Three Good Things in Nature: an Intervention for Parental Wellbeing and Nature-Connectedness

Dr Nicole Harris (corresponding author) a
Dr Gulcan Garip b
Dr Ryan Lumber c

a Doctorate in Educational Psychology, School of Psychology, University of Southampton, Highfield, Southampton, UK
b College of Health, Psychology and Social Care, University of Derby, Derby, UK
c School of Social Sciences, Psychology, Nottingham Trent University, Nottingham, UK

Abstract

Improving parental mental health and Wellbeing is a necessity, as costs associated with mental illness amongst adults, children and young people continue to escalate. Evidence suggests increasing nature-connectedness can foster personal Wellbeing. However, little research to date has explored the role of nature-connectedness for improving parental Wellbeing, in particular for those with neurodiverse children. The present study investigated whether a Three Good Things in Nature (3GTN) intervention could improve parental Wellbeing and nature-connectedness for parents of neurotypical (NTC, n=43) and neurodiverse (NDC, n=10) children. Wellbeing and nature-connectedness increased over time, regardless of condition. Nature-connectedness increased for all parents. Parents of NDC had lower Wellbeing at baseline and post-intervention. There was no impact of the intervention on Wellbeing for parents of NDC or NTC, but there was an impact on nature-connectedness. The results suggest encouraging participants to take notice increases nature-connectedness. The reasons for lack of a specific intervention effect are discussed.

Keywords: Wellbeing; nature-connectedness; neurodiverse; neurotypical; children; parents

Introduction

What is ecopsychology? This question was pondered upon by the authors and the editors in an attempt to come to a shared understanding about what we seek to understand, how we aim to explore, and what can ultimately be inferred from

research findings. These fundamental questions helped to channel, challenge and change this article from its first iteration, in 2020, to its current format, in 2024.

What follows is an empirical, hypothetico-deductivist piece of research presented in a novel, mixed-methods format, which investigates whether a Three Good Things in Nature intervention could improve parental Wellbeing and nature-connectedness for parents of neurotypical and neurodiverse children. Within this manuscript are our reasonings on why we feel that we didn't get our expected results. Running alongside and through this research paper (in italicised script), we present a commentary on the research process and our findings; we consider why we did what we did, and what our results may mean in the context of the nature-connectedness literature and our future research endeavours in this field. We recognise that we have adopted a bifurcated view that implies a separation of humans from nature, which is an especially Western ontological framework. We also acknowledge that a more embodied ontology has been espoused by indigenous peoples for thousands of years (Todd, 2016).

Mental illness is a major public-health issue, costing the UK economy over £117.9 billion annually (McDaid and Park, 2022). The World Health Organisation (2022) defines mental health as "a state of well-being, in which an individual realises his or her own abilities, can cope with the normal stresses of life can work productively and is able to make a contribution to his or her community." Wellbeing is therefore a fundamental cornerstone of mental health. The burden of mental illness, however, does not fall evenly across the ages: individuals in the age bracket of 15-49 account for 56% of the of costs incurred (McDaid and Park, 2022). Most parents of children and young people (CYP) fall within this age bracket.

The parents of CYP have the joint responsibility of looking after their own Wellbeing, as well as supporting that of their children (Carr and Springer, 2010; Resch, Benz and Elliott, 2012). Eighteen percent of young people in the UK have low Wellbeing, and nearly 13% of children and have at least one diagnosable mental health concern per year; rising to 33% for children with special educational needs (NHS, 2018; The Children's Society, 2020). Levels of stress, anxiety and depression have been shown to be significantly higher in parents of neurodiverse children (NDC) than neurotypical children (NTC) (Bewa, Kirby and Sayi, 2020; Bitsika and Sharpley, 2004; Contact, 2017; Griffin, 2019, 2020; Lim and Chong, 2017), making them a particularly vulnerable population.

Ecopsychology studies the relationship between people and the natural world through both ecological and psychological theories, and Wellbeing is an important focus within the field (International Centre for Ecopsychology, 2023; Palmer, 2014, 2015).

Evidence increasingly suggests reconnecting with nature has a significant positive impact on mental health and Wellbeing (Capaldi et al., 2015; Lumber, Richardson and Sheffield, 2017; Martin et al., 2020; Richardson and Sheffield, 2017; Richardson, McEwan and Garip, 2018). Nature-connectedness is a psychological construct that captures a sense of oneness with the natural world (Mayer and Frantz, 2004). Nature-connectedness, however, is more than simply spending time outdoors, it has an additional effect to the benefits that nature exposure brings to Wellbeing (Martin et al., 2020). Importantly, nature-connectedness has been found to be a consistent predictor of Wellbeing with an effect size comparable to established factors including income and education (Capaldi, Dopko and Zelenski, 2014), and even exceeding that of marital status (Richardson et al., 2021). Attention has therefore increasingly turned towards using nature-connectedness to increase Wellbeing, especially as nature-connectedness interventions have been shown to be disproportionately beneficial to those with the lowest Wellbeing (Richardson, McEwan and Garip, 2018). The mechanism by which this is often achieved is to embed activities that promote nature-connectedness within Positive Psychological Interventions (PPI's).

PPI's are treatments or activities implemented to cultivate positive feelings, behaviours or thoughts (Sin and Lyubomirsky, 2009) and can be used to improve Wellbeing (Seligman et al., 2005). A limitation of PPIs, however, is their effectiveness is impacted by personal strengths, lifestyles and sources of unhappiness and so they have unequal efficacy. Seligman et al., (2005) showed writing about three good things had significant and sustained effects on Wellbeing. Richardson and Sheffield (2017) modified a three good things PPI into a nature-connectedness intervention by asking participants to write down three good things in nature for five days. The intervention significantly increased nature-connectedness and improved psychological health, however well-being was not specifically measured. Given the increasing evidence of the effectiveness of a nature-based three good things intervention on the Wellbeing of the general population as well as specific clinical populations (Keenan et al., 2021; Richardson, McEwan and Garip, 2018; Richardson and Sheffield, 2017), it was considered to be an appropriate intervention to address Wellbeing in parents in general, but also parents of NDC more specifically.

Wellbeing can be conceptualised as a single facet, for example happiness or quality of life, or as a multidimensional construct (Lambert et al., 2020; Morrison, Tay and Diener, 2011) that combines hedonic (HWB) and eudaemonic (EWB) aspects (Hefferon and Boniwell, 2011). Despite there being some disagreement over how HWB and EWB relate to one another, Lambert et al., (2020) support an integrative approach that combines both HWB and EWB. This integrative approach is adopted in this current piece of research as well as in the Five Ways to Wellbeing (FWW) model (Aked et al., 2008). A meta-analysis of evidence-based research into

Wellbeing suggested five key elements to developing Wellbeing: Connect, Be Active, Take Notice, Keep Learning, and Give, and they have been conceptualised as the FWW model (Aked et al., 2008). This model adopts a promotive and preventative approach to supporting Wellbeing- an alternative to the more prevalent deficit model (Aked and Thompson 2011). A strength of FWW is it promotes actions that have been shown, individually, to improve Wellbeing (Aked et al., 2008). There is, however, no evidence for the effectiveness of the FWW model itself: the impact of the combined activities has not been shown to be greater than each in isolation, they are simply assumed to accrue (Aked and Thompson, 2011).

The FWW has been adopted by a range of organisations in their efforts to promote Wellbeing, with some focussing on the Connect element as the relationship with nature through nature-connectedness. Lumber, Richardson and Sheffield (2017) identified five pathways that promote nature-connectedness (Contact, Emotion, Meaning, Compassion, and Beauty), which were mapped onto the FWW (Lumber, 2016) to help facilitate Wellbeing gains through developing nature-connectedness. The present study seeks to utilise this approach by focusing on two elements of the FWW model, Connect, and Take Notice, for which there is a theoretical and empirical evidence base (Gander et al., 2020; Seligman et al., 2005; Wilson, Weiss and Shook, 2020). These elements have a particular relevance to nature-connectedness as an effective mechanism for improving Wellbeing (Capaldi, Dopko and Zelenski, 2014; Capaldi et al., 2015; Martin et al., 2020; McEwan et al., 2019).

