



**CANADIANS CONNECT WITH NATURE
AND INCREASE THEIR WELL-BEING**

Results of the 2014 30x30 Nature Challenge



**Canadians Connect With Nature and Increase Their Well-Being:
Results of the 2014 David Suzuki Foundation
30x30 Nature Challenge**

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Background and Methodology

Beginning in 2012, the David Suzuki Foundation (DSF) developed an annual intervention to promote contact with the natural environment. Each spring, thousands of participants voluntarily pledge to spend 30 minutes outdoors, in nature, for 30 days during the month of May. Schools, workplaces, and individuals receive tips via email listservs and the DSF social media sites (Twitter, Facebook) on how to incorporate nature contact into their daily routine. The 30x30 nature challenge strives to encourage Canadians to connect with nature and, as a result, improve their health and happiness.

Beginning in 2013, the 30x30 challenge included an opportunity to participate in scientific research as part of the enrollment process. By inviting participants to complete a survey at the beginning and end of the challenge, researchers were able to empirically assess how the 30x30 influenced participants' nature contact and whether this was related to changes in well-being. The 2014 research survey was designed by Dr. Elizabeth Nisbet, a psychologist at Trent University, and Aryne Sheppard, Senior Public Engagement Specialist at the DSF. The goal was to measure changes in subjective connection with nature ('nature relatedness') as well as mood (positive and negative emotions), vitality, and environmental concern over the month-long challenge. When people visited the DSF 30x30 challenge website (French or English), they were invited to participate in the online survey, hosted on Trent University's survey program (Qualtrics). The survey included measures of nature relatedness, well-being, environmental concern, and time spent in various daily activities (see Appendix A for links to the full survey text). At the end of May, participants were emailed an invitation for a follow-up survey containing the same measures. Follow-up survey responses were collected until June 12, 2014. Data was then analyzed by Dr. Nisbet, at Trent University.

Contact with the natural environment has well-documented benefits for human physical and psychological health (e.g., Selhub & Logan, 2012; Tsunetsugu, Park, & Miyazaki, 2010; see also Frumkin, 2001 for a review of the health benefits of nature). Feeling connected with nature is also associated with happiness as well as more regular nature contact (Nisbet & Zelenski, 2013; Nisbet, Zelenski, & Murphy, 2011). Thus, participants spending more time in nature during the 30x30 challenge were expected to report better moods and greater feelings of vitality, as well as a strong subjective connection with and concern for the natural environment. Thousands of Canadians generously volunteered to participate and contribute to the scientific research component of the 2014 30x30 nature challenge.

Participant Characteristics

Data for the initial (Time 1) survey was collected when participants enrolled in the challenge, beginning in mid-April, up to and including the first week of May 2014. After removing surveys with missing data, and those with unreliable data (e.g., response sets, or weekly sleep hours < 20 and > 110), the final Time 1 sample consisted of 9,354 people. Participants were mostly women (89.7%, $n = 8,333$; men: $n = 864$; other: $n = 22$; 135 people did not indicate their gender). The average age of participants was 41.46 ($SD = 13.11$, range: 17 to 86; 113 people did not provide a response). Most participants (93.1%) were enrolled in the challenge for the first time ($n = 8,710$); 598 people participated in the 2013 nature challenge, and 82 took part in 2012.

A subsample of people ($n = 2,542$) completed the follow up survey (Time 2) sent by email on June 1st. These participants were very similar in background characteristics to the larger Time 1 sample. Average age was 43.65 ($SD = 13.43$; range: 17 to 83; 4 participants did not indicate age) and most were women (89.8%, $n = 2,279$, men: $n = 242$; other: $n = 3$; 18 people did not indicate their gender). The majority of these participants (90.3%) were new to the challenge ($n = 2,295$); 230 people reported participating in 2013, and 37 were part of the 2012 challenge. The analyses examining the effects of the month-long challenge were conducted using the data from the 2,542 participants who completed both surveys. Due to the mostly female sample, analyses were conducted to examine the effects of gender. Including gender did not change the findings, thus results reported below are those using the entire sample of participants.

