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An exploration of nature-based therapy for children with long term health conditions and associated psychological difficulties.

Section A: The impact of nature-based therapeutic interventions on the wellbeing of children and adolescents: A narrative review

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## **Summary of Portfolio**

*Section A: Literature Review.* A narrative review based on a systematic search methodology aimed to evaluate how nature-based therapeutic interventions (NBTIs) impact on children and young people's (CYP) subjective wellbeing. The review utilized a comprehensive measure of subjective wellbeing, including evaluative, eudaimonic and experienced approaches, allowing for a deeper understanding of how wellbeing is impacted by NBTIs. Fourteen studies were retrieved, including quantitative and qualitative research. Overall, the findings identified themes of improved health appreciation, mood and self-esteem, impacting all evaluative, experienced and eudaimonic approaches. Clinical implications and recommendations for future research were discussed.

*Section B: Empirical Paper.* CYP with long-term health conditions (LTC) face many biopsychosocial challenges impacting wellbeing. NBTIs may have a positive impact on CYPs wellbeing, however, research exploring the experience of NBTIs for CYP with LTC and associated psychological difficulties (APD) is limited. Ten participations, attended a NBTI and took part in semi-structured interviews, analysed using Interpretative Phenomenological Analysis (IPA). Four themes developed from the analysis including 'Overcoming Illness-Identity', 'Freedom to Choose', 'Sense of Connection' and 'A Mindful Presence' as well as 10 subthemes. Future research could examine mechanisms of NBTIs mediating positive change. Including NBTIs in treatment planning for CYP with LTC and APD could support wellbeing.

## Table of Contents

<b>Section A</b> .....	<b>1</b>
<b>Abstract</b> .....	<b>2</b>
<b>Introduction</b> .....	<b>3</b>
Children and nature.....	8
Rationale for the current review.....	9
<b>Review Aims</b> .....	<b>10</b>
<b>Methods</b> .....	<b>11</b>
Design.....	11
Eligibility criteria.....	11
Search processes.....	13
Data Extraction.....	14
Quality Appraisal.....	14
Approach to synthesis.....	15
<b>Results</b> .....	<b>16</b>
Selected studies.....	16
Overview and critique.....	17
<b>Review findings</b> .....	<b>32</b>
<b>Review Question A) What are the pre- to post- NBTI changes in CYP self- reported subjective wellbeing?</b> .....	<b>32</b>
Evaluative.....	34
Experienced.....	36
Eudaimonic.....	38
<b>Review Question B) How do CYP perceive the impact of NBTIs on their subjective wellbeing?</b> .....	<b>41</b>
Evaluative.....	42
Experienced.....	44
Eudaimonic.....	45
<b>Outcome of Synthesis</b> .....	<b>47</b>
<b>Discussion</b> .....	<b>48</b>
Strengths and limitations.....	51
Clinical Implications.....	52
Research Implications.....	53
<b>Conclusions</b> .....	<b>54</b>
<b>References</b> .....	<b>55</b>

<b>Section B</b> .....	<b>66</b>
<b>Abstract</b> .....	<b>69</b>
<b>Introduction</b> .....	<b>70</b>
<b>Study aims</b> .....	<b>74</b>
<b>Methods</b> .....	<b>75</b>
Ethics.....	75
Nature-based intervention.....	75
Participants.....	76
Recruitment.....	77
Design.....	78
Data Collection.....	79
Data Analysis.....	79
Quality Assurance.....	80
Procedure .....	81
Positioning.....	81
Expert by Experience.....	82
<b>Results</b> .....	<b>82</b>
Challenging Illness Identity.....	<b>83</b>
Freedom to Choose .....	<b>87</b>
Sense of Connection.....	<b>90</b>
A Mindful Presence .....	<b>93</b>
<b>Discussion</b> .....	<b>96</b>
Overcoming Illness Identity .....	97
Freedom to Choose.....	97
Sense of Connection.....	98
A Mindful Presence .....	99
Limitations.....	100
Clinical Implications .....	101
Research Implications.....	102
<b>Conclusion</b> .....	<b>102</b>
<b>References</b> .....	<b>104</b>