Hypotheses

Whilst increasing evidence shows a general correlation between improved nature-connectedness and Wellbeing (Capaldi et al., 2015; Martin et al., 2020; Richardson and Sheffield, 2017; Richardson, McEwan and Garip, 2018), there is little research on specific population groups. Further, the need to improve the Wellbeing of parents, especially parents of NDC, requires research that offers a novel approach, such as the use of a nature-connectedness-based PPI. The present study sought to address this gap and so explored the impact of a Three Good Things in Nature (3GTN) intervention, in comparison to a Three General Things (3GT) control, on the nature-connectedness and Wellbeing of parents of NTC and NDC. As collecting data on people with disabilities can be challenging (Humanity Inclusion, 2018; Markesich, 2008), uneven NTC/NDC group sizes were anticipated, which would affect the ability to conduct statistical analyses and make generalizable conclusions. The aim of this study is therefore to investigate if noticing 3GTN could boost nature connectedness, and in turn the wellbeing, of parents. The hypotheses are:

H1- 3GTN will have a positive impact on Wellbeing in comparison to the 3GT
H2- 3GTN will have a positive impact on nature-connectedness in comparison to the 3GT
H3- parents of NDC will have lower baseline Wellbeing than parents of NTC
H4- there will be no significant difference in baseline nature-connectedness between the parents of NTC and NDC
H5- 3GTN will have a greater positive impact on Wellbeing of parents of NDC than NTC
H6- 3GTN will have a greater positive impact on nature-connectedness of parents of NDC than NTC.

Method

Participants

Opportunity sampling was used to recruit 53 participants. Consent was obtained from the headteachers of 13 schools in south Wales to invite staff and parents to participate in the study. Invitations were passed on through the school's communication platforms. Additionally, personal contacts and professional social media platforms were used to invite additional participants. G*Power (Faul et al., 2007) suggested n=64 (alpha .05, power .80), as was used by Lumber, Richardson and Sheffield (2017). Post-hoc power analysis confirmed power to be sufficient for a large effect size (1- ß = .81), as seen in Richardson, McEwan and Garip, 2018, but insufficient for a medium effect size (1- ß = .43), as seen in Richardson and Sheffield, 2017. Participants were predominantly female (83%), highly educated (85% with undergraduate degree or higher), married/cohabiting (91%), in full-time employment (68%) and residing in the UK/ROI (83%). Participants tended to live in less built-up areas. Mean participant age was 43.09 (SD 6.32). Additional demographic information is shown in Table 1. Participants were asked how many children they had and if any children had a diagnosed learning difficulty, specified as dyslexia, dyspraxia, Asperger's, autistic spectrum disorder (ASD) or attention deficit (hyperactivity) disorder (AD(H)D). Participants were subsequently allocated to the NDC or NTC according to their response. Participants were also asked if they or the other parent had one of the six diagnosed difficulties.

Table 1

Participant Demographics for Three Good Things in Nature (3GTN) and the Three General Things (3GT) Control

	N	Mean Age (SD)	Age Range	Females	Males
3GTN	25	41.97 (5.80)	31-52	20	5
3GT	28	44.11 (6.37)	31-57	24	4

Measures

General Wellbeing Scale (GW85)

The GW85 (Dupuy, 2006) is a valid and reliable measure of HWB (test-retest reliabilities 0.68 to 0.85 and alpha coefficients 0.90 to 0.95 (Bech, 1993; McDowell and Newell, 1987; Norman et al., 2000). It rates general mood, anxiety, feelings of control, stress health concerns, energy levels and interest in life. GW85 has six subscales (positive Wellbeing, anxiety, depression, self-control, vitality and general health), however high internal consistency resulted in scoring as a single, composite measure (McDowell and Newell, 1987).

GW85 asks 18 questions, 14 of which are scored on a 0-5 Likert scale, with questions such as "have you felt so sad, discouraged, hopeless, or had so many problems that you wondered if anything was worthwhile?" Four questions are scored on a 10-point Likert scale, with participants given six answer options, ranging from, for instance, very tense (0), to very relaxed (10). Scores are summed, with 81-110 reflecting positive Wellbeing, and 0-25 being severe.

Scale of Psychological Wellbeing (SPWB)

The SPWB (Ryff and Keyes, 1995) measures six dimensions of EWB: autonomy, environmental mastery, personal growth, positive relationships with others, purpose in life and self-acceptance. It has low to moderate internal consistency (Cronbach's alphas .33 - .56) and low to high construct correlations (coefficients .24 -.85) (Ryff and Keyes, 1995), however each is significant ($p = .01$). Despite some low measures, the six factors create a strong measure for the single construct of psychological Wellbeing. (Ryff and Keyes, 1995).

SPWB asks 18 questions which are scored on a six-point Likert scale, from (1) strongly disagree to (6) strongly agree. Most questions are positively scored (i.e., "I

like all aspects of my personality"), with eight being reverse scored (i.e. "The demands of everyday life often get me down"). Scores are tallied and the higher the score, the higher the psychological Wellbeing. Lambert et al., (2020) highlight the importance of richer measures of Wellbeing (de Chavez et al., 2005). As such, GW85 and SPWB scores are combined, creating an index that incorporates hedonic and eudaemonic facets.

Connectedness to Nature Scale (CNS)

The CNS (Mayer and Frantz, 2004) measures an individual's sense of oneness with the natural world, and while initially identified as an affective measure of connection, later work found it to be a cognitive measure instead (Perrin and Benassi, 2009). It asks questions such as "I often feel part of the web of life". The 13 questions of the trait questionnaire are measured on a 5-point Likert scale from (1) strongly disagree to (5) strongly agree. Three questions are reverse scored. A total CNS is found by summing all scores, with a higher score indicating feeling more connected to nature. CNS is reliable (alpha = .84) and valid, with an average factor loading of .57 (range .24 to .80). Test-retest reliability was also high (Mayer and Frantz, 2004). The use of this multi-item scale has advantages over others, for instance the Inclusion of Nature in the Self (INS) scale (Schultz, 2001) which cannot be assessed for reliability as it is a single item scale (Schultz et al., 2004). A review by Tam (2013) demonstrated that although the many adult measures of nature-connectedness measure the construct in a slightly different way, each does, in its own way, measure nature-connectedness. CNS was used here as it is valid and reliable (Tam, 2013) and has been shown to be an effective measure of the effects of an intervention, as demonstrated in Keenan et al., (2021).

Design

An experimental 2x2x2 repeated mixed-measures design analysed the impact of a 3GTN intervention versus a 3GT control (Independent variable (IV)1: 3GTN vs 3GT), on the Wellbeing and nature-connectedness of parents of NTC versus parents of NDC (IV2: NTC vs NDC) at baseline and post-intervention (IV3: initial vs final). An active control group was used, whereby the difference between the two groups (3GTN and 3GT) is in whether they are noticing good things in nature versus noticing things generally. This is a similar design to that used by Keenan et al., (2021), McEwan et al., (2019) and Richardson and Sheffield (2017). Participants were randomly assigned to the 3GTN or 3GT group via an online survey platform. Self-report scales measured the dependent variables (general Wellbeing, psychological Wellbeing and nature-connectedness).

Mixed factorial ANOVA was used to investigate differences in Wellbeing and nature-

connectedness between and within the two groups (3GTN vs 3GT) over the two timeframes (baseline and post-intervention). Given the small sample of parents of NDC (n= 10), and their uneven split between groups (70% in 3GTN), IV2 (NTC vs NDC) was removed from formal analysis. The trends in the NTC/NDC data, however, were still explored.

Procedure

Study duration was just over 12 weeks, between January and April 2020. Participant involvement was seven days: day one collected baseline data, days 2-6 implemented the experimental condition/control, and day 7 collected post-intervention data. Completion of the scales on days 1 and 7 provided baseline and post-intervention results. Participants in 3GTN were asked, in a daily email, to record three good things that they had observed in nature. They were instructed to write as simply or beautifully as they wished, and given three examples: the sight of the sunrise, the smell of fresh air or the sound of birdsong. Guidance was given to consider the small things in nature, or nature in its grand majesty. The expectation was for participants to notice the 'everyday' nature around them as they went about their typical day. The instructions for participants in 3GT were altered to noticing three things around you. A different prompt was given for each day, for instance "types of food in your kitchen" or "items of clothing you own". The two groups were therefore either noticing things in nature, or in general. Details on the experimental conditions were withheld until the end of the study to ensure no bias in expected outcome was triggered. This is similar to the approach of Richardson and Sheffield (2017) in their research on three good things in nature, and Lumber, Richardson and Sheffield's (2017) research on potential nature-connectedness pathways. Qualtrics randomly allocated participants to the 3GTN/3GT conditions. This study was approved by the University of Derby Ethics Committee.

The overarching context in which this research was carried out was with a view to encouraging schools to incorporate more opportunities for their children and young people to engage with nature outside of the classroom. As it was not possible to work with children and young people directly within the ethical parameters and time scales available for a Master's research project, we chose to work with parents. The purpose of this research was to help build the evidence base of the efficacy of short-term interventions to build nature-connectedness and Wellbeing, and to help show schools the value of creating time in their already-overstretched curriculums for programmes that would move their children outside to engage and interact with nature.