Results

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

One goal of the study was to determine how participating in the challenge might influence contact with nature. To assess how successful participants were in getting outdoors and meeting their goals for nature contact, a number of time use questions were included in the survey. Participants were asked about the number of hours spent engaged in various activities during the previous week, including time spent either being active ("on a walk, hike, or physical activity in nature") or relaxing in nature ("relaxing or sitting outside in nature"). Activities such as email and surfing the internet were included to explore how these behaviours might change if participants spent more time in nature. Other activities, such as sleeping, were indicators of the reliability of responses (e.g., data with unrealistic hours in these activities was excluded).

Paired samples t-tests were conducted to assess changes in nature contact and all other activities over time (Table 1). Participants were successful in getting outdoors in nature for both activity and restoration. The average weekly hours spent being active in nature almost doubled, from 5.26 to 10.38 hours, by the end of the survey (Figure 1). Participants also reported spending more time relaxing in nature, with an average of 2.44 hours a week at the beginning of the challenge, increasing to 6.73 hours by the end of May (Figure 2). Nature contact was the activity that changed most; participants also reduced their time in vehicles, texting and emailing, and spent slightly less time with friends (Figure 3).

Table 1

Average Weekly Time Use: Change in Nature Contact and Daily Activities from Beginning to End of May 2014

Activity	Time 1, <i>M (SD)</i> Hours/Week	Time 2, <i>M (SD)</i> Hours/Week	<i>t (d)</i>
On a walk, hike, or physical activity in nature	5.26 (7.78)	10.38 (10.61)	23.46** (0.48)
Relaxing or sitting outside in nature	2.44 (5.26)	6.73 (9.00)	23.50** (0.49)
Shopping	2.63 (3.02)	2.67 (2.98)	0.62 (0.01)
At a gym or fitness facility	1.17 (2.46)	1.13 (4.49)	-0.46 (0.01)
Visiting friends	6.16 (8.46)	6.88 (9.87)	3.20** (0.06)
In a vehicle	6.37 (6.74)	5.98 (5.85)	-2.66** (0.05)
Talking on the phone/texting	4.61 (7.49)	3.62 (5.34)	-7.00** (0.14)
Email/surfing the internet	14.12 (13.96)	10.07 (10.59)	-16.35** (0.33)
Sleeping	51.37 (9.33)	51.11 (9.02)	-1.39 (0.03)

Note: For each time point, table presents mean scores, with standard deviations in parentheses and results of paired-samples t-tests, comparing means (Time2-Time1), with effect sizes (Cohen's *d*, paired-samples-corrected) in parentheses. ** $p < .01$.