<b>Section C</b> .....	<b>111</b>
<b>Appendix A:</b> Data extraction forms.....	<b>112</b>
<b>Appendix B:</b> CASP Quality Assessment Tools.....	<b>127</b>
<b>Appendix C:</b> Table of Quality Appraisal Ratings.....	<b>146</b>
<b>Appendix D:</b> Adult and Child participant Information sheet.....	<b>159</b>
<b>Appendix E:</b> Semi structured interview schedule.....	<b>166</b>
<b>Appendix F:</b> Consent and assent forms.....	<b>168</b>
<b>Appendix G:</b> Summary of research findings provided to participants.....	<b>171</b>
<b>Appendix H:</b> Sample transcript.....	<b>173</b>
<b>Appendix I:</b> Experiential statement into Personal Experiential Themes.....	<b>193</b>
<b>Appendix J:</b> Personal Experiential Themes across participants.....	<b>195</b>
<b>Appendix K:</b> Personal Experiential Themes into Group Experiential Themes.....	<b>196</b>
<b>Appendix L:</b> Bracketing Interview.....	<b>197</b>
<b>Appendix M:</b> Research Diary.....	<b>199</b>
<b>Appendix N:</b> Letter of ethical approval from Salomons ethics panel.....	<b>201</b>
<b>Appendix O:</b> IRAS NHS ethical approval.....	<b>203</b>
<b>Appendix P:</b> Submission details of journal.....	<b>206</b>
<b>Appendix Q:</b> End of study letter to Salomons ethics panel.....	<b>208</b>

## Figures and tables

<b>Table 1:</b> Inclusion and Exclusion for systematic review .....	<b>12</b>
<b>Table 2:</b> Terms used for the systematic literature search .....	<b>13</b>
<b>Figure 1:</b> Prisma Diagram .....	<b>17</b>
<b>Table 3:</b> Summary of quantitative findings.....	<b>22</b>
<b>Table 4:</b> Summary of qualitative findings .....	<b>29</b>
<b>Table 5:</b> Categorisation of wellbeing measures along wellbeing approaches .....	<b>32</b>
<b>Table 6:</b> Categorisation of themes within wellbeing approaches... ..	<b>41</b>
<b>Table 7:</b> Participant Demographic Information.....	<b>77</b>
<b>Table 8:</b> Inclusion and Exclusion criteria for participants.....	<b>78</b>
<b>Table 9:</b> Overview of group experiential themes and subthemes .....	<b>83</b>

## **Section A**

**The impact of nature-based therapeutic interventions on the wellbeing of children and adolescents: A narrative review using a systematic literature search.**

**Word count: 7956 (8568)**



## **Abstract**

**Aim:** Research suggests active engagement with nature promotes wellbeing. This narrative review based on a systematic search methodology aimed to evaluate research on nature-based therapeutic interventions (NBTIs) and their impact on children and young people's (CYP) subjective wellbeing, using evaluative, experienced, and eudaimonic approaches. **Method:** A systematic literature search was undertaken using PsychINFO, Medline, Cochrane library, Web of Science and Google scholar. Quantitative, qualitative, and mixed methods studies evaluating and exploring the impact of NBTIs on participants' subjective wellbeing were included and assessed for quality. **Results:** Fourteen studies were retrieved, including eight quantitative studies, two qualitative studies and four mixed-methods studies. Overall, twelve out of fourteen studies found NBTIs were associated with improvements in health appreciation, mood and self-esteem and were perceived by participants as having a positive impact on evaluative, experienced and eudaimonic wellbeing post-intervention. **Discussion:** Findings suggest NBTIs may improve wellbeing in CYP. However, study limitations included samples that lacked diversity and unreliable methods of data collection and analysis. **Conclusions:** Conducting randomized control trials and longitudinal studies are needed to establish a causal relationship and the long-term impact of NBTIs on subjective wellbeing. This would strengthen evidence for implementing clinical and policy-led NBTIs more widely.