We felt that the design of this research project needed to be SMART (specific, measurable, achievable, relevant, and time-bound) to be appropriate as an

intervention to ultimately be used in schools. Based on these considerations, the methodology used met each of these criteria. We recognise, however, that there are arguments against the use of scales, especially in the measurement of something such as nature-connectedness. There are elements of connection that may not be reflected in a standardised scale, and the questions within a scale may be relevant to only the socio-ecological context in which they were framed. Moreover, scales of nature-connectedness typically do not ask questions around eco-phobia, fear or eco-anxiety and so cannot speak to why someone may not feel connected to nature.

For the research team it was important to use a process that could be later adapted for use by researchers and teachers in schools. Within Educational Psychology there is a strong drive to recommend interventions for which there is an evidence base of effectiveness. It was therefore relevant to use scales that had been established to measure accepted definitions of both nature-connectedness and Wellbeing. By utilising these scales, it was hoped that should the intervention be effective in raising the scores assessed by them, adoption of the intervention would be much more likely due to the objective measure of change they could provide.

Such a positivist approach to knowledge generation may be at odds with other work within the Ecopsychology body of work that utilises an interpretivist paradigm, which would have taken a very different approach to research in this area. However, given the need for measures that are classed as objective, due to their estimates of reliability and validity, to make a persuasive case for the effectiveness of much needed interventions to support the target population with their Wellbeing, and help engage children with the more-than-human world to which they belong, the authors felt that this approach was the most suitable to achieve this broader aim. It was also necessary to engage with areas/aspects of wider nature that would be accessible to children in school - which is why there is a focus on the use of 'nearby nature'. Finally, it was important to use an intervention that already had been shown to work over a relatively short timescale, so that schools would be able to fit it into an already-busy curriculum.

Schools are currently under intense pressure to meet the educational, social and mental health needs of a diverse student population, many of whom are presenting with increasingly complex social, emotional and mental health (SEMH) difficulties. This is widely reflected in the mainstream media, with reports of increased levels of dysregulated behaviour, difficulties with social skills, high levels of anxiety, and high levels of pupils feeling unable to attend and engage with education (often referred to as emotionally based school non-attendance (EBSNA)). This is also reflected in the current caseload of the children and young people that Educational Psychologists are being asked to work with in schools.

A 3GTN intervention was felt to be a suitable intervention to use in schools for a number of reasons. It does not take a lot of time to engage with, is low cost and does not require any additional resources- other than being able to access outdoor space. It provides children with an opportunity to leave an environment they may be finding tricky to manage (e.g., the classroom), it is based on solid Positive Psychological theory, as well as tapping into psychological constructs such as grounding, and connection- both of which have been shown to help manage anxiety. Moreover, it is an intervention that can be used both pro-actively and reactively. Finally, it gives children an opportunity to move, get outside, shift focus and to connect with the wider world, and it has been shown to increase wellbeing in a number of studies based on adult populations. Although this research wasn't able to work with children and young people in schools directly, it was hoped that they may have benefitted indirectly, by introducing parents and carers to a practice that could have been adopted by the wider family.

Results

The impact of a 3GTN intervention, in comparison to a 3GT control, on the Wellbeing and nature-connectedness of parents of NDC and NTC was analysed. Fidelity checks confirmed participants had responded correctly and fully engaged. Normality was confirmed, and where it was not met, data was transformed by winsorization and reconfirmed.

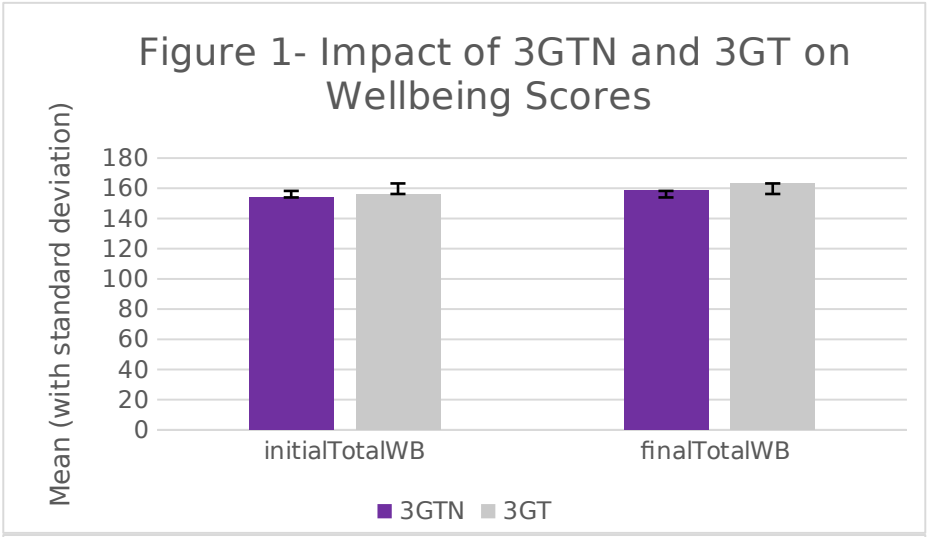
ANOVA 3GTN vs 3GT

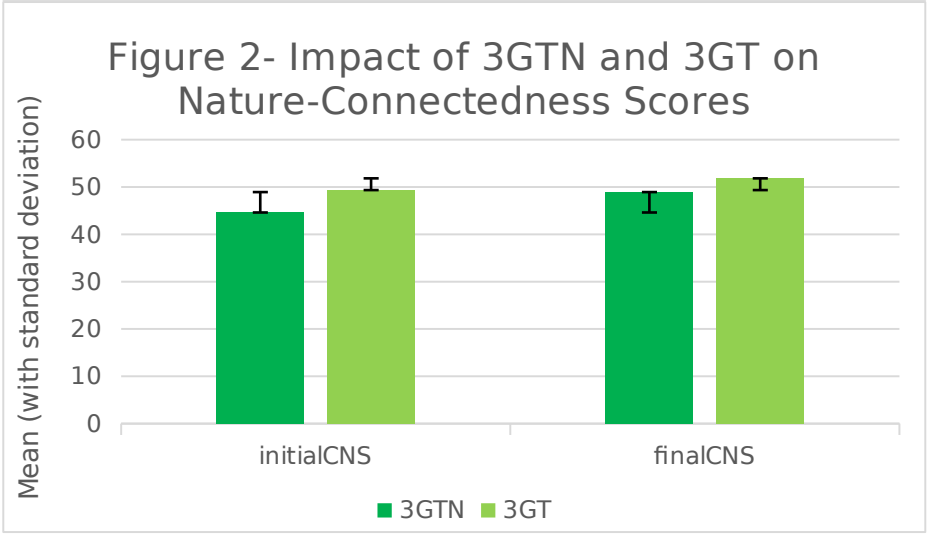
There was a significant impact and a medium effect size of time on Wellbeing $F(1, 51) = 9.96$, $p = .003$, $\eta p2 = .16$. Wellbeing scores increased between baseline and the post-intervention (Figure 1). There was, however, no interaction effect of intervention on Wellbeing $F(1, 51) = .55$, $p= .46$, $\eta p2 = .01$. The between-subjects tests also showed no main effect of intervention: $F(1, 51) = .45$, $p= .50$, $\eta p2 = .01$. Figure 1 shows Wellbeing increased by a similar magnitude for both intervention and control. H1 therefore is not supported.

There was a significant impact and a large effect-size of time on nature-connectedness $F(1, 51) = 27.38$, $p <.0001$, $\eta p2 = .35$. Nature-connectedness scores increased between baseline and post-intervention (Figure 2). There was, however, no interaction effect of intervention on nature-connectedness $F(1, 51) = 2.05$, $p = .16$, $\eta p2 = .04$.The between-subjects tests also showed no main intervention effect: $F(1, 51) = 3.03$, $p= .09$, $\eta p2 = .06$. H2 therefore is not supported.

Figure 1 shows similar baseline Wellbeing for 3GT and 3GTN, with a marginally greater increase in Wellbeing for 3GT than 3GTN. The opposite is true for nature-

connectedness (Figure 2), with greater baseline disparity, and moderate convergence of scores post-intervention. It could therefore be argued that 3GT had a marginally greater impact on Wellbeing, and 3GTN a marginally greater impact on nature-connectedness.

