

## Reconnecting with Nature for Biodiversity Conservation and Sustainable Development

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### Introduction

Disconnection from nature, driven by urbanisation, has been identified as an underlying cause of biodiversity loss (Miller, 2005). It is not enough to just give people knowledge about nature, but they need to have adequate positive experiences with or in nature to develop an enduring emotional affinity or connection with nature, such that they would care enough to want to protect nature. As Baba Dioum puts it with his famous words: "In the end we will conserve only what we love, we will love only what we understand, and we will understand only what we are taught."

Indeed, our personal values and attitudes concerning nature, and our relationship with nature affect the way we live and the choices we make that have either positive or negative effects on the ecosystem and environment. And our collective human behaviour towards nature makes or breaks the environment (Schultz, 2011). Hence, we need to continue finding ways to connect people, especially the young, with nature, so that they will choose to act in favour of nature and the long-term sustainability of our culture. In fact, Abson et al. (2016) put reconnecting people to nature as a key realm of societal interventions that operates at a deep leverage point (Meadows, 1999), which can result in transformational changes towards truly sustainable development. Others, like Balmford and Cowling (2006), also agree that reconnecting people and nature is crucial for biological conservation to succeed.

The study of how people identify themselves with the natural environment and the relationships they form with nature has been referred to by various terms, including 'connectedness to nature', 'nature relatedness', 'love and care for nature' and 'emotional affinity towards nature' (Restall and Conrad, 2015). Zylstra et al. (2014) proposed Connectedness with Nature (CWN) as "a stable state of consciousness comprising symbiotic cognitive, affective, and experiential traits that reflect, through consistent attitudes and behaviours, a sustained awareness of the interrelatedness between one's self and the rest of nature... it is an enduring appreciation, empathy, and mindfulness of the intrinsic value and shared essence of all life – including non-(aesthetically) appealing and non-(apparently) useful elements to humans... CWN manifests as a commitment to action (i.e., a resolve to respect and take responsibility for conserving nature)." This definition, we think, embodies the essence of what we seek in trying to reconnect people with nature.

If we are able to measure the CWN of our citizens, it will help to inform us over time whether we are on the right track to becoming a biophilic and sustainable city. Of course, while there have been some attempts to measure CWN, there is still much room for investigating the reliability, validity, and applicability of potential indicators (Zylstra et al., 2014). Nevertheless, with reference to the review by Restall and Conrad (2015), the 'Love and Care for Nature' (LCN) scale was selected and used in a recent survey of local residents as well as nature group members, on the perception of naturalistic landscapes. We will present below some results of the exploratory LCN assessment via the survey, and discuss their potential implications.

## Assessing Connectedness with Nature using Love and Care for Nature Scale

Perkins (2010) came up with the Love and Care for Nature (LCN) psychometric scale to measure an individual's personal and emotional relationship with nature, based on the underlying construct of love and deep caring for nature elucidated by 15 scale items (see **Table 1**). It covers the cognitive representation<sup>1</sup> and affective affiliation<sup>2</sup> dimensions of CWN, which are 2 of the 3 aspects identified and used by Restall and Conrad (2015) to differentiate uni- versus multi-dimensional measurement scales for CWN; the third dimension (not covered by LCN) is relationship commitment. The 3 dimensions coincide with various parts of Zylstra's definition of CWN. According to Tam (2013; also cited by Restall and Conrad), the multi-dimensional measures tended to perform better (in terms of predicting the criterion variables in his study) than the uni-dimensional measures.

**Table 1:** Love and Care for Nature Scale (Perkins, 2010)

Love and Care for Nature Scale items	
1.	I feel joy just being in nature.
2.	I feel that closeness to nature is important for my wellbeing.
3.	When I am close to nature, I feel a real sense of oneness with nature.
4.	I feel content and somehow at home when I am in unspoilt nature.
5.	I feel a deep love for nature.
6.	I often feel emotionally close to nature.
7.	When I spend time in unspoilt nature I feel that my day-to-day worries seem to dwindle away in the face of the wonder of nature.
8.	Protecting the wellbeing of nature for its own sake is important to me.
9.	I feel spiritually bound to the rest of nature.
10.	I feel a personal sense of interconnectedness with the rest of nature.
11.	I often feel a sense of awe and wonder when I am in unspoilt nature.
12.	I often feel a strong sense of care towards the nature environment.
13.	I need to have as much of the natural environment around me as possible.
14.	When in natural settings I feel emotionally close to nature.
15.	I enjoy learning about nature.

