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**30x30**  
NATURE CHALLENGE

# ANSWERING NATURE'S CALL

Results of the 2015 David Suzuki Foundation's 30x30 Nature Challenge





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SOLUTIONS ARE IN OUR NATURE



## **Answering Nature's Call:**

### **Commitment to Nature Contact Increases Well-Being**

#### **Results of the 2015 David Suzuki Foundation's 30x30 Nature Challenge**

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## **Background and Methodology**

Connecting with the natural environment is important for human and environmental health. Contact with nature has a variety of salubrious effects for physical and psychological well-being, including improvements in mood, vitality, attentional focus, and immune functioning (Selhub & Logan, 2012; Tsunetsugu, Park, & Miyazaki, 2010; see also Frumkin, 2001 for a review of the health benefits of nature). Regular nature contact is associated with feelings of nature connectedness, as well as greater happiness (Nisbet & Zelenski, 2013; Nisbet, Zelenski, & Murphy, 2011; Passmore & Howell, 2014). Nature contact is good for people, but it also fosters prosocial and proenvironmental behaviour (Sullivan, Kuo, & Depooter, 2004; Zelenski, Dopko, & Capaldi, 2015; Zhang, Piff, Iyer, Koleva, & Keltner, 2014). In other words, time in nature is good for us and for the planet.

Despite the evidence of nature's impacts on human health, people may be missing out on the potential benefits of nature contact. Visitation rates for Canada's national parks have been declining over the past 20 years (Schultis & More, 2011). Nearby nature contact seems to be less frequent than it could be. Almost one third of Canadian adults get little to no daily outdoor time; only 6% of their time is spent outside (Matz et al., 2014). Canadian youth appear similarly deprived of nature contact, with most spending an hour or less outside each day, on average (David Suzuki Foundation, 2012). Nature contact may be undervalued and not considered as a source of personal happiness. Indeed, empirical studies indicate people underestimate the importance of nature contact for psychological well-being (Nisbet & Zelenski, 2011). The underutilization of nature for recreation, restoration, and well-being underscores the need for nature-based intervention strategies and the importance of evaluating programs designed to foster more nature contact.

The David Suzuki Foundation (DSF) conducts an annual nature-based program to encourage contact with the natural environment. Each spring, thousands of Canadians pledge to spend 30 minutes outdoors, in nature, for 30 days during the month of May. Schools, workplaces, and individuals receive tips via email and the DSF social media sites (Twitter, Facebook) on how to add regular outdoor activities to their daily routine. The 30x30 Nature Challenge strives to encourage people to connect with nature and, as a result, improve their personal health and happiness.

Since 2013, the 30x30 Challenge has included a scientific research component. Participants voluntarily completed surveys at the beginning and end of the challenge, allowing researchers to empirically assess any effects on nature contact and well-being. The research surveys were designed by Dr. Elizabeth Nisbet, a psychologist at Trent University, and Aryne Sheppard, Senior Public Engagement Specialist at the DSF. The surveys measured changes in subjective connection with nature ('nature relatedness') as well as mood (positive and negative emotions), vitality, and environmental concern. In addition, participants provided reports about their average weekly time spent in various activities, including nature contact (see Appendix A for links to the full survey text). The online surveys were available in both French and English and were hosted on Trent University's Qualtrics survey program. The pre- and post-challenge measures were designed to capture changes in participants' nature contact, well-being, and connectedness during the month-long challenge. Data was analyzed by Dr. Nisbet, at Trent University.

In 2015, thousands of Canadians took part in the research component of the challenge. Both new and returning participants agreed to report on their experiences, contributing essential information for the scientific study of human-nature relationships. It was expected that spending time outside and developing a sense of connection with nature would be associated with improvements in happiness.

### **Participant Characteristics**

Pre-challenge questionnaires (Time 1) were completed when participants enrolled in the challenge between April and the first week of May 2015. After removing surveys with excessive missing data (e.g., mostly blank, or with no time use or connectedness reports), the final Time 1 sample consisted of 6,724 people.<sup>1</sup> Participants were mostly women (87.9%,  $n = 5,778$ ; men:  $n = 751$ ; other:  $n = 8$ ; 148 people did not indicate their gender). The average age of participants was 43.72 ( $SD = 13.76$ , range: 18 to 87; 209 people did not provide a response). Surveys were completed either in English ( $n = 5,678$ ; 84.4%) or French ( $n = 1,046$ ). Most participants (86.7%) were enrolled in the challenge for the first time ( $n = 5,831$ ). Of those returning to the challenge, 89 had taken part in 2012, 241 in 2013, and 746 in 2014.