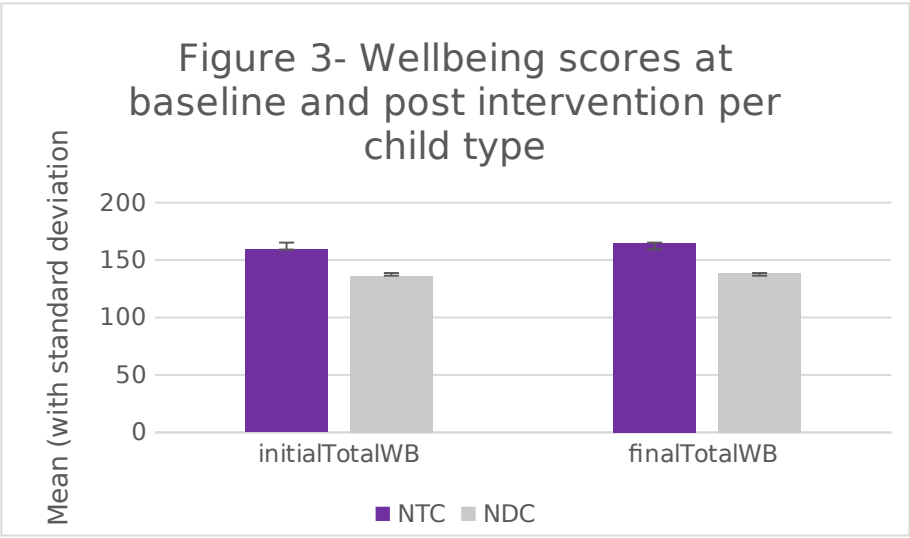


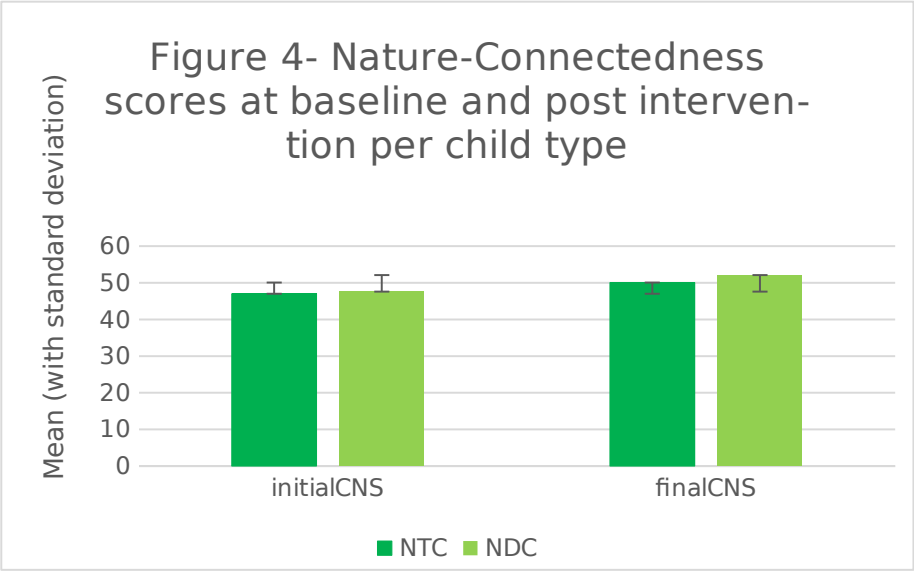


Exploratory ANOVA NTC vs NDC

The assumptions for ANOVA were not met and so relationships were only explored. There was no significant impact of time on Wellbeing $F(1, 51) = 3.02$, $p = .09$, $\eta p2 = .06$, so there was no significant difference between baseline and post-intervention Wellbeing scores for either group of parents (Figure 3). Nor was there an interaction effect of child type on Wellbeing $F(1, 51) = .61$, $p = .44$, $\eta p2 = .01$. There was, however a main effect, with a medium/large effect size, of child type on Wellbeing, with $F(1, 51) = 13.09$, $p = .001$, $\eta p2 = .20$. Parents of NDC had significantly lower Wellbeing than parents of NTC. The relationship suggested by H3 is therefore supported. There is a marginally greater increase in Wellbeing scores for parents of NTC than NDC.

There was a significant impact and a large effect-size of time on nature-connectedness $F(1, 51) = 20.42$, $p < .0001$, $\eta p2 = .29$. Nature-connectedness scores increased between baseline and post-intervention (Figure 4) for both groups. There was, however, no interaction effect of child type on nature-connectedness $F(1, 51) = .73$, $p = .40$, $\eta p2 = .01$. The between-subjects tests also showed no main effect of child type, with $F(1, 51) = .21$, $p = .65$, $\eta p2 = .004$. The relationship suggested by H4 is therefore supported.

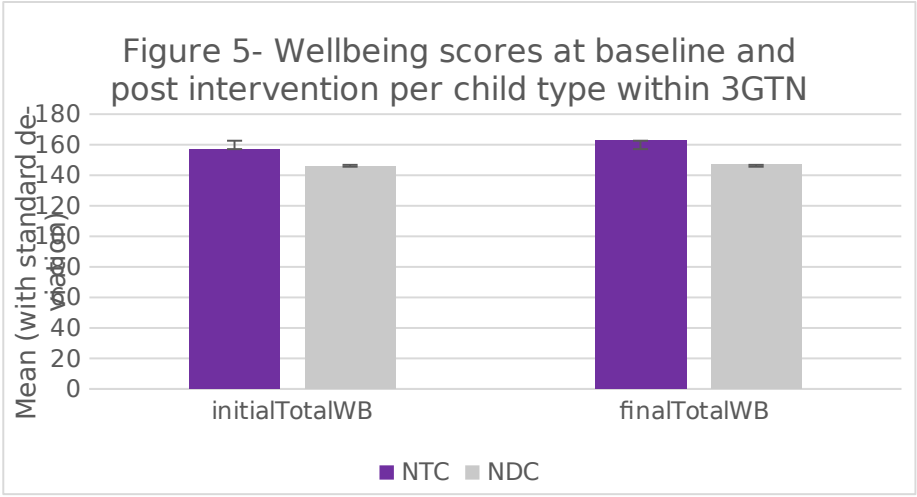


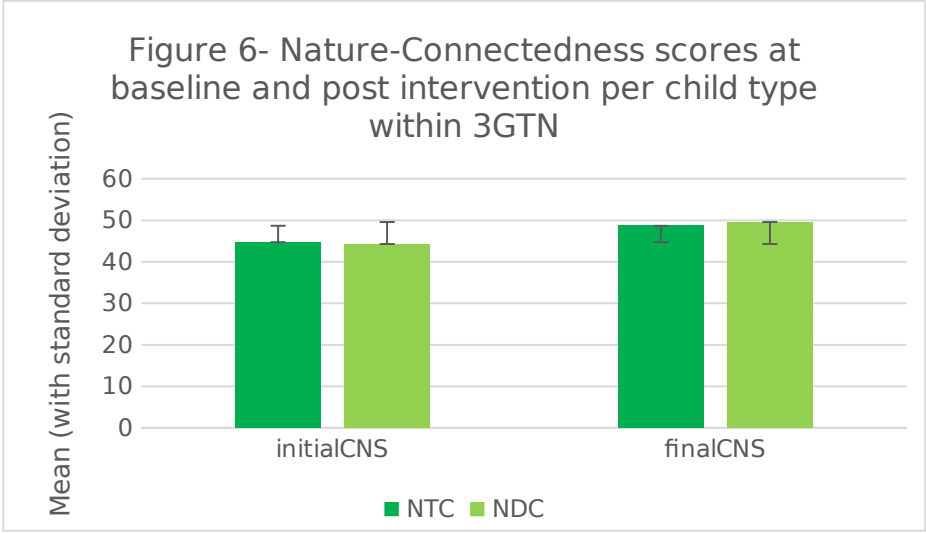


Exploratory ANOVA NTC vs NDC within 3GTN

The assumptions required for ANOVA were not met and so relationships are only explored. There was no significant impact of time on Wellbeing of either parental group within the 3GTN condition $F(1, 23) = 1.25$, $p = .28$, $\eta p2 = .05$ (Figure 5). There was therefore no significant difference in Wellbeing scores for either the parents of either NTC or NDC resulting from the 3GTN intervention. There was also no interaction effect of child type on Wellbeing $F(1, 23) = .49$, $p = .49$, $\eta p2 = .02$. Furthermore, there was no main effect of child type on Wellbeing, $F(1, 23) = 2.89$, $p = .10$, $\eta p2 = .11$. This is in contrast with the overall data, which did show a significant difference in Wellbeing between parents of NDC and NTC (see Figure 3). The relationship suggested by H5 is not supported.

