recalling a positive memory in nature could evoke similar emotional benefits to actual nature contact, which Buell (2017) discusses in his study about the uses of environmental memory. Buell suggests that the “arts of environmental imagination are a potential resource” (p.113) activating the interdependent relationship between human and nature. Contact with nature is shown to increase mood (Neill et al., 2018).

Comparison of Post-Writing Scores

Despite prior studies suggesting the power of nature-based interventions on nature connection (Mayer et al., 2008; Schultz & Tabanico, 2007;), life satisfaction (Lewis, 1996; Kaplan, 1992), and pro-environmental behavior (Gifford, 2014; Zelenski, Dopko, & Capadli, 2015), the predictions for an increase in the nature writing group were only supported for environmental behavior intention. In alignment with the proposed notion that a nature-based writing intervention could produce the desirable benefits of nature contact, this could explain the significant increase of pro-environmental behavior intention, since prior studies suggest that nature exposure is associated with increased pro-environment behavior (Evans et al., 2018). While the other variables did not yield significant results, they all yielded in the proposed positive direction, suggesting that further data collection could produce the predicted results.

Identification of Transcendence

The qualitative analysis supported the third hypothesis that the nature writing group would produce more instances of transcendent examples than the movie writing group. Experiences in nature have shown to promote transcendence (Rohde & Kendell, 1994; Niell et al., 2018).

Chawla (1998) suggests that significant life experiences that people describe in nature not only exhibit accounts of their “outer environment” (the physical world around them) but also their “inner environment” (personal interests, values, etc.). Chawla concludes that paying attention to both the outer environment and the inner environment is important in environmental research, which is why we not only examined instances of transcendence but also strived to generate common themes amongst the data. The themes

we generated were mental health/wellness, social, creativity, and activity/adventure, and they were more prominent in the nature writing group than the movie writing group.

Limitations

Data collection was a struggle due to the necessity to complete this study in the spring semester of 2020 which coincided with the Covid-19 pandemic, school closures, and social distancing. We had already faced issues with a lack of interest to participate in this in-person study, as it is more difficult to gain participants for a face-to-face experiment than through an online study because of convenience. The Covid-19 pandemic forced the conclusion of data collection, which left the analyses underpowered. More time would have allowed for more participation and valid analyses, which could have resulted in the positive trends found in this study to reach significance.

Data collection was self-report, which allows for participants to express bias, answer incongruently with the truth, etc. Participants may also interpret questions differently. Also, the writing intervention was created by the researcher as a new and unique method of nature-based intervention, so even though the literature suggests it to be an appropriate method, it has not been tested as valid or reliable.

Furthermore, contrasting an experience in nature with an experience watching a movie was meant to evoke similar feelings of positivity and, simultaneously, opposite feelings of surroundings. This too was created by the researcher and has not been validated. The freestyle nature of the writing intervention could have created discrepancies in the data.

Lastly, this study only compared post-test results of groups for every measure except mood. The lack of pre-test and post-test measures for connection to nature, pro-

environmental behavior, and life satisfaction could mean that the writing intervention did not affect these post-writing scores. Future research would test all measures before and after to ensure that the manipulation of the writing intervention was applicable.

Implications for Wellbeing and Pro-Environmentalism

This study shows that reflecting on and writing about a positive childhood experience can significantly increase mood, which is an important extension of the existing literature. This suggests the importance of incorporating positive reflection on past experiences and/or positive writing exercises into our daily lives. We could even use these exercises as tools when we are feeling down or unhappy.

This study also suggests that reflecting on and writing about a positive childhood experience in nature can boost pro-environmental behavior intention, which suggests that this could be a useful tool in sustainability efforts if actual nature contact is unavailable or inconvenient. Perhaps drawing on environmental memories evokes nostalgia and care for the natural world, which translated in this study to an increase in taking measures to protect the natural world. In these troubled times of devolving environments, an exercise as simple, personal, and mood-boosting as this one should be considered.

Implications for Future Research

This is one of many studies that aimed to add to the growing body of literature regarding alternative nature experiences (Benfield et al., 2014; Joye, 2007; Kjellgren & Burkhall, 2010), significant life experiences in nature (Howell & Simon, 2016; Rosa & Collado, 2019), and transcendent experiences in nature (Bethelmy & Corraliza, 2019; Cheung, 2014). This study was unique in that it used a brief writing exercise about an environmental memory to see if nostalgic reflection, expressive writing, and the mind's

eye were powerful enough to evoke a similar experience to nature exposure and promote increased nature connectedness, life satisfaction, and pro-environmentalism. Only an aspect of pro-environmentalism, environmental behavior intention, showed a significant effect between subjects. This suggests that the nature writing intervention was successful in promoting environmental behavior intention compared to the movie group.

The lack of significance for the other variables could mean that this nature writing intervention is not an adequate method of promoting higher mood, nature connectedness, life satisfaction, or environmental sensitivity. With the analysis lacking necessary power, this study cannot draw conclusions. This research ultimately suggests that positive nature reflection and writing should be further explored as a method of promoting wellbeing and sustainability.

The written accounts of brief, personal reflection could be further examined and more diligently analyzed in future research, especially if more data is collected. Drawing on common themes could give an insight into what kind of nature memories are most influential and most easily remembered.

Conclusion

The current study examined the effects of an autobiographical writing intervention on mood, nature connectedness, life satisfaction, and pro-environmentalism. The goal of this study was to investigate positive autobiographical writing as an alternative way of experiencing nature and to explore relationships between positive nature writing, mood, wellbeing, and sustainability. Findings indicate a significant overall positive effect on mood, regardless of condition. Findings also indicate that nature writing was associated with environmental behavior intention. Qualitative data showed

that nature writing produced more experiences of transcendence and other aspects of wellbeing than movie writing. Overall, this experiment explores the power of environmental memory to bring positive change to ourselves and our environment.

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