The post-challenge survey invitation was sent via email on June 1st to all those who had completed the first survey and all participants enrolled in the challenge. The Time 2 survey was completed by 1,896 of the Time 1 participants, as well as several new people ( $n = 46$ ). Participants who completed both surveys were highly similar in background characteristics to the larger Time 1 sample. Average age was 45.25 ( $SD = 14.15$ ; range: 18 to 87; 28 participants did not indicate age) and most were women (87.1%,  $n = 1,646$ , men:  $n = 226$ ; other:  $n = 2$ ; 22 people did not indicate their gender).<sup>2</sup> The majority of these participants (84.8%) were new to the challenge ( $n = 1,607$ ); 28 participated in 2012, 88 in 2013, and 249 in 2014. Analyses examining the effects of the month-long challenge were conducted using data from people who completed both surveys ( $n = 1,896$ ).

## **Results**

### **Effects of the 30x30 Nature Challenge: Assessing Nature Contact Over Time**

The purpose of this study was to test whether the 30x30 Nature Challenge is beneficial for increasing nature contact and influencing participants' well-being. In order to determine whether people were successful in their commitment to spend more time outdoors, a number of questions in the surveys inquired about time use. Respondents reported on their activity patterns, and the number of hours spent either being active ("on a walk, hike, or physical activity in nature") or relaxing in nature ("relaxing or sitting outside in nature") during the prior week. A number of

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<sup>1</sup> ) Analyses were conducted with and without extreme responders to time use questions (weekly sleeping hours < 35 and > 80) or with response sets (where respondents failed to insert a specific requested response in the survey). Exclusion based on these criteria did not alter results or their interpretation, thus findings are reported on the entire participant sample.

<sup>2</sup> Due to the mostly female sample, analyses were conducted to examine the effects of gender on nature contact. Gender explained 1% or less of the variability in how much participants increased their time in nature (both active and relaxed), thus analyses are reported here for the entire sample.

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other common activities were included such as texting, email and surfing the internet, shopping, visiting friends, travelling in a vehicle, exercising at a fitness facility, and sleeping.

Paired samples (within subjects) t-tests were conducted to assess changes over time in nature contact and all other activities (Table 1). Participants successfully increased their nature contact. Time spent hiking, walking, or being active almost doubled, from an average of 5.33 hours per week before the challenge to 9.8 hours by the end of the challenge (Figure 1). Participants also reported spending more time relaxing in nature, with an average of 2.55 hours a week at the beginning of the challenge, increasing to a weekly average of 6.08 hours by the end (Figure 1). Nature contact was the activity that changed most; participants also increased their contact with friends, and significantly reduced their time using technology (phone, texts, email, internet; Figure 2).

Separate analyses were conducted on those new to the challenge ( $n = 1605$ ) versus repeat participants ( $n = 289$ ), to determine if novelty might impact the experience (i.e., examining change in active and relaxed nature time by participant type). Increases in active nature time were slightly greater for first time participants (4.73 hours on average, compared to 3.04 hours for repeat participants), but very little of the variation in how people changed over time was explained by participant novelty ( $< 1\%$ ).<sup>3</sup> The effect sizes for change in active nature contact were virtually identical for first time ( $d = .45$ ) and repeat participants ( $d = .44$ ). Participants were very successful in increasing their nature contact, regardless of whether they were new to the 30x30 challenge or not. Both new and returning participants had similar increases in relaxed nature time.

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<sup>3</sup> Repeated measures ANOVAs were conducted for change in active and relaxed nature time by participant type. To address the unequal sample sizes, however, within subjects paired samples t-tests were also conducted for the two participant types separately, and separate effect sizes (Cohen's  $d$ ) were calculated for first time and repeat participants on the nature contact variables.