There was a significant impact and a large effect size of time on nature-connectedness $F(1, 23) = 12.07$, $p = .002$, $\eta p2 = .34$. Nature-connectedness scores therefore increased between the baseline and the post-intervention as a result of the 3GTN intervention for both groups of parents (Figure 6). There was no interaction effect of child type on nature-connectedness $F(1, 23) = .26$, $p = .62$, $\eta p2 = .01$. Equally, there was no main effect of child type on nature-connectedness, $F(1, 23) = .004$, $p = .95$, $\eta p2 = .000$.The relationship suggested by H6 is therefore not supported.





This research looked to objectively quantify and qualify relationships- the felt strength of relationship between self and nature, and the expected correlation between feeling connected to nature, and wellbeing. As such, it was reliant on the use of scales to capture this relationship. It is possible that the scales used didn't capture the full

breadth of what different people conceptualise as nature-connectedness. It is also possible that for the participants in this study, any perceived Wellbeing benefits of being in nature don't correlate with a cognitive connection to nature (compared to say an affective, experiential connection or place-based connection (Ives et al., 2017), which is what the Connectedness to Nature Scale (CNS) used in this study is based on. Should this study be replicated, it may be beneficial to have additional qualitative, open questions that would enable participants to reflect on how their feelings toward nature, and their perceived Wellbeing, may have changed (or not) as a result of participating in the project.

This has highlighted the need to fully consider how to measure nature-connectedness and Wellbeing in children, if subsequent research looks to assess the efficacy and effectiveness of a 3GTN intervention in children and young people. It may also be necessary to consider how children and young people experience their connection to nature and whether this impacts on any potential correlations to wellbeing. For example, many adult nature connectedness scales measure an affective or cognitive element of nature-connectedness (or both), whereas those for children often include an experiential measure. If children's connection is driven in a more experiential way, it is possible that they will respond to the 3GTN intervention in a way that differs to adults.

Different people also respond to nature in different ways due to their personal and lived history and experience with the wider natural world making any interaction highly subjective to the individual. We had a relatively small but homogenous sample- which may simply have not responded in a way that fit with the samples of previous studies. It is possible that we didn't get the results we predicted due to these personal differences.

It is also possible that the lack of an intervention effect serves to highlight the complexity of the relationship that we have with the environment. That not everyone will respond to time in nature in the same way. None of the current measures of nature-connectedness explore nature-disconnection (Beery et al., 2023). Interventions that seek to increase nature-connectedness are unlikely to have an impact for someone who has a fear of nature, unless the underlying causes of that fear are resolved. This is equally true for someone who has disconnected from nature as a form of self-protection due to feelings of extreme eco-anxiety (Hickman, 2020).

An increasing number of systematic literature reviews into the impact of nature on different aspects of human functioning are finding that the approaches used are heterogeneous and the impacts are inconsistent. So although we didn't find what we expected to in our research, this does still fit within the wider research picture. Upon reflecting on what this means, it suggests that the relationship between each of us and the natural world is complex and perhaps most importantly- that each of our

relationships with the natural world is personal. This piece of research would have benefited from a qualitative element, to learn about the individual experiences of the participants. This would have added richness and understanding to the results.

Discussion

A significant limitation is that due to the small sample size, this study was underpowered for small or medium sized effects and may therefore under-report genuine effects (Field, 2013). Significant relationships, however, were still identified which add to our understanding of how PPI interventions can be used to support increased nature-connectedness and wellbeing. The 3GTN intervention was designed to encourage people to notice the positive aspects of nature with a view to increasing nature-connectedness and Wellbeing (McEwan et al., 2019; Richardson, Hallam and Lumber, 2015; Richardson, McEwan and Garip, 2018; Richardson and Sheffield, 2017). Although a significant impact of time on Wellbeing was found, there was no impact of intervention: Wellbeing scores increased in both 3GTN and 3GT cohorts. As there was no 'do nothing' control, however, it is possible the act of noticing three things acted to improve Wellbeing in both groups. Although using an active control helps make the study blind (Cohen, Manion and Morrison, 2011) (i.e., participants do not know if they are in the intervention or control group), it does not let us establish whether the active control group had an effect that we did not control for, as is conceivably the case here. Despite the fact that many related studies have used similar active controls (Keenan et al., 2021; McEwan et al., 2019), this study would have benefitted from an additional do-nothing control group against which to compare the intervention group and the active control.

Lumber, Richardson and Sheffield (2017), however, similarly found Wellbeing increased over time, regardless of condition, when comparing walking in nature and walking in the built environment. McEwan et al., (2019) also showed improved Wellbeing in both intervention and active control groups. H_1 suggested 3GTN would have a positive impact on Wellbeing as this has been reported previously (McEwan et al., 2019; Richardson and Sheffield, 2017). It is suggested that as average baseline Wellbeing scores in this study were relatively high in both 3GTN and 3GT groups, with a fairly large standard deviation, it would have been difficult to show a significant difference with this small sample size. Moreover, it is possible that there is a ceiling effect on improving high baseline Wellbeing scores with a nature-connectedness intervention (Richardson, McEwan and Garip, 2018). The presence of a ceiling effect would have affected both 3GTN and 3GT groups as they both had high baseline Wellbeing scores. Richardson, McEwan and Garip (2018) showed the greatest impact on Wellbeing was in those with lowest Wellbeing; baseline scores here could be too high to register an intervention effect. It is also possible that combining GW85 and SPWB scores masked a relatively greater impact on either

HWB or EWB. Martin et al., (2020), for instance, found correlation with EWB, not a combined measure. Lambert et al., (2020) however, attest that those who are connected to nature have improved HWB and EWB (Capaldi, Dopko and Zelenski, 2014; Pritchard et al., 2020) implying that a correlation should be evident in a combined measure. As GW85 data was not normally distributed, it was not possible to investigate the intervention impact separately on HWB and EWB to see if relationships differed from the combined measure. Future research on this aspect with a larger sample would be useful to investigate this further.

There was an impact of time on nature-connectedness, interestingly with no intervention effect. H2 suggested 3GTN would have a positive impact on nature-connectedness, as this has been reported previously (McEwan et al., 2019; Richardson and Sheffield, 2017). Participants had relatively high mean baseline nature-connectedness scores for both groups. It is possible that the very act of being encouraged to 'notice' had an impact on nature-connectedness. McEwan et al., (2019) similarly showed improved nature-connectedness scores in both their intervention and active control groups. It is also possible that the changing of the seasons, moving from winter towards spring, had an impact on nature-connectedness. This is similar to what was observed by Nisbet, Zelenski and Murphy (2011), however, they found nature-relatedness scores decreased between time measures for as the season progressed from fall to winter. Having a 'do-nothing' control would have helped to account for general trends that weren't necessarily related to the experimental conditions. It is also possible that insufficient pathways were activated by the 3GTN intervention to promote nature-connectedness over and above 'noticing'. Of the pathways identified by Lumber, Richardson and Sheffield (2017) to increase connectedness, Beauty and Contact most overlap with 3GTN. Further refinement of 3GTN interventions to additionally engage the remaining pathways (Meaning, Emotion and Compassion) would help to ensure they promote nature-connectedness more effectively by drawing upon an evidenced framework.

The exploratory investigation of NTC/NDC data shows tentative support for two hypotheses. There was a significant effect of child type on Wellbeing, with parents of NDC having significantly lower Wellbeing scores than those of NTC (supporting H_3). This is in keeping with findings by Contact (2017) who showed differences in quality of life and Wellbeing in parents of disabled children in comparison to those without disabilities. There was a significant impact of time on nature-connectedness for both NTC and NDC, however nature-connectedness increased across both groups in a similar manner. H_4 was therefore supported. Both data sets broadly showed that both nature-connectedness and Wellbeing increased over time in both NTC and NDC groups. This is consistent with findings from Nisbet, Zelenski and Murphy (2011) who found positive correlations between nature-relatedness and all measures of

Wellbeing. This means that the trend shown between the 3GTN and 3GT groups on nature-connectedness holds for both parental groups, as well as parents collectively.

Investigating the impact of the 3GTN intervention on Wellbeing and nature-connectedness in parents of NTC and NDC, there was no effect on Wellbeing. This is interesting as parents of NDC had significantly lower Wellbeing, and the mean baseline score was below the positive Wellbeing band (<150.62); research by Richardson, McEwan and Garip (2018) would suggest a 3GTN intervention should have a positive impact on them. It is possible this study was insufficiently powered to detect potentially small to medium effect sizes. There was a significant impact on nature-connectedness, improving scores for both groups of parents, however with no difference between groups, therefore not supporting H_6. It is suggested that as mean baseline nature-connectedness scores were relatively high that a further increase in scores had little impact on Wellbeing. This would imply a plateau effect whereby further increases in nature-connectedness, above a certain threshold, do not increase Wellbeing. This would put limitations on the effectiveness of a 3GTN intervention on Wellbeing on those with high baseline nature-connectedness. These potential ceiling effects were also noted by Richardson, McEwan and Garip (2018), where those with higher baseline nature-connectedness tended to benefit less from increased engagement with nature. Nisbet, Zelenski and Murphy (2011) found differences in baseline nature-relatedness scores affected their ability to draw generalisable conclusions; they too may have had a ceiling effect confounding the outcomes.