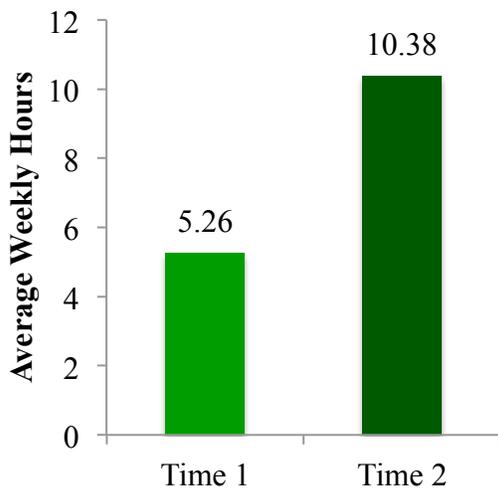


Figure 1. Change in Weekly Active Nature Contact

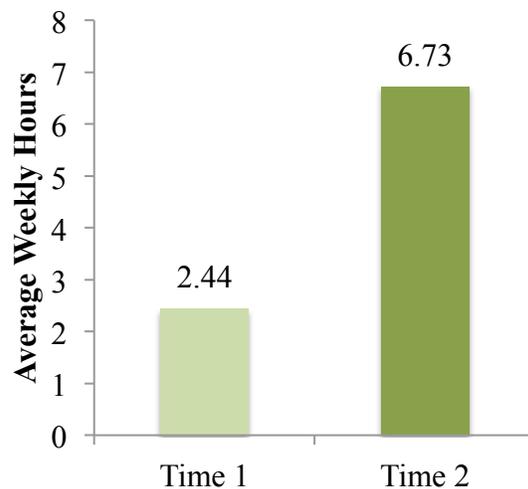


Figure 2. Change in Weekly Relaxing Nature Contact

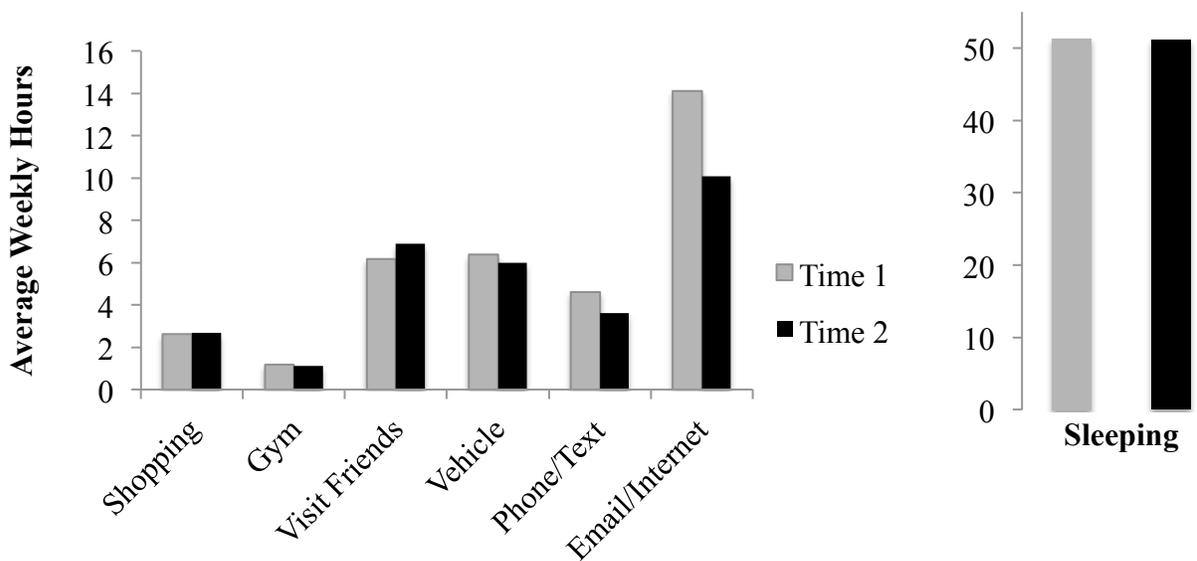


Figure 3. Change in Weekly Activities

Note: Sleeping is presented separately due to differences in scale.

Effects of the 30x30 Nature Challenge on Connectedness with Nature

Nature relatedness was measured using the 21-item self-report "Nature Relatedness Scale" (Nisbet, Zelenski, & Murphy, 2009). The scale assesses internalized identification with nature as well as nature-related worldviews, people's familiarity, comfort with, and desire to be in nature. Participants respond to 21 statements using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Nature relatedness is comprised of 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 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 new brief version of the scale (NR-6) was 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 6 for Chronbach's α for all measures at Time 1 and Time 2).

Challenge participants had high nature relatedness scores at the beginning of May (Table 2; in prior research, mean scores on the 21-item scale ranged from approximately 3.0-3.7 in community samples and from 4.4-4.5 for environmental activists and educators). Participants had small but significant increases in their nature relatedness during the challenge. Overall nature relatedness increased, but particularly the dimensions of nature related-self and nature related-experience. In other words, participants had a slightly stronger subjective connection with the natural environment - mainly an increased sense of identification with the natural world, and more desire to spend time in nature.

Table 2

Change in Nature Relatedness and Nature Relatedness Dimensions from the Beginning to End of May

	Time 1 <i>M (SD)</i>	Time 2 <i>M (SD)</i>	<i>t (d)</i>
Nature Relatedness (21)	4.26 (0.45)	4.37 (0.40)	19.73** (0.40)
Nature Relatedness (6)	4.23 (0.61)	4.36 (0.54)	17.03** (0.40)
nature related-self	4.32 (0.56)	4.47 (0.49)	20.01** (0.40)
nature related-perspective	4.35 (0.49)	4.36 (0.49)	1.32 (0.03)
nature related-experience	4.07 (0.66)	4.25 (0.58)	20.17** (0.41)

Note: For each time point, table presents mean scores, with standard deviations in parentheses, and results of paired-samples t-tests, comparing means, with effect sizes (Cohen's *d*, paired-samples-corrected) in parentheses. ** $p < .01$.