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Table 1

*Average Weekly Time Use: Change in Nature Contact and Activities Pre- and Post-Challenge*

Activity	Time 1, <i>M</i> ( <i>SD</i> )		Time 2, <i>M</i> ( <i>SD</i> )		<i>r</i>	T2-T1	<i>t</i>	<i>d</i>
	Hours/Week		Hours/Week					
<b>Active nature</b>	<b>5.33</b>	<b>(7.17)</b>	<b>9.80</b>	<b>(10.47)</b>	<b>.34</b>	<b>4.47</b>	<b>18.51***</b>	<b>0.44</b>
<b>Relaxed nature</b>	<b>2.55</b>	<b>(4.97)</b>	<b>6.08</b>	<b>(7.79)</b>	<b>.32</b>	<b>3.53</b>	<b>19.70***</b>	<b>0.47</b>
Shopping	2.69	(3.46)	2.82	(3.68)	.17	0.13	1.20	0.03
At a gym	1.26	(2.77)	1.24	(3.14)	.42	-0.03	-0.36	-0.01
Visiting Friends	5.30	(8.06)	6.84	(9.53)	.21	1.54	6.01***	0.14
In vehicle	6.02	(6.46)	6.20	(5.97)	.39	0.18	1.14	0.03
Phone/texting	4.55	(7.30)	3.68	(5.54)	.47	-0.87	-5.62***	-0.13
Email/Internet	14.23	(13.90)	10.27	(11.20)	.48	-3.95	-13.20***	-0.31
Sleeping	50.24	(10.57)	50.78	(11.32)	.37	0.53	1.89	0.04

Note: For each time point, table presents mean scores, with standard deviations in parentheses, correlations (T1, T2), difference scores, and results of paired-samples t-tests, comparing means (Time2-Time1), with effect sizes (Cohen's *d*, paired-samples-corrected). *N* = 1,896.