These findings suggest there may be a limit to the impact of increasing nature-connectedness to improve Wellbeing through the approach used in this study. Just as Lumber, Richardson and Sheffield (2017) identified five pathways to nature-connectedness, of which one, engaging the senses, was tested here, this research supports the notion of including all five pathways to map more closely onto Aked et al.'s (2008) FWW model (Aked and Thompson, 2011; Roberts et al., 2011). This study used two ways: connect (to nature) and take notice. Incorporating the full FWW and pathways framework could offer an improved approach for using nature-connectedness to improve Wellbeing, that may push through the Wellbeing ceiling observed.

Strengths and Limitations

A strength of this study was the use of an experimental design in a field with many correlational studies (McEwan et al., 2019), which has helped to investigate the effectiveness of a 3GTN PPI with a previously unstudied population (to the authors' knowledge). The study was limited, however, by the low recruitment of parents of NDC, as was anticipated given the challenges in collecting data on people with

disabilities (Humanity Inclusion, 2018; Markesich, 2008). This significantly impacted the power of the study, and the ability to investigate trends between and within the NDC and NTC groups. Additional research, with a larger sample size and more targeted recruitment is therefore suggested.

Demographic discrepancies between groups could have impacted results. Of particular relevance is the difference in number of parents with a diagnosis (24% and 3.7% in 3GTN/3GT and 40% and 6.98% in NDC/NTC). Additionally, the overall demographic of older, affluent, educated and married women means that results may not be generalizable outside of this cohort. It is not unusual, however, for nature-based studies to have skewed demographics where potential confounders are not corrected for during analysis. Females, for instance, often outnumber males (i.e., McEwan et al., 2019, 59.9%), or participants are a subset of the wider population, for instance university students (i.e. Nisbet et al., 2011, 67.4% and mean age 19.48, SD 2.83) or more affluent individuals (MacKerron and Mourato, 2013). This is illustrated in Richardson, McEwan and Garip's (2018) well-powered study (N = 6 179) where 90% of participants were female, with a mean age of 40.51 (SD 11.63), a recruitment profile similar to this study.

A further limitation of nature-based intervention studies identified by Richardson, McEwan and Garip (2018) is that they appeal to those already connected to nature and who are functioning well. This may offer an alternative explanation as to why we did not see the expected outcomes within our study. This is further supported by the findings of White et al. (2021), who carried out an international study to explore more nuanced associations between multiple measures of mental health and exposure to different natural settings. Their findings corroborated previously stated correlations of improved well-being in people who lived in green or coastal environments. However, when they looked at the mediating effect of visits to these areas, they found the positive effects controlled for. They therefore suggested that the reason why people who live in green and/or coastal neighbourhoods experience positive mental health is because these neighbourhoods encourage more frequent recreational visits. As this study was carried out on participants who lived in a green and rural environment, within 10 miles of easy access to the coast, it is also possible that we did not see expected improvements in mental health as our participants were already experiencing the associated benefits of positive wellbeing by virtue of where they lived and how they interacted with the blue and green spaces around them. Future studies should therefore seek to recruit participants from more diverse local environments, and seek information on baseline frequency of visits to green/blue spaces.

A wider limitation that exists in many areas of psychological research is a focus on

Western, Educated, Industrialised, Rich and Democratic (WEIRD). This has especial relevance here, with different conceptualisations of wellbeing and nature (Gallegos-Riofrio, 2022). Moreover, the interpretation of 'nature' is often taken from a conventional psychological standpoint and espouses humanist secular values. Subsequent research should therefore seek to recruit from a more diverse population to obtain a more globally representative demographic.

It should also be noted that the use of the Nature Connectedness Scale (Mayer and Frantz, 2004) being a trait measure that while aiming to be an affective measure of connection has been identified as an assessment of cognitive connection with nature (Perrin and Benassi, 2009). While there are many measures of nature-connectedness, work by Tam (2013) showed that the Connectedness to Nature Scale was an effective measure with sufficient overlap between it and all measures assessed, demonstrating they broadly measured the same construct. While this supports the use of this measure in the present study, state measures such as the Nature Connection Index (Richardson et al., 2019) published after the present study was conducted, offer a useful alternative. Future studies on 3GTN with this population should utilise a state measure sensitive to change such as the Nature Connection Index (with its revised scoring to avoid ceiling effects) so that change in nature connectedness could be detected more effectively.

Time of year could have introduced seasonal bias to the findings (Richardson, Hallam and Lumber, 2015; Richardson et al., 2019). Between January and early April, people are less likely to be out engaging with nature and may therefore have lower nature-connectedness (Nisbet, Zelenski and Murphy, 2011). These can also be months with lower Wellbeing (Eagles, McLeod and Douglas, 1997; Howell et al., 2011). Nisbet, Zelenski and Murphy (2011) attributed their decreases in nature-relatedness and Wellbeing to the changing of seasons from fall to winter. This implies the general trend of increasing scores could in part be attributable to the seasonal shift towards spring; a do-nothing control would have helped control for this. A nature-connectedness intervention to improve Wellbeing should therefore take seasonality into account.

It would have been beneficial to have a do-nothing control group. Within this study, both groups were asked to 'notice'. It is possible that simply taking the time to notice things could have had an impact on results, especially for parents of NDC who may otherwise have a very inward focus. Future work should therefore consider comparing 'noticing nature', with 'noticing not-nature' (as was carried out here), but with a control group of participants carrying out their daily routines in a 'business as usual' scenario. This would help to establish whether findings were related to being asked to notice in generally, or whether noticing nature specifically had a different impact.

Future Research

Further research is suggested to test 3GTN efficacy with a revised focus on the pathways framework (Lumber, 2016) and the FWW (Aked et al., 2008) to ascertain if ceiling effects persist. The five pathways could be used to help inform and design the intervention to optimise nature-connection. Equally, the three ways of the FWW that were not promoted within the current 3GTN intervention (namely Be Active, Keep Learning, and Give) could also be incorporated, with a view to maximising potential Wellbeing gains. Should this be successful, further investigation of its use in other demographics, for instance children and young people would also be useful. Using thematic analysis to investigate the good things in nature that participants wrote about, especially as they relate to the five pathways (as undertaken by Richardson et al., (2015), would help further refine the 3GTN intervention.

Conclusion

Wellbeing and nature-connectedness increased over time, regardless of test condition; the 3GTN intervention had no significant impact. Nature-connectedness increased for all parents, regardless of child type. Parents of NDC had lower Wellbeing at baseline and post-intervention compared to parents of NTC. Finally, there was no impact of 3GTN intervention on Wellbeing for parents of either NDC or NTC, but there was an impact on nature-connectedness. The lack of a specific intervention effect, as shown by McEwan et al., (2019) and Richardson and Sheffield, (2017), may be due to high baseline nature-connectedness and Wellbeing scores, suggesting a plateau effect on the interaction, as seen in Richardson, McEwan and Garip (2018). Of note, nature-connectedness and Wellbeing increased in both the 3GTN and 3GT conditions, suggesting encouraging participants to take notice appears to increase their engagement with nature and Wellbeing.

Given that this paper was first submitted for review three years ago, it is useful to reflect on the key take-away from this research, especially given the further training and occupation now being pursued by the first author. This article came into being as the first author's Master's research project, and as such was shaped by limited timescales (i.e., 9 months), ethics around participants (i.e., I would have liked to work with children, but this was not permitted), and the knowledge and understanding (of the first author) around the very concepts of Wellbeing and nature-connectedness.

The core reflection taken from this piece of research is the limitation of scales in capturing what we mean by nature connectedness. The scales typically used focus on the positive aspects of nature connection, and do not consider negative affect, such as despondency and helplessness, that can arise from feeling connected to nature. This is

especially relevant in the context of the climate crisis and the growing number of children with climate-anxiety. This is not to say there isn't a place for objective measures, or for research to continue to strive to refine the core components of what it means to be connected to nature. It is only by so doing that we will be better able to dig into the mechanisms that underpin feeling connected to nature, and so better understand what we can do to help develop nature connectedness. But this can be done alongside and intertwined with qualitative exploration that provides a depth and breadth of understanding beyond what numbers bring. Three years of research and reflection have led to an axiological shift in the first author from quantitative to mixed methods.