Note: Each item is rated on a 7-point Likert scale, with 1 for 'strongly disagree' and 7 for 'strongly agree'.

In a recent survey on public perception of naturalistic landscapes,<sup>3</sup> respondents for the local general (resident) population sample and a sample of local nature group members were asked to rate the LCN scale as part of the survey questionnaire. As expected, the mean LCN index score<sup>4</sup> for the nature group members was significantly higher than that of the general population (see **Figure 1**).

However, a cluster analysis of the general population sample suggested there are 2 broad clusters, one with a high mean LCN index (close to the mean for nature group members) – the "high affinity to nature" cluster – and the other with a relatively low mean LCN index. Those in the high LCN cluster tended to be frequent park visitors who are 40 years old or above, among other characteristics (see **Figure 2**). Looking at the broad generational groups, we find that indeed those who are older tended to report a slightly higher LCN index, as shown by the gently upward-sloping line for the general population in **Figure 1**.<sup>5</sup>

<sup>1</sup>'Cognitive representation' refers to one's mental concept of nature in relation to self that underpins an appreciation of interdependence with nature.

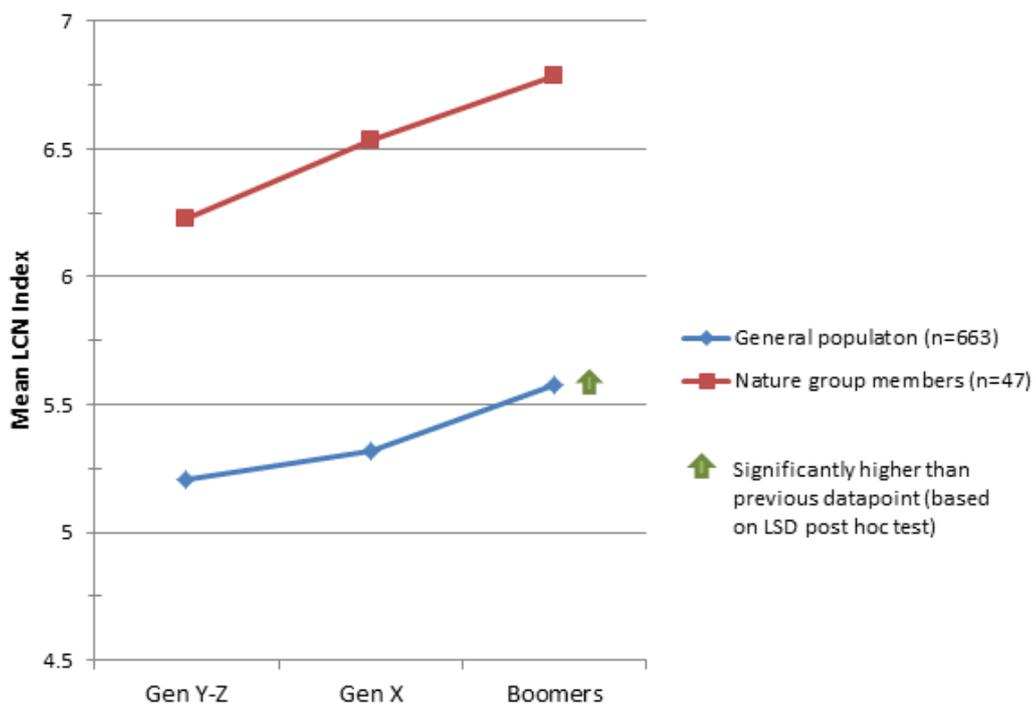
<sup>2</sup>'Affective affiliation' refers to one's emotional attachment or connection with nature that creates a sense of closeness and care for it.

<sup>3</sup>Conducted between Nov 2015 and Jan 2016; Blackbox Research Pte Ltd was commissioned to conduct the survey.

<sup>4</sup>Computed by averaging the individual scores for the 15 scale items.

<sup>5</sup>It is interesting to note that for the sample of nature group members, there is a similar upward trend for the mean LCN index as the general population sample.

**Fig 1.** Mean LCN index for various age groups by board generational categories



Notes:

- The difference between the GenX/GenY and Boomers groups was found to be significant, but the difference between the GenX and GenY groups was not.
- Here, Gen Y-Z are aged 15-34 years, Gen X are aged 35-49 years, and Boomers are aged 50 years and above.

**Fig 2.** Cluster analysis of the LCN index for the general population sample

The Data Suggests that the Population can be Split into 2 Clusters

The ‘Love & Care for Nature’ (LCN) Index for S’pore residents as a whole is 5.4, and for members of nature groups in S’pore it is 6.5.