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

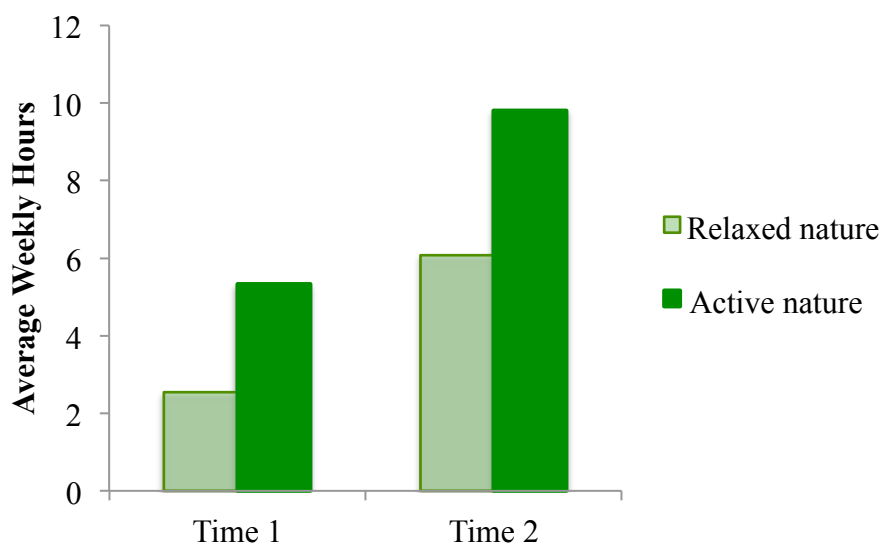


Figure 1. Change in Weekly Nature Contact

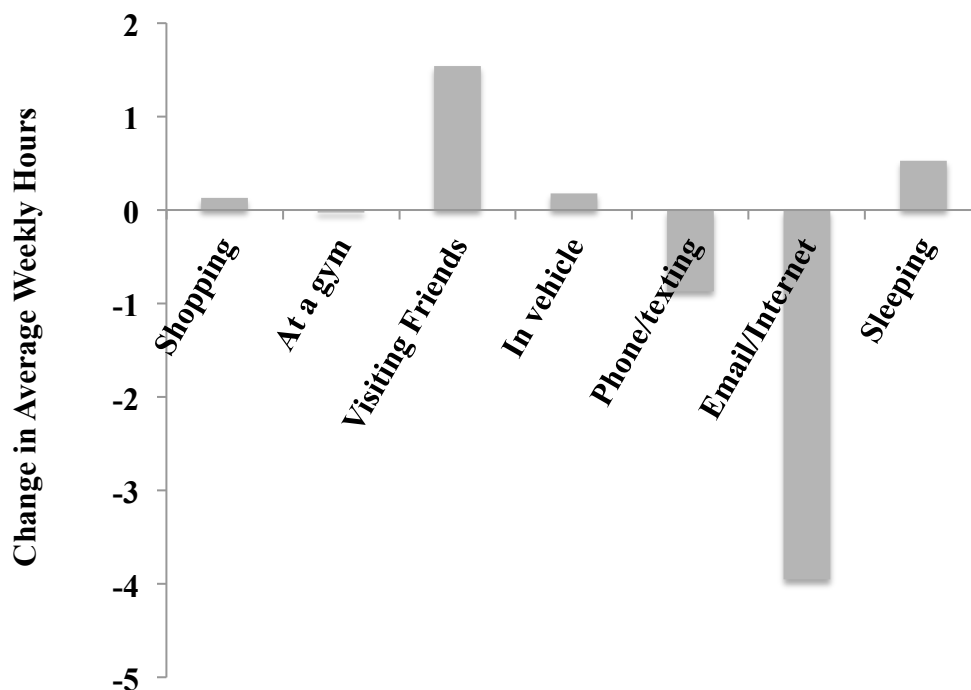


Figure 2. Change in Hourly Average for Weekly Activities

Note: Bars above the zero axis reflect an increase whereas bars below the axis indicate decrease.

### Effects of the 30x30 Nature Challenge on Connectedness with Nature

Nature immersion is associated with increased feelings of connection with the natural world. Regular nature contact is likely to enhance a person's sense of nature relatedness, and the challenge provides an opportunity to demonstrate this empirically. Participants completed the 21-item self-report "Nature Relatedness Scale" (Nisbet, Zelenski, & Murphy, 2009) which assesses internalized identification with nature as well as nature-related worldviews, people's familiarity, comfort with and desire to be in nature. Respondents indicate agreement with each of the nature relatedness items using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The nature relatedness scale can be used to explore three sub-dimensions which contribute to one's relationship with the natural environment. The first dimension, nature related-self, represents an internalized identification with nature, reflecting feelings and thoughts about one's personal connection to nature. A person scoring high on this dimension would consider herself to be a part of nature and live their life in ways that reflect this. The second dimension, nature related-perspective, represents an external, nature-related world view about how humans interact with other living things. This component of nature relatedness would be reflected in a person's views about the treatment of animals and use of natural resources, for example, and may be apparent in pro-environmental attitudes. This aspect of nature relatedness would also be demonstrated by a sense of agency concerning individual actions and their impact on all living things. The third dimension, nature related-experience, reflects a physical familiarity with the natural world, a level of comfort with and desire for nature contact. This aspect of nature relatedness would be most evident in someone who seeks out nature, is drawn to

the wilderness, and who is aware of and fascinated with nature everywhere in daily life. Reverse scored items were recoded and items were averaged to compute an overall score for the 21-item scale, as well as scores on each subscale. (A score for the short-form version of the scale (NR-6) was also computed for comparison purposes.) A higher score on the full nature relatedness scale or the subscales indicates stronger connectedness with the natural environment (see Appendix B, Table 7 for Chronbach's  $\alpha$  for all measures at Time 1 and Time 2).

Participants had relatively strong connections with nature at the beginning of the challenge, similar to previous years. The nature relatedness mean for the sample was 4.28 on a 1 to 5 scale (range: 2.29 – 5.00;  $M = 4.21$  for the larger Time 1 sample of participants).<sup>4</sup> Despite the generally high levels of connectedness at the beginning of the study, participants further increased their sense of nature relatedness during the challenge (Table 2). Overall nature relatedness increased, and particularly the aspects of connectedness that are related to personal identity or self-concept and experience (the dimensions of nature related-self and nature related-experience). This pattern was consistent for people who were new to the challenge, as well as for repeat participants. Repeated measures ANOVAs were conducted to examine whether participant type influenced the changes over time for the dependent variables (nature relatedness, well-being, environmental concern) and there were no significant interactions.

Table 2

*Change in Nature Relatedness and Nature Relatedness Dimensions Pre- and Post-Challenge*

	Time 1, <i>M (SD)</i>		Time 2, <i>M (SD)</i>		<i>r</i>	T2-T1	<i>t</i>	<i>d</i>
Nature Relatedness (21)	4.28	(0.45)	4.38	(0.42)	.82	0.10	16.49***	0.38
Nature Relatedness (6)	4.24	(0.62)	4.37	(0.55)	.81	0.13	14.66***	0.34
nature related-self	4.35	(0.56)	4.48	(0.49)	.78	0.13	16.04***	0.37
nature related-perspective	4.37	(0.49)	4.39	(0.50)	.72	0.02	2.18*	0.05
nature related-experience	4.08	(0.67)	4.23	(0.61)	.80	0.15	16.15***	0.37

Note: For each time point, table presents mean scores, with standard deviations in parentheses, correlations (T1, T2), difference scores, and results of paired-samples t-tests, comparing means (Time2-Time1), with effect sizes (Cohen's  $d$ , paired-samples-corrected).  $N = 1,896$ .