Keywords: nature-based interventions, subjective wellbeing, children and young people.

## Introduction

The natural environment plays an integral role in promoting and maintaining wellbeing. This has been evidenced through a growing body of literature stemming from eco-psychology in the 1960's (Greenway, 1995). Increased technological developments over the past few decades have created a divergence from interactions with the natural world, coinciding with increasing prevalence of mental-health difficulties within the population (Aboujaoude & Starcevi, 2015). Research has shown engaging with nature can reduce such difficulties and may support self-compassion, self-esteem, and quality of life (McMahan & Estes 2015; Repke et al., 2019; Swami et al., 2020).

Previous reviews evaluating the impact of nature on wellbeing have often adopted the two-dimensional definition of hedonic and eudaimonic wellbeing (Henderson & Knight, 2012); hedonic wellbeing involving joy, satisfaction and positive affect, associated with short-term wellbeing and eudaimonic wellbeing involving fulfillment of personal goals and connection associated with long-term wellbeing (McMahan & Estes, 2011).

Although exploring diverse facets of wellbeing this definition has been criticized for failing to capture an overarching evaluation of individual wellbeing (Ryan & Deci, 2001; Ryff et al., 2021). Including subjective quality of life outcomes can support this, understanding the degree to which an individual perceives their needs to be met through the availability of opportunities and resources (Costanza et al., 2007; White et al., 2017). When needs are satisfied, individuals are increasingly likely to form resilience and contribute positively to their communities increasing wellbeing (Martela et al., 2023).

Assessing the effectiveness of interventions using quality of life outcomes, can identify

opportunities that contribute to fulfillment of needs. This can support policy and decision making allowing resources to be allocated effectively facilitating a long-term view of societal wellbeing (Diener et al., 2015; Tinkler & Hicks, 2011).

The Office of National Statistics (ONS) conceptualized three broad approaches to measuring subjective wellbeing; 'evaluative', 'experience' and 'eudaimonic' (Tinkler & Hicks, 2011; ONS; 2018). The evaluative approach refers to a global evaluation of life and health including quality of life. The experience approach refers to one's day-to-day emotional experience, including positive and negative emotions. Lastly, the eudaimonic approach comprise a sense of meaning, fulfillment, and connection. This trichotomy has been encouraged for use within wellbeing research by U.S National Research Council (Stone & Mackie, 2013), the OECD (Durand, 2015) and within recommendations published in notable journals (Graham et al., 2018). Research has identified all three approaches are positively associated with long-term physical and mental health outcomes and have been used to assess wellbeing of communities (Bullinger et al., 2014; Martin-Maria et al., 2017; Steptoe et al., 2015). Wellbeing can be difficult to measure as definitions vary cross-culturally. However, the ONS conceptualization can be flexibly applied across different populations (Kinnunen et al., 2020) and will be utilized within this review. This can support the identification of how nature-based interventions impact wellbeing, informing how they may be used (Tinkler, 2015).

The biophilia hypothesis (Wilson, 1984) states humans possess an integral sense of relatedness to nature and a predisposition to seek connection with it. This biophilic instinct is thought to arise from birth, Phenice and Griffore (2003) suggest our

relationships with nature mirror early human attachments. Nature acts as a secure base, providing safety and security, allowing individuals to develop positive emotional states, alleviating negative ones. This fosters the development of an eco-psychological self, one's identity in relation to the natural world, shaping emotional, cognitive and physical processes (Barrows, 1995, p.87). Therefore, early life may be an integral stage to nurture a relationship with nature.