Effects of the 30x30 Nature Challenge on Well-Being

To assess the well-being benefits of the challenge, participants were asked about their mood and vitality using two reliable psychological instruments. 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). 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 8 positive and 8 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 alive 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.

Participants benefitted from the challenge in all three aspects of well-being. Positive emotions increased and negative emotions decreased significantly during the study. In addition, participants reported feeling more vitality and energy. The changes in fascination were particularly strong, with participants reporting large significant increases in the nature-specific emotions of awe, curiosity, and fascination by the end of the month (Table 3, Figure 4).

Table 3

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

	Time 1 <i>M (SD)</i>	Time 2 <i>M (SD)</i>	<i>t (d)</i>
positive affect	3.17 (0.70)	3.68 (0.63)	38.22** (0.76)
negative affect	2.26 (0.79)	1.84 (0.63)	-29.94** (0.61)
fascination	2.96 (0.95)	3.53 (0.84)	31.20** (1.35)
vitality	4.09 (1.29)	4.98 (1.18)	39.55** (0.79)

Note: For each time point, table presents mean scores with standard deviations in parentheses. Results of paired-samples t-tests, comparing means, with effect sizes (Cohen's *d*, paired-samples-corrected) in parentheses. ** $p < .01$.

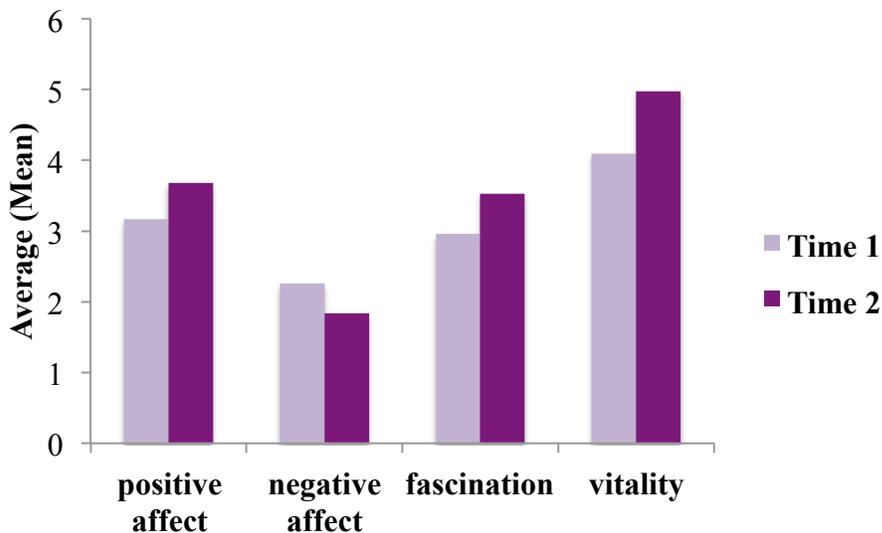


Figure 4. Change in Well-Being from the Beginning to End of May

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. The more time participants spent in nature, the greater well-being they reported (i.e., positive correlations between the change variables; see Table 4). The greater the increase a participant had in nature contact (both active and relaxed), the greater the improvements in their mood and vitality. Participants varied in terms of how much they were able to spend time in nature (e.g., the large standard deviations for nature contact listed in Table 1), but those with a greater change in their nature time reported more improvement in happiness (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 .06 to .15; NR-experience correlations were somewhat higher: .13 to .22), but the relative changes in nature time were not related to changes in overall connectedness. In other words, 30x30 participants generally spent more time in nature and they also had increases in nature relatedness but the changes in these two variables over time were mostly unrelated. Changes in active and relaxed nature time were correlated significantly but very weakly with changes in the NR-experience dimension ($r = .08, p < .01$ and $r = .06, p < .01$, respectively).