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

The impact of the challenge, in terms of fostering nature relatedness, differed for participants, depending on their initial connection with nature. People who began the challenge without particularly high levels of nature relatedness (Time 1  $M = 3.88$ ,  $SD = 0.35$ ) had greater improvements (Time 2  $M = 4.08$ ,  $SD = 0.41$ ) than those who were already very connected (Time 1  $M = 4.61$ ,  $SD = 0.19$ , Time 2  $M = 4.62$ ,  $SD = 0.23$ ,  $F(1, 1877) = 275.27$ ,  $p < .001$ ,  $\eta^2 = 0.13$ ).

<sup>4</sup> Mean scores on the 21-item scale typically range from approximately 3.0 - 3.7 in community samples and from 4.4 - 4.5 for environmental activists and educators.



The challenge seems to foster strong connections with nature, particularly for those who may not feel part of the natural world.

There may be a limit to how much change in nature relatedness is possible (or measureable) for highly connected people, however. For strongly connected people, nature contact is often already a habit. Indeed, people with high levels of nature relatedness reported moderate amounts of active (6.51 hours) and relaxed (3.09 hours) weekly nature time at the start of the challenge (compared to 3.9 and 1.9 weekly hours of active and relaxed nature time for less nature related participants). Despite initial differences in connectedness, however, people with both high and low levels of nature relatedness increased their nature contact (similar relative change).

### **Effects of the 30x30 Nature Challenge on Well-Being**

To assess the well-being benefits of the challenge, participants reported on their mood and vitality. A revised version of the *PANAS* (positive and negative affect schedule; Watson, Clark, & Tellegen, 1988) was used to measure high and low arousal positive and negative emotions. The 19-item scale included 11 original PANAS items: interested, upset, strong, hostile, enthusiastic, irritable, alert, stressed, inspired, nervous, afraid. Five emotion words that are markers of subjective well-being were added (joyous, anxious, sad, content, relaxed), as well as three emotion words (in awe, fascinated, curious) particularly relevant to nature experiences (Fredrickson, 2000; Kellert, 1997; Keltner & Haidt, 2003; Williams & Harvey, 2001). The biophilia hypothesis (Kellert & Wilson, 1993; Wilson 1993), along with growing evidence on human-nature interactions, suggests immersion in the natural environment triggers these positive emotions. Participants indicated how much, in general, they felt each of the 19 emotions, using a 5-point Likert scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). Responses to the eight positive and eight negative emotion words were averaged, separately, to create positive and negative affect scores. A nature-specific positive emotion variable was calculated by averaging scores on the three emotion words (in awe, fascinated, curious) intended to capture the restorative 'fascination' evoked by nature (Kaplan, 1995).

Vitality was assessed with the *Vitality Scale* (individual difference level version, Ryan & Frederick, 1997). The 7-item scale is a reliable measure of how much participants feel vital and energetic (Bostic, Rubio, & Hood, 2000). Items include “I feel alive and vital” and “I have energy and spirit”. Respondents indicated how true each statement was for them, using a Likert scale ranging from 1 (*not at all true*) to 7 (*very true*). Items were averaged to produce an overall vitality score.

The 30x30 Challenge participants were relatively happy at the start of the study, but reported moderate improvements by the end of the challenge. Positive emotions and vitality increased; negative emotions declined. Fascination (combined emotions of awe, fascination, curiosity) also increased over the course of the challenge (Table 3, Figure 3).

Table 3

*Change in Well-Being Indicators Pre- and Post-Challenge*

	Time 1, <i>M (SD)</i>		Time 2, <i>M (SD)</i>		<i>r</i>	T2-T1	<i>t</i>	<i>d</i>
Positive Affect	3.18	(0.73)	3.65	(0.63)	.58	0.48	32.92***	0.76
Negative Affect	2.25	(0.77)	1.83	(0.62)	.55	-0.42	-26.93***	-0.63
Fascination	2.98	(0.96)	3.51	(0.87)	.56	0.53	26.76***	0.62
Vitality	4.13	(1.33)	4.94	(1.19)	.63	0.82	32.71***	0.76

Note: For each time point, table presents mean scores, with standard deviations in parentheses, correlations (T1, T2), difference scores, and results of paired-samples t-tests, comparing means (Time2-Time1), with effect sizes (Cohen's *d*, paired-samples-corrected). *N* = 1,896.