There are two theories conceptualizing the natural environment's beneficial impact on wellbeing. Firstly, Ulrich's (1981) Stress Reduction Theory explains the restorative effects of nature result from human's evolving within the natural environment. Nature facilitates greater psychological and physiological benefits than urban environments, easing our stress response. Research has demonstrated visual exposure to nature in the short-term improves parasympathetic nervous system activity, promoting physical healing and psychological effects on mood, and relaxation (Moore, 1982; Sop Shin, 2007; Thompson et al., 2012; Ulrich, 1984). Secondly, Kaplan's (1989) Attention Restoration Theory suggests being in nature allows individuals to engage in 'soft-fascination', a state of effortless attention where ideas are consolidated alongside activity engagement, acquiring mental clarity and improved cognitions. This contrasts with 'hard fascination' where engaging in an activity, doesn't allow for introspection. While hard fascination can provide restoration through reducing boredom, the continual requirement of mental energy can be exhausting. The impact of nature exposure on attention- restoration has been supported in research within schools, demonstrating watching nature videos increased executive functioning and lowered stress in students (Moreno et al., 2018). Evidence has also been highlighted in forensic populations (Moran, 2019) and older adults (Neale et al., 2020). Research

suggests Ulrich and Kaplan's theories of nature engagement may be closely linked due to the bi-directional relationship between parasympathetic nervous system activation and improved selective attention to the environment (Guiliano et al., 2018; Hepburn et al., 2021).

While nature may be beneficial for some, in others it may be threatening and psychologically harmful. A biophobic affiliation to nature can result in fear towards animals or natural disasters, meaning individuals avoid nature (Khan, 1997). Evidence also shows a lack of childhood experiences in nature can result in a reduced likelihood of nature engagement in adulthood and consequently poorer mental health (Preub et al., 2019). Moreover, due to the intersections of race and class on environmental inequality, not all individuals have equitable access to nature within their local environments and may struggle to access this independently, even if they had previous positive experiences of nature (Strife & Downy, 2009). Research has identified connectedness to nature is beneficial to wellbeing, however it requires active engagement of senses, focused on biophilic values including emotion, meaning, compassion and beauty, rather than passive contact (Lumber et al., 2017).

Ecotherapy can be used as an overarching concept capturing interventions incorporating the natural world. Ecotherapy interventions aimed at improving wellbeing are commonly named nature-based therapeutic interventions (NBTIs). NBTIs can take place within green-space environments ranging from city parks to nature reserves, characterized by active exploration of the environment.

Substantial research has been carried out exploring the effects of NBTIs within healthcare and educational settings, harnessing the beneficial impact of the outdoors, delivering this within a safe and empowering environment (Stigsdotter et al., 2011).

This has supported the accessibility of nature for vulnerable individuals and consequently improved wellbeing (Overbey, 2021). Most NBTIs are structured group-based programmes, often led by professional facilitators. Types of interventions have included wilderness therapy (Berman & Davis-Berman, 2008), horticulture programs (Kamioka et al., 2014), nature-based education (Mann et al., 2021) and mindfulness programmes (Djernis et al., 2019). As NBTIs vary considerably in their delivery, this can make them difficult to interpret. However, Oh et al (2020) provides a theoretical model for the process of nature-based therapy, containing six categories which are thought to facilitate emotional and behavioral change. This includes 1) stimulation; a sense of fascination and awe within the environment, 2) acceptance; a sense of belonging, 3) purification; release from stress and negative emotion, 4) insight; self-reflection and meditation, 5) recharging; an increase in confidence and hope and 6) change; a sense of health and healing. However, further research is needed to establish a more systematic theoretical model.

Increasing concerns about the deterioration in children and young people's (CYP) wellbeing has contributed to a growing interest in the potential benefits of NBTIs for CYP (Tillman et al., 2018). CYP are reportedly feeling increasingly low in mood, anxious and lonely, with around one third of CYP receiving a mental health diagnosis across their lifetime (Merikangas et al., 2022). This coincides with increasing concerns regarding the negative impact of CYPs disengagement from the natural world. CYP born after 1995, regarded as the Internet Generation (iGen), are the first generation to grow up with advanced technology. They are spending less time in outdoor activities and more time online than their predecessors (Larson et al., 2019). Research also illustrates the Covid-19 pandemic had a significant negative impact on CYP mental

health, coinciding with increased time spent at home and online (Singh et al., 2020). CYPs wellbeing affects development, relationship formation and identity (Erickson, 1968). Therefore, supporting CYPs wellbeing early can prevent persisting difficulties in adulthood (Costello, 2016).