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	.19**	1.00	-	-	-	-	-
3. Nature Relatedness change	.03	.04	1.00	-	-	-	-
4. Positive affect change	.14**	.13**	.27**	1.00	-	-	-
5. Negative affect change	-.12**	-.09**	-.19**	-.47**	1.00	-	-
6. Fascination change	.13**	.12**	.24**	.70**	-.31**	1.00	-
7. Vitality change	.15**	.13**	.31**	.75**	-.44**	.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. ** $p < .01$.

Effects of the 30x30 Nature Challenge on Environmental Concern

The *Environmental Concern* scale (Schultz, 2001) evaluated the structure of participants' concern for the environment. The scale differentiates between three types of environmental

motivation or concern: egoistic, which is based on how the environment affects one’s own well-being; social-altruistic, which is concern based on the environmental conditions that affect other humans; and biospheric, concern for the impact of environmental problems on all other living things. 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.

Participants reported high levels of all types of environmental concern at the beginning of the challenge, but particularly strong concern for other living things (including other humans. There were significant increases in all three type of concern during the challenge (Table 5), however these relative changes were very small in magnitude.

Table 5

Change in Environmental Concern from the Beginning to End of May

	Time 1 <i>M (SD)</i>	Time 2 <i>M (SD)</i>	<i>t (d)</i>
biospheric concern	6.40 (0.80)	6.44 (0.75)	3.25** (0.06)
altruistic concern	6.48 (0.77)	6.51 (0.78)	2.94** (0.06)
egoistic concern	6.08 (1.00)	6.15 (0.98)	3.84** (0.08)

Note: For each time point, table presents mean scores, with standard deviations in parentheses. Results of paired-samples t-tests, comparing means, with effect sizes (Cohen's *d*, paired-samples-corrected) in parentheses. ** $p < .01$.

Environmental concerns for other living things was also related to subjective connection with nature. There were moderate positive correlations between nature relatedness and biospheric concern at both Time 1 ($r = .47, p < .01$) and Time 2 ($r = .50, p < .01$). Biospheric concern was not strongly linked to either active or relaxed nature contact at either time point, however ($r = .04$ to $r = .07$).

To determine how concern and connectedness changed together, over time, change in biospheric concern was correlated with change in nature relatedness ($r = .25, p < .01$). The more connected with nature a person became over the month-long challenge, the greater their increase in concern for all living things.

Discussion

The 30x30 challenge was, once again, successful in encouraging participants to increase their nature contact. This year's survey assessed two different types of nature contact - active and relaxed - and Canadians reported increases in both. Participants began the challenge with high

levels of nature relatedness but strengthened their connection with nature over the month of May. These small but significant improvements in nature relatedness suggest that immersive experiences are important for fostering and maintaining a connection with the natural environment. People are more motivated to spend time in places they feel connected to. In Australia, researchers recently discovered that people with a strong connection to nature are more likely to seek it out - spending time in their backyards and visiting parks more than those with a weaker sense of connection (Lin, Fuller, Bush, Gaston, & Shanahan, 2014). Nature contact also yielded benefits for personal happiness. The more time participants spent connecting with nature, the more they reported increased positive mood and vitality, and less negative mood.

The greatest improvements in participants' sense of connection with nature were for the nature related-self and nature related-experience dimensions, reflecting enhanced self-identification with the natural environment and a greater desire for nature contact. The perspective dimension of nature relatedness reflects a pro-environmental attitude and, similar to the 2013 challenge, there was little change in this subdimension. The high scores on this aspect of connectedness at the beginning of the study suggest challenge participants were already conscious of ecological issues.