In reflecting and ruminating on the limitations of this piece of research, it is easy to lose sight of what it brings. And that is discussion and thought and research into ways in which we can encourage the growth of nature-connectedness in children, young people and adults so that more of us feel the pull to act in ways to preserve nature and protect this beautiful biosphere we call home.

References

Aked, J., Marks, N., Cordon, C. and Thompson, C. (2008) *Five ways to wellbeing*. London: New Economics Foundation. Available at: https://neweconomics.org

Aked, J. and Thompson, S. (2011) *Five ways to wellbeing- New applications, new ways of thinking*. London: New Economics Foundation. Available at: https://neweconomics.org

Bech, P. (1993) 'Quality of life measurements in chronic disease', *Psychotherapy and Psychosomatics, 59*, 1-10.

Beery, T., Stahl Olafsson, A., Gentin, S., Maurer, M., Stålhammar, S., Albert, C., Bieling, C., Buijs, A., Fagerholm, N., Garcia-Martin, M., Plieninger, T., & M. Raymond, C. (2023). Disconnection from nature: Expanding our understanding of human–nature relations. *People and Nature*, 5(2), 470–488. https://doi.org/10.1002/pan3.10451

Bewa, M.J., Kirby, R., Sayi, T. (2020) 'Are child autism status and severity associated with maternal mental and emotional health (MEH)?' (Conference poster), University of South Florida College of Public Health, Tampa, Florida

Bitsika, V and Sharpley, C. (2004) 'Stress, anxiety and depression among parents of children with austism spectrum disorder', *Australian Journal of Guidance and Counselling, 14*(2), 151-161

Cachia, R.L., Anderson, A. and Moore, D.W. (2016) 'Mindfulness, stress and well-being in parents of children with Autism Spectrum Disorder: a systematic review', *Journal of Children and Family Studies, 25*, 1-14. Available at: https://doi.org/DOI:10.1007/s10826-015-0193-8

Capaldi, C.A., Dopko, R.L. and Zelenski, J.M. (2014) 'The relationship between nature connectedness and happiness: a meta-analysis', *Frontiers in Psychology, 5*(976), 1-15.

Capaldi, C.A., Passmore, H-A., Nisbet, E.K. Zelenski, J.M., and Dopko, R. L. (2015) 'Flourishing in nature: A review of the benefits of connecting with nature and its application as a wellbeing intervention', *International Journal of Wellbeing, 5*(4), 1-16. Doi: 10.5502/ijw.v5i4.449

Carr, D. and Springer, K. W. (2010) 'Advances in families and health research in the 21st century', *Journal of Marriage and the Family*, 72, 743–761. doi:10.1111/j.1741-3737.2010.00728.x

Cohen, L., Manion, L, & Morrison, K. (2011). *Research methods in education*. Routledge

Contact (2017) *Caring more than most- Executive Summary*. Contact, with the University of Leeds. Available at: https://contact.org.uk/media/1168966/caring_more_than_most_exec_summary.pdf
Cowling, C. and Van Gordon, W. (2018) 'Effects of a brief online mindfulness intervention on mindfulness, psychological distress and parenting stress in preschool parents', *Mindfulness and Compassion,* 3(2), 55-70. Available at: https://www.researchgate.net/profile/William_Van_Gordon2/publication/324058569_

De Chavez, A.C., Backett-Milburn, K., Parry, O. and Platt, S. (2005) 'Understanding and researching wellbeing: Its usage in different disciplines and potential for health research and health promotion', *Health Education Journal, 64*(1), 70-87. https://doi.org/10.1177/001789690506400108

Dupuy, H.J. (2006) *Measuring health: a guide to rating scales and questionnaire*. 3rd ed. I. Mcdowell (Ed.). USA: Oxford University Press. Available from the University of Derby test bank.

Eagles, J.M., McLeod, I.H. and Douglas, A.S. (2018) 'Seasonal changes in psychological well-being in an elderly population', *The British Journal of Psychiatry, 171*(1), 53-55. https://doi.org/10.1192/bjp.171.1.53

Faul, F., Erdfelder, E., Lang, A.-G. and Buchner, A. (2007) 'G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences', *Behavior Research Methods*, 39, 175-191.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics.* Sage

Gallegos- Riofrio, C.A., Arab, H., Carrasco-Torrontegui, A., & Gould, R. K. (2022). Chronic deficiency of diversity and pluralism in research on nature's mental health effects: A planetary health problem. *Current Research in Environmental Sustainabiity, 4*. https://doi.org/10.1016/j.crsust.2022.100148

Gander, F., Proyer, R.T., Hentz, E. and Ruch, W. (2020) 'Working mechanisms in positive interventions: A study using daily assessment of positive emotion', *The Journal of Positive Psychology*. https://doi.org/10.1080/17439760.2020.1789698

Griffin, J. (2019) *A report into the emotional impact of parenting a disabled child*. https://www.affinityhub.uk/userfiles/documents/Report%20of%20findings.pdf

Griffin, J., (2020) 'Supporting parent carers', *The Psychologist (June)*, 28-31.

Hefferon, K., Boniwell, I. (2011) *Positive Psychology: Theory, Research and Applications*. London: McGraw-Hill/Open University Press.

Howell, A.J., Dopko, R.L, Passmore, H.A., and Buro, K. (2011) 'Nature connectedness: Associations with well-being and mindfulness', *Personality and Individual Differences, 51*, 166-171.0

Hickman, C. (2020). We need to (find a way to) talk about … Eco-anxiety. *Journal of Social Work Practice*, *34*(4), 411–424. https://doi.org/10.1080/02650533.2020.1844166

Humanity Inclusion (2018) *Disability Data Collection: A summary review of the use of the Washington Group Questions by development and humanitarian actors*. London: Leonard Cheshire and Humanity Inclusion. Available at: https://humanity-inclusion.org.uk/sn_uploads/document/2018-10-summary-review-wgq-development-humanitarian-actors.pdf

International Centre for Ecopsychology (2023). *What is Ecopsychology*. https://www.ecopsychology.info/what-is-ecopsychology

Ives, C. D., Giusti, M., Fischer, J., Abson, D. J., Klaniecki, K., Dorninger, C., Laudan, J., Barthel, S., Abernethy, P., Martín-López, B., Raymond, C. M., Kendal, D., & von Wehrden, H. (2017). Human–nature connection: a multidisciplinary review. In *Current Opinion in Environmental Sustainability* (Vols. 26–27, pp. 106–113). Elsevier B.V. https://doi.org/10.1016/j.cosust.2017.05.005

Keenan, R., Lumber, R., Richardson, M. and Sheffield, D. (2021). Three good things in nature: a nature-based positive psychological intervention to improve mood and well-being for depression and anxiety. *Journal of Public Mental Health*, pp. 1-20

Lambert, L., Lomas, T., van de Weijer, M., Passmore, H.A., Joshanloo, M., Harter, J, Ishikawa, Y., Lai, A. and Diener, E. (2020- in press) 'Towards a greater global understanding of wellbeing: A proposal for a more inclusive measure', *International Journal of Wellbeing, 10*(2), 1-18. Doi: 10.5502/ijw.v10i2.1037

Lim, K.K. and Chong, W.H. (2017) 'Moderating effect of child's autism spectrum disorder (ASD) diagnosis on benefit finding and negative affect of parents', *American Journal of Orthopsychiatry, 87*(3), 357-364. http://dx.doi.org/10.1037/ort0000251

Lumber, R. (2016) *Contact, Emotion, Meaning, Compassion, and Beauty as Pathways to Nature connectedness* [Doctoral dissertation, University of Derby]. http://hdl.handle.net/10545/621530

Lumber, R., Richardson, M., and Sheffield, D. (2017) 'Beyond knowing nature: Contact, emotion, compassion, meaning and beauty are pathways to nature connection', *PLoS ONE, 12*(5), e0177186. https://doi.org/10.1371/journal.pone.0177186

Lumber, R., Richardson, M., and Sheffield, D. (2018) 'The seven pathways to nature connectedness: A focus group exploration', *European Journal of Ecopsychology, 6*, 47-68

MacKerron, G., and Mourato, S. (2013) 'Happiness is greater in natural environments', *Global Environmental Change*, *23*(5), 992–1000. https://doi.org/10.1016/j.gloenvcha.2013.03.010

Markesich, J. (2008) 'Surveying People with Disabilities- A Source Guide', *Cornell University, ILR School, Employment and Disability Institute*. Available at: https://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1254andcontext=edicollect

Martin, L., White, M.P. Hunt, A., Richardson, M., Pahl, S. and Burt, J. (2020) 'Nature contact, nature connectedness and associations with health, wellbeing and pro-environmental behaviours', *Journal of Environmental Psychology, 68*, e101389 https://doi.org/10.1016/jenvp.2020.101389

Mayer, F.S., and Frantz, C.M., (2004) 'The connectedness to nature scale: A measure of individuals 'feeling in community with nature", *Journal of Environmental Psychology, 24*, 503–515.

https://dx.doi.org/10.1016/jenvp.2004.10.001
McDaid, D., and Park, A-La., (2022) 'The economic case for investing in the prevention of mental health conditions in the UK', *Mental Health Foundation*, https://www.mentalhealth.org.uk/sites/default/files/MHF_Investing_In_Prevention_FULLReport_FINAL.pdf

McDowell, I., and Newell, C. (1987) *Measuring health: a guide to rating scales and questionnaires*. New York: Oxford Press.