A survey of tourists at nature-themed attractions in the Gold Coast region yielded an index score of 5.36 (Perkins, 2010).

	Cluster 1 Moderate Affinity to Nature LCN Index = 4.4	Cluster 2 High Affinity to Nature LCN Index = 6.3
Protecting the wellbeing of nature for its own sake is important to me.	5.1	6.5
I feel joy just being in nature.	4.9	6.4
I need as much of the natural environment around me as possible.	4.3	6.4
I often feel a strong sense of care towards the natural environment.	4.4	6.4
I feel that closeness to nature is important for my wellbeing.	4.7	6.4
I feel a deep love for nature.	4.5	6.3
I enjoy learning about nature.	4.7	6.3
When I am close to nature, I feel a real sense of oneness with nature.	4.5	6.3
When I spend time in unspoilt nature... my... worries seem to dwindle away...	4.4	6.3
I feel content and somehow at home when I am in unspoilt nature.	4.4	6.3
When in natural settings I feel emotionally close to nature.	4.2	6.2
I often feel a sense of awe and wonder when I am in unspoilt nature.	4.2	6.2
I often feel emotionally close to nature.	4.2	6.2
I feel spiritually bound to the rest of nature.	4.0	6.1
I feel a personal sense of interconnectedness with the rest of nature.	4.1	6.1

Base=329

Base=334

Those with high affinity to nature tend to be...

- Older (40 years and above)
- Frequent park visitors
- Want to live close to a park - within 5-10 minutes walk
- Want to live close to a forest - within 10-20 minutes walk
- Like urban greenery more
- Like green (non-urban) landscape more
- Lower education level
- Keep plants at home

Q1. On a scale of 1 to 7, 1 being “Strongly Disagree” and 7 being “Strongly Agree”, to what extent do you AGREE or DISAGREE with the following statements:

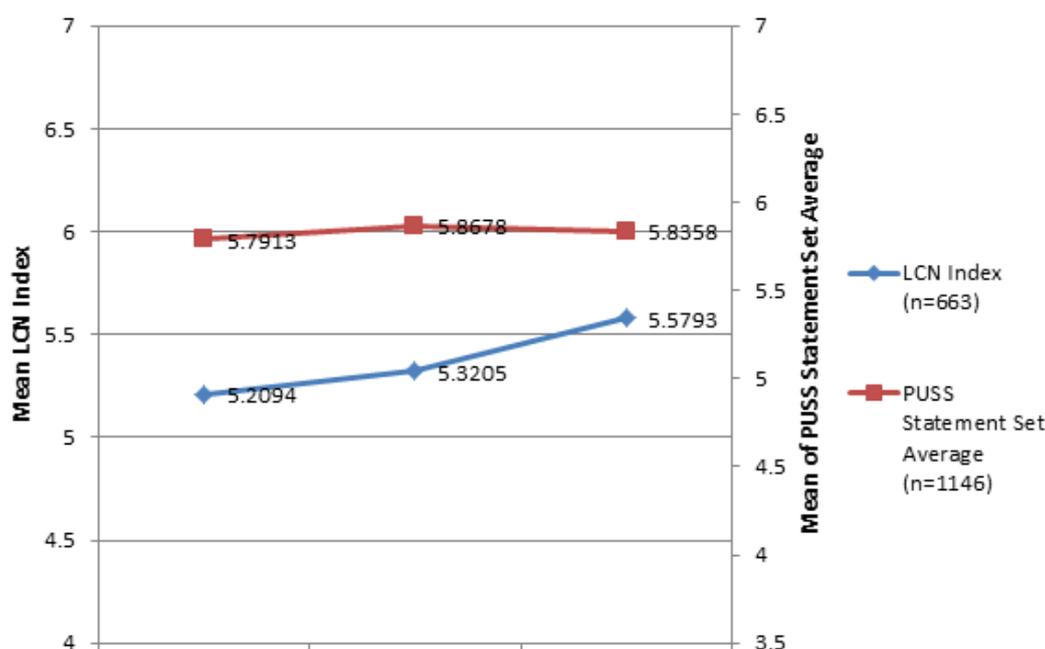
We compared this observed trend for the LCN index with data from the biennial Parks Usage and Satisfaction Survey (PUSS) conducted in 2014 on questions about respondents' perceptions of parks, greenery and nature conservation. Only statements which appear related to the LCN scale items were selected for the comparative analysis (see **Table 2**). It should be noted from the content of the statements selected that they cover just a small part of the whole construct which the LCN scale is attempting to measure. The PUSS 2014 responses for the 5 selected statements were averaged and the results presented in Figure 3.