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

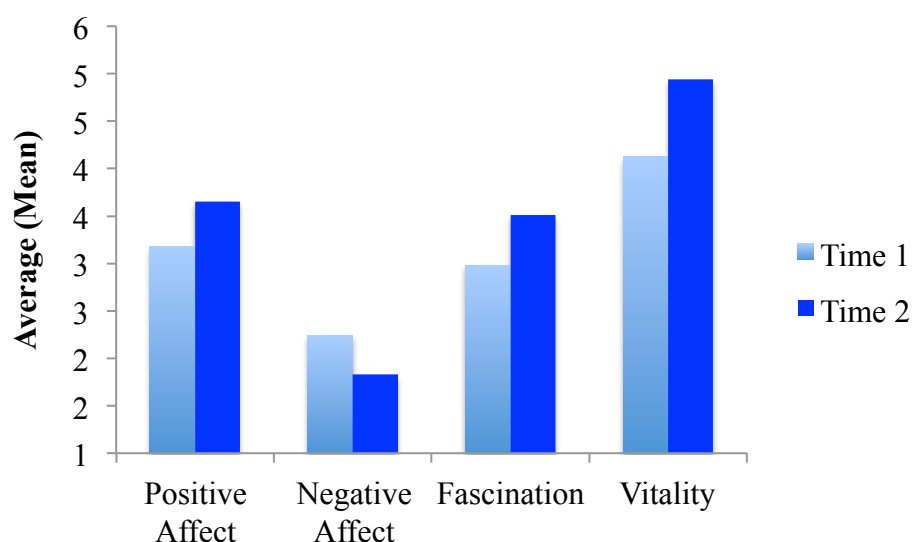


Figure 3. Change in Well-Being from the Beginning to End of May

Note: positive and negative affect and fascination are scored on a 1-5 scale; vitality is scored on a 1-7 scale.

**Relative Changes During the 30x30 Nature Challenge**

To determine how changes in nature contact were related to other changes (i.e., well-being, nature relatedness), new "change" variables were computed. Standardized residuals, derived from regression analyses, were used as change scores (i.e., representing the difference from Time 1 to Time 2) and correlational analyses were conducted on the new change variables. Participants who spent more time in nature reported more improvements in happiness compared those whose nature contact changed less (i.e., small but significant correlations between the nature time and well-being change variables; see Table 4). The more a participant increased their nature contact

(both active and relaxed), the greater the boost in mood and vitality. Participants varied in their actual nature time (i.e., large standard deviations for nature time, Table 1) and also in how much of a change they achieved over the course of the challenge, but improvements in weekly nature contact corresponded with participants' happiness increases (Table 4).

Nature contact was associated with nature relatedness at both the beginning and end of May (zero order correlations between the NR 21-item scale and the two types of nature contact at Time 1 and 2 ranged from .10 to .18; NR-experience correlations were also significant: .11 to .21). The relative changes in nature time were not related to changes in overall connectedness (the correlation between relaxed time and NR is significant, but very weak). Change in active nature time was correlated significantly but weakly with change in the NR-experience dimension ( $r = .10, p < .001$ ). Relaxed nature time was only correlated (weakly) with the dimension of nature related self ( $r = .06, p < .05$ ).

Table 4

*Correlations Between Nature Contact, Nature Relatedness, and Well-Being Changes*

	1.	2.	3.	4.	5.	6.	7.
1. Active nature contact change	1.00	-	-	-	-	-	-
2. Relaxed nature contact change	.26***	1.00	-	-	-	-	-
3. Nature Relatedness change	.03	.06*	1.00	-	-	-	-
4. Positive affect change	.13***	.14***	.29***	1.00	-	-	-
5. Negative affect change	-.09***	-.09***	-.20***	-.43***	1.00	-	-
6. Fascination change	.12***	.14***	.26***	.67***	-.27***	1.00	-
7. Vitality change	.11***	.13***	.32***	.75***	-.42***	.58***	1.00

Note: change scores were calculated by regressing the Time 2 variable on the corresponding Time 1 variable, with the standardized residuals becoming the new variable reflecting change over the month-long challenge.