### The impact of nature on CYPs wellbeing

Research investigating the relationship between nature and wellbeing in CYP has been growing. Research evaluating nature-based education illustrates improved engagement and concentration within learning (Marchant et al., 2019). Self-regulation within nature has also been found to reduce stress levels in CYP (Von Kampen, 2011). CYPs wellbeing is reportedly inadequately nurtured by current educational systems (Reupert, 2019) and mental health service provision (Merikangas et al., 2022). This has generated interest in more creative approaches to improving wellbeing, particularly NBTIs. British Psychological Society (BPS) guidelines suggest NBTIs may be more effective than indoor interventions due to increasing the equity of care, promoting access and creating greater ownership of the individual within their environment (Cooley et al., 2020).

Several systematic reviews on the impact of CYPs contact with nature (Norwood et al., 2019; Tilmann et al., 2018; Vanaken et al., 2018, Weeland et al., 2019, Zhang et al., 2020) have found evidence to suggest contact with nature has a positive impact on wellbeing measures including self-esteem, stress and depression, however, defining contact with nature was variable. Many studies measured 'accessibility' to nature, quantifying local geographical greenness using measurements derived from satellite images. Therefore, how green spaces were interacted with and whether direct contact

occurred was unclear. Additionally, reviews included studies measuring 'exposure' to nature, analysing 'time spent in/near' nature, i.e. examining incidental rather than the intentional contact required to build a meaningful relationship with nature (Lumber et al., 2017). Reviews exploring active engagement in nature-based activity alongside a sustained focus on the natural environment are important to understand the true impact of nature on CYPs wellbeing. Mygind et al (2019) aimed to accomplish this by exploring a range of interventions adhering to the characteristics of 'friluftsliv', a Scandinavian practice of immersive and close engagement with nature, within CYP. It provided useful evidence on the effects of immersive nature experience in recreational, educational and health sectors. However, it utilized a broad definition of wellbeing including mental, physiological and social factors, and lacked a specific exploration of how subjective wellbeing was impacted. Roberts et al (2020) provided an insightful review exploring nature-based activities and its impact on wellbeing, highlighting a positive impact on self-esteem, affect, functioning and social resources. However, its definition of childhood and adolescence (ranging from ages 0-21), and wellbeing was broad and outcomes included indirect reports e.g. observation, rather than subjective self-reported wellbeing. It excluded some types of NBTIs (adventure therapy), providing an incomplete evaluation of the impact of current NBTIs on CYPs subjective wellbeing.

### Rationale for current review

The current review adds to and differs from previous reviews in several ways. Firstly, subjective wellbeing will be assessed based on self-reported; 'evaluative', 'experience' and 'eudaimonic' approaches (Tinkler & Hicks, 2011), allowing for a comprehensive exploration of how CYPs wellbeing is impacted by NBTIs. Secondly,



this review aims to look at both quantitative and qualitative literature to strengthen the synthesis of findings and corresponding conclusions. Thirdly, an increase in research on NBTIs over the last three years emphasises the need for an updated review of current literature. The Covid-19 pandemic has resulted in efforts to think creatively about incorporating the use of nature and green-space within public health settings (Cooley et al., 2020). By taking therapeutic work outdoors, social distancing can be maintained while continuing to facilitate face-to-face work where social connection can be built. There is growing evidence for the beneficial role of the outdoors within rehabilitation and recovery (Madsen et al., 2022), educational settings (Mann et al., 2022; Solomonian et al., 2022) and mental health services (Harper, 2021; Jimenez, 2021). However, it is not clear what aspects of subjective wellbeing are being impacted. Lastly, evaluating the impact of active rather than passive nature contact through NBTIs could