**Table 2:** List of rating question statements on parks and greenery, and nature conservation selected from PUSS 2014 for their apparent relation to the LCN scale items

Selected Statement in PUSS	Potentially Related LCN Scale Items
<b>On parks, greenery and nature conservation</b>	
Parks are necessary spaces even if I do not make use of them.	#2 and #8
Living in a 'City in a Garden' improves my quality of life.	#2
Singaporeans should protect our existing nature reserves.	#8 and #12
The nature areas in Singapore should be conserved even if I do not visit them.	#8 and #12
The nature areas in Singapore should be conserved for our future generations.	#8 and #12

Note: Each item is rated on a 5-point Likert scale, with 1 for 'strongly disagree' and 5 for 'strongly agree'.

**Fig. 3** Mean of the average score for the selected set of PUSS statements on parks, greenery and nature conservation, compared with mean LCN Index, for general population



- Notes:
- The individual PUSS statement scores were transformed to fit the 7-point scale for LCN Index.
  - The Y-axes are not plotted with the same starting value at the intercept with X-axis so as to enhance the presentation of the trend lines.
  - Here, Gen Y-Z are aged 15-34 years, Gen X are aged 35-49 years, and Boomers are aged 50 years and above.

From Figure 3, we see that in general those aged 15-34 years gave a marginally lower agreement rating overall compared with the rest, for the selected set of PUSS statements regarding conservation of nature areas and value of parks and greenery. This slight difference for the youngest group could perhaps be attributed partly to a maturing appreciation of nature with age. The increase for mean LCN Index going from Gen X to Boomers group was not apparent for the PUSS statement set average, which may reflect the fundamental difference in terms of overall construct for the 2 sets of statements, albeit being somewhat related. It should be noted that the LCN scale was specifically designed to assess the emotional and psychological connections which people have with nature; while the PUSS statements were meant for the sensing of various values for nature for policymaking considerations.

## Discussion on Survey Results Relating to Connectedness with Nature

The survey results for LCN scale presented above may suggest, as Miller (2005) had painted, that the older generation, having grown up in a much less urbanised and developing Singapore, and were exposed more to nature, and so derived a stronger connection with nature; while our youth's weaker connection with nature could be symptomatic of their generally lower exposure to nature, having grown up in a much more urbanized city, given the rapid development that has taken place.

Of course, it is not that simple and further investigations are needed to elucidate. For one, our living environment is much greener than before and there should be more opportunities now to experience nature overall, at the extensive parks, Park Connector Network (PCN), Nature Ways and even skyrise green spaces, besides the nature reserves. However, some studies have suggested that exposing children to nature of the wild or pristine kind (as opposed to "domesticated nature") could better bring about environmentally responsible behaviour in adulthood (Wells and Lekies, 2006). Or it could be that the connections need to be fostered through involvement of nature-loving parents, teachers and other role models, and that has been a limiting factor. There is also the problem that CWN changes over time, so what we see as relatively low affinity for nature among the younger population in this snap shot might well develop into a stronger connection years later (like a maturing of views over time, suggested for the PUSS statement set above), being influenced by accrued life experiences and a whole range of cultural and societal factors.

What seems clear is that it would be good to be able to assess the CWN of our people over time, since it is fundamentally linked to care for the earth and environmental sustainability. While there could be proxy indicators in existing surveys like our own PUSS, these do not afford much reliability for measuring CWN since they were not crafted for that purpose. At the same time, we should seek to better evaluate the effectiveness of existing nature/environmental education or stewardship programmes in raising CWN, and continue to strengthen our understanding of why some programmes work better than others.

## Conclusion

Singapore is not immune to the nature deficit syndrome, the phrase coined by Richard Louv in his book *Last Child in the Woods*, which refers to the problem of people, especially children, spending too little time outdoors resulting in a wide range of behavioural problems. It seems from the exploratory survey done that our younger generation does have a weaker connection with nature. The good news is – given the extensive green spaces and burgeoning nature in

our City in a Garden, there are abundant opportunities to do more to enhance residents' connectedness with nature. We need to build up our know-how on how best to harness the available biodiversity to offer engaging, even eye-opening experiences for the uninitiated and unconverted that would enhance their Connectedness with Nature. Measuring Connectedness with Nature more consistently may afford us some good reference points as we strive to move forward as a biophilic and sustainable city.

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