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

### Effects of the 30x30 Nature Challenge on Environmental Concern

The *Environmental Concern* scale (Schultz, 2001) evaluated the structure of participants' concern for the environment. People differ in their motivation for environmental concern. It may be based on how the environment affects one's own well-being (egoistic), environmental conditions that affect other humans (social-altruistic), or concern for the impact of environmental problems on all other living things (biospheric). Using a 7-point Likert scale ranging from 1 (*not important*) to 7 (*supreme importance*), people indicated their concern for the environment due to the consequences to: "animals", "plants", "marine life", "birds" (these four items reflect

biospheric concern), “me”, “my future”, “my lifestyle”, “my health” (reflecting egoistic concern), “all people”, “children”, “people in my community”, and “my children” (reflecting social-altruistic concern). Responses on the respective dimensional items were averaged to create scores for biospheric, altruistic, and egoistic concern.

As with prior challenges, participants reported high levels of all types of environmental concern at the beginning of the challenge, but particularly for other living things (including other humans). Although there were slight increases in all three types of concern (Table 5), the effect sizes are too small to have practical significance.

Table 5

*Change in Environmental Concern Pre- and Post-Challenge*

	Time 1, <i>M (SD)</i>		Time 2, <i>M (SD)</i>		<i>r</i>	T2-T1	<i>t</i>	<i>d</i>
biospheric concern	6.40	(0.79)	6.44	(0.75)	.68	0.04	2.44*	0.06
egoistic concern	6.07	(1.02)	6.15	(0.96)	.64	0.08	4.01***	0.09
altruistic concern	6.47	(0.79)	6.51	(0.74)	.64	0.04	2.74**	0.06

Note: For each time point, table presents mean scores, with standard deviations in parentheses, correlations (T1, T2), difference scores, and results of paired-samples t-tests, comparing means (Time2-Time1), with effect sizes (Cohen's *d*, paired-samples-corrected). *N* = 1,896.

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

Environmental concern for other living things was related to subjective connection with nature. There were moderate positive correlations between nature relatedness and concern for the ecosystem (biospheric), for one's self (egoistic), and for other humans (altruistic) at both Time 1 (*r*'s were .49, .12, .19, respectively) and Time 2 (*r*'s: .54, .15, .21). To determine how concern and connectedness changed together, over time, change in concern was correlated with change in nature relatedness (Table 6). As nature relatedness increased, so did all types of concern, but the more connected with nature a person became over the month-long challenge, the greater their increase in concern for all living things. None of the changes in environmental concern were linked to changes in either active or relaxed nature contact.

Table 6

*Correlations Between Nature Contact, Nature Relatedness, and Environmental Concern Changes*

	1.	2.	3.	4.	5.	6.
1. Active nature contact change	1.00	-	-	-	-	-
2. Relaxed nature contact change	.26***	1.00	-	-	-	-
3. Nature Relatedness change	.03	.06*	1.00	-	-	-
4. Biospheric change	.00	.02	.23***	1.00	-	-
5. Egoistic change	-.00	.02	.10***	.33***	1.00	-
6. Altruistic change	.02	.03	.11***	.31***	.47***	1.00

Note: change scores were calculated by regressing the Time 2 variable on the corresponding Time 1 variable, with the standardized residuals becoming the new variable reflecting change over the month-long challenge.

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

### Discussion

The DSF 30x30 Nature Challenge was successful in encouraging Canadians to increase their contact with the nature and the results lend further support to the growing evidence of nature's benefits for human psychological health. Challenge participants spent more time in nature being physically active and had more restorative relaxing nature experiences by the end of the study. There may be increased opportunities for nature contact with seasonal changes and warmer temperatures that occur over the month-long challenge. Participants who were able to spend more time in nature, however, experienced a greater happiness boost than those who did not get as much time outdoors. Participants had better moods, more energy and vitality, and increased fascination at the end of the challenge.

Psychological well-being was associated with nature contact, but also with nature relatedness. Particularly for people who do not usually feel a strong bond with the natural environment, completing the challenge enhanced their connectedness. This sense of connectedness may motivate people to make nature contact a regular habit in the future. In Australia, for example, people who are more connected with nature spend significantly more time in their backyards and make more of an effort to visit parks, compared to those with a weaker connection (Lin, Fuller, Bush, Gaston, & Shanahan, 2014). The experiences people have during the challenge may inspire them to make nature contact part of their regular routine.

Challenge participants indicated high levels of concern for the environment at the start of the study - for personal reasons and in consideration for future generations and the ecosystem. People who increased their subjective sense of connectedness with nature developed slightly stronger concern for all living things (biospheric concern). Connectedness is an intrinsic

motivator, likely to inspire greater care and protection of natural places. Thus, finding ways to help people enjoy the outdoors is a promising strategy for improving human and environmental health. As Canadians develop a stronger connection to nature, both communities and ecosystems are likely to benefit. The natural environment provides opportunities for stress reduction and mood improvement. Experiencing these effects personally may help people to be more aware of the impact of nature on their health and, in turn, foster the desire to create and conserve places that provide enjoyment and restoration. Communities that incorporate green space and accessible nature into urban planning are likely to provide higher quality of life and thereby encourage more nature contact in their citizens, allowing them to reap the health benefits of nature immersion.