McEwan, K., Richardson, M., Sheffield, D., Ferguson, F.J., and Brindley, P. (2019) 'A smartphone App for improving mental health through connecting with urban nature', *International Journal of Environmental Research and Public Health, 16*(18). 3373. https://doi.org10.3390/ijerph16183373

Morrison, M., Tay, L., and Diener, E. (2011) 'Subjective well-being and national satisfaction: Findings from a worldwide survey?', *Psychological Science, 22*(2), 166-171. https://doi.org/10.1177/0956797610396224

Navaie-Waliser, M., Feldman, P. H., Gould, D. A., Levine, C., Kuerbis, A. N., and Donelan, K. (2002) 'When the caregiver needs care: The plight of the vulnerable caregivers', *American Journal of Public Health, 92,* 409–413. doi:10.2105/AJPH.92.3.409 NHS (2018) *Mental Health of Children and Young People in England 2017, Summary of Key Findings*. Available at: https://files.digital.nhs.uk/A6/EA7D58/MHCY %202017%20Summary.pdf

Nisbet, E.K., Zelenski, J.M. and Murphy, S.A. (2011) 'Happiness is in our nature: Exploring nature relatedness as a contributor to subjective well-being', *Journal of Happiness Studies, 12*, 303-322.

Norman, R. M. G., Malla, A. K., McLean, T., Voruganti, L. P. N., Cortese, L., McIntosh, E., Cheng, S., and Rickwood, A. (2000) 'The relationship of symptoms and level of functioning in schizophrenia to general wellbeing and the Quality of Life Scale', *Acta Psychiatrica Scandinavica, 102*, 303-309.

Palmer, S. (2014). "I'll go anywhere as long as it's forward," said David Livingstone. "You can't navigate without a decent map," retorted Christopher Columbus. Closing keynote paper given at the BPS SGCP 4th International Congress of Coaching Psychology, London, 12 December 2014.

Palmer, S. (2015). Can ecopsychology research inform coaching and positive psychology practice? *Coaching Psychology International, 8(*1), 11-15.

Perrin J. L., Benassi V. A. (2009). The connectedness to nature scale: a measure of emotional connection to nature? *J. Environ. Psychol.* 29 434–440. 10.1016/j.jenvp.2009.03.003

Pritchard A., Richardson M., Sheffield, D., and McEwan K. (2020) 'The relationship between nature connectedness and eudaimonic well-being: A meta-analysis', *Journal of Happiness Studies.* Doi.org/10.1007/s1002-019-00118-6

Resch, J.A., Benz, M.R. and Elliott, T. R., (2012) 'Evaluating a Dynamic Process Model of Wellbeing for Parents of Children With Disabilities: A Multi-Method Analysis', *Rehabilitation Psychology, (57)1,* 61–72. DOI: 10.1037/a0027155

Roberts, G., Bora, R., Hoerning, E., Ley, A. and Long, M. (2011). *Five ways to wellbeing: How do you get the message across?* Devon Patnership NHS Trust. Available at: https://www.dpt.nhs.uk/resources/recovery-and-wellbeing/five-ways-to-wellbeing

Richardson, M., Hallam, J., and Lumber, R. (2015) 'One thousand good things in nature: aspects of nearby nature associated with improved connection to nature', *Environmental Values, 24*, 603-619.

Richardson, M., Hunt, A., Hinds, J. Bragg, R., Fido, D., Petronzi, D., Barbett, L., Clitherow T. and White, M. (2019) 'A measure of nature connectedness for children and adults: Validation, performance and insights', *Sustainability, 11*, 3250. Doi: 10.3390/su11123250

Richardson, M., McEwan, K. and Garip, G., (2018) '30 days wild: who benefits most?', *Journal of Public Mental Health, 17*(3), 95-104. http://hdl.handle,net/10545/622998

Richardson, M., Passmore, H-A., Lumber, R., Thomas, R. and Hunt, A. (2021) 'Moments not minutes: the nature – well-being relationship', *Journal of Happiness Studies*

Richardson, M., and Sheffield, D. (2017) 'Three good things in nature: noticing nearby nature brings sustained increases in connection with nature', *Psyecology, 8(1)*, 1-32. DOI: 10.1080/21711976.2016.1267136

Rutherford, M., Singh-Roy, A., Rush, R., McCartney, D., O'Hare, A., Forsyth and K. (2019) 'Parent focused interventions for older children or adults with ASD and parent wellbeing outcomes: A systematic review with meta-analysi', *Research in Autism Spectrum Disorders, 68.* https://doi.org/10.1016/j.rasd.2019.101450

Ryff, C.D. and Keyes, C.L.M. (1995) 'The structure of psychological wellbeing revisited', *Journal of Personality and Social Psychology, 69*(4), 719-27.

Schultz, P. W. (2001) 'Assessing the structure of environmental concern: Concern for the self, other people, and the biosphere', *Journal of Environmental Psychology, 21*, 327–339.

Schultz, P. W., Shriver, C., Tabanico, J., and Khazian, A. (2004) 'Implicit connections with nature', *Journal of Environmental Psychology, 24*, 31–42.

Seligman, M.E.P., Steen, T.A., Park, N., and Peterson, C. (2005) 'Positive psychology progress. Empirical validation of interventions', *American Psychologist, 60*, 410-421. Doi: 10.1037/003-066X.60.5.410

Sin, N.L. and Lyubomirsky, S. (2009) 'Enhancing wellbeing and alleviating depressive symptoms with positive psychological interventions: a practice-friendly meta-analysis', *Journal of Clinical Psychology, 65(5), 467-87.* https://onlinelibrary.wiley.com/doi/pdf/10.1002/jclp.20593

Tam, K.-P. (2013). Concepts and measures related to connection to nature: Similarities and differences. *Journal of Environmental Psychology*, 64–78. The Children's Society (2020). *The Good Childhood Report 2020*. https://www.childrenssociety.org.uk/sites/default/files/good-childhood-report-2020.pdf

Todd, Z. (2016). An indigenous feminist's take on The ontological turn: "Ontology" is just another word for colonialism. Journal of Historical Sociology, 29(1), 4–22. https://doi.org/10.1111/johs.12124

Whetter, D. (2019) 'Stop plastering over problems', *The psychologist, October*, 68-69.

White, M. P., Elliott, L. R., Grellier J., Economou T., Bell S., Bratman, G. N., Cirach M., Gascon M., Lima, M. L., Lõhmus, M., Nieuwenhuijsen, M., Ojal, A., Roiko, A., Schultz, P. W., van den Bosch, M., & Fleming, L. E. (2021). Associations between green/blue spaces and mental health across 18 countries. *Scientific Reports, 11*. https://doi.org/10.1038/s41598-021-87675-0

Wilson, J.M, Weiss, A., and Shook, N.J. (2020) 'Mindfulness, self-compassion, and savouring: Factors that explain the relation between perceived social support and well-being', *Personality and Individual Differences, 152*, e109568. https://doi.org/10.1016/j.paid.2019.109568

World Health Organisation (2022). *Health and wellbeing*. https://www.who.int/data/gho/data/major-themes/health-and-well-being

Zelenski, J. M. and Nisbet, E. K. (2014) 'Happiness and feeling connected: The distinct role of nature relatedness', *Environment and Behaviour, 46*(1), 3-23. doi:10.1177/0013916512451901

Correspondence

Dr Nicole Harris email: N.M.Harris@soton.ac.uk
Dr Gulcan Garip email: G.Garip@derby.ac.uk
Dr Ryan Lumber email: ryan.lumber@ntu.ac.uk