Challenge participants reported very high levels of biospheric environmental concern at the start of the study, creating a potential ceiling effect. Changes in nature contact were not linked to changes in biospheric concern (likely due to the lack of variation in responses). This high level of environmental concern supports the idea that people who visit the DSF website are aware of environmental issues and the impact on earth's ecosystems. It is worth noting that challenge participants reported great environmental concern for themselves and other humans, not just for plants and animals. Those participants who did increase their biospheric concern also reported increases in nature relatedness. The greater our connection with the natural world, the more motivated we are to protect it - be it the wildlife that triggers our fascination and awe, the care and compassion we feel for future generations, or a desire to maintain our own health or happiness (or all of these reasons). These findings are consistent with past research and theory. For example, renowned sociobiologist E. O. Wilson proposed the concept of biophilia to explain humans' innate need to connect with other life (Kellert & Wilson, 1993; Wilson, 1993). Fostering connections with the natural environment may help to promote and maintain more environmentally sustainable behaviour while simultaneously contributing to our well-being.

Somewhat counter to past findings (and the results of the 2013 challenge), there was no mediating effect of connectedness increases on well-being. Increases in happiness were associated with increased nature contact, but this was not necessarily due to changes in nature relatedness. Nonetheless, both nature contact and nature connectedness were linked to positive outcomes. Other longitudinal research has demonstrated that strong connections with nature are associated with more regular nature contact and more happiness (Nisbet & Zelenski, 2013; Nisbet et al., 2011).

Limitations and Future Directions

The 30x30 challenge research has some limitations that should be noted. First, the participants are self-selected and likely aware of the potential benefits of nature contact. As visitors to the DSF website, they are also potentially unique in their interest in and awareness of nature's benefits. Results could be due to demand characteristics, however there is also considerable variability in participants' reports (e.g., not everyone was successful meeting the 30x30 goal, but those who did benefitted more). There are also other potential explanations for the results. Participants could be happier due to warmer weather or vacation plans. The results are mainly correlational, limiting evidence of nature's causal effects and any interpretation of results should be considered in light of the large sample size. Effect sizes and the magnitude of correlations are likely more meaningful than statistical significance alone. Nonetheless, relative increases in nature contact were associated with improvements in all indicators of well-being, suggesting there are good reasons to encourage regular nature contact.

Finally, it is important to consider the difficulty of meeting the goal of the 30x30. Modern lifestyles can make it challenging to get outdoors and maintain a sense of connection with the natural environment. Urban design often disconnects people from the natural environment. The results of the nature challenge suggest that, with commitment and effort, it is possible to foster and even increase contact with nature and take advantage of the personal happiness opportunities that come from regular time in nature. Human health and well-being and ecological sustainability are interdependent. Indeed, our natural environment is an underestimated and vital mental health resource. A nation-wide campaign to promote nature contact holds great promise as both a mental health strategy and a way to foster intrinsic motivation for environmental conservation.

Conclusion

The 2014 30x30 challenge was successful in encouraging participants to increase their regular nature contact. The commitment to spending more time in nature had benefits for participants' nature relatedness, mood, and vitality. These findings are consistent with a growing body of evidence documenting the physical and psychological health benefits of nature. The results of the 2014 challenge highlight the importance of healthy, accessible natural spaces and urban design that encourages (vs. hinders) connection with nature. The more easily Canadians can connect with the natural environment, the better the opportunities for promoting health and well-being.

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Appendix A: 2014 Nature Challenge Surveys

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

https://dl.dropboxusercontent.com/u/31032726/2014_Nature_Challenge_30x30-English-Surveys.pdf

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

https://dl.dropboxusercontent.com/u/31032726/2014_Nature_Challenge_30x30-French-Surveys.pdf

Appendix B: Test-Retest Correlations and Scale Reliabilities

Table 6

Stability and Reliability of Survey Measures, Pre- and Post-Challenge (n = 2,542)

Scale (number of items)	<i>r</i> (Time 1-2)	Time 1 α	Time 2 α
Nature Relatedness (21)	.79**	.82	.81
Nature Relatedness (6)	.77**	.76	.75
NR-self (8)	.77**	.81	.80
NR-perspective (7)	.69**	.54	.56
NR-experience (6)	.76**	.76	.75
Positive Affect (8)	.50**	.88	.88
Negative Affect (8)	.52**	.89	.87
Fascination (3)	.48**	.82	.82
Vitality (6)	.58**	.93	.93
Biospheric Concern (4)	.61**	.95	.95
Altruistic Concern (4)	.63**	.82	.85
Egoistic Concern (4)	.60**	.88	.88

** $p < .01$.