### **Limitations and Future Directions**

The 30x30 Nature Challenge was successful in encouraging nature contact and demonstrating the potential benefits of nature contact, however there are limitations to consider when interpreting the results. Participants are self-selected rather than randomly assigned to the challenge and likely more motivated to connect with nature than the average person. There is some variability but, in general, challenge participants have relatively strong connections with the natural world and this may limit how much change is possible. The large proportion of participants new to the research component is helpful in ruling out demand characteristics or carry over effects from prior participation, although the purpose of the challenge is explicit and participants are likely very aware of the possible positive effects of nature contact.

Because the challenge is a community intervention, without a strong control group of participants for comparison purposes, the findings cannot be assumed to generalize to other populations. A growing amount of converging evidence suggests people benefit from nature contact, but there may be individuals who do not fit this pattern. Random assignment is not always practical or feasible for this type of intervention. Without it, however, we cannot assume causal effects or be sure that nature is good for all people all of the time. One of the strengths of the 30x30 challenge is the voluntary nature of participation (reducing confounds associated with monetary incentive or coercion), but this is also a drawback due to lack of control in the research design and composition of the participant sample.

It is possible that seasonal effects contribute to the increases in well-being and nature contact during the study. Patterns of within-person change are useful for establishing that more nature time is indeed beneficial, however bright light exposure, frequent exposure to cleaner air, exercise opportunities, or other aspects of the environment are influential factors that need to be studied further.

### **Conclusion**

In May 2015, thousands of Canadians answered nature's call. Participants in the 30x30 Nature Challenge were more immersed in nature, more connected, and happier after the month-long program. Despite the fact that modern life often makes it difficult to spend time in nature, participants doubled the amount of time spent being active or relaxing in nature. Results from the 2015 30x30 Nature Challenge are consistent with the two prior years of research - spending

time in nature has benefits for mood and vitality, and nature contact is associated with greater awe, curiosity, and fascination.

Increasingly, research evidence suggests that a stronger connection with the natural world promotes physical and psychological well-being, as well as ecologically sustainable behaviour. Recent reviews on this topic underscore the potential importance of healthy natural places for optimal human mental and physical health, for sustainable urban design, climate change adaptation, and ecosystem functioning (e.g., Africa et al., 2014; Hartig, Mitchell, de Vries, & Frumkin, 2014). The 30x30 Nature Challenge findings highlight the importance of community interventions that get people outside on a regular basis and demonstrate the great potential for similar nature-based health promotion strategies.

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## **Appendix A: 2015 Nature Challenge Surveys**

Full text of the Nature Challenge 30x30-English Survey available at:

[https://dl.dropboxusercontent.com/u/31032726/2015\\_Nature\\_Challenge\\_30x30-English-Surveys.pdf](https://dl.dropboxusercontent.com/u/31032726/2015_Nature_Challenge_30x30-English-Surveys.pdf)

Full text of the Nature Challenge 30x30-French Survey available at:

[https://dl.dropboxusercontent.com/u/31032726/2015\\_Nature\\_Challenge\\_30x30-French-Surveys.pdf](https://dl.dropboxusercontent.com/u/31032726/2015_Nature_Challenge_30x30-French-Surveys.pdf)

## Appendix B: Test-Retest Correlations and Scale Reliabilities

Table 7

*Stability and Reliability of Survey Measures, Pre- and Post-Challenge (n = 1,896)*

Scale (number of items)	<i>r</i> (Time 1-2)	Time 1 $\alpha$	Time 2 $\alpha$
Nature Relatedness (21)	.82***	.83	.83
Nature Relatedness (6)	.81***	.78	.77
NR-self (8)	.78***	.81	.80
NR-perspective (7)	.72***	.55	.59
NR-experience (6)	.80***	.78	.77
Positive Affect (8)	.58***	.89	.88
Negative Affect (8)	.55***	.89	.87
Fascination (3)	.56***	.84	.83
Vitality (6)	.63***	.93	.92
Biospheric Concern (4)	.68***	.95	.95
Altruistic Concern (4)	.64***	.81	.82
Egoistic Concern (4)	.64***	.88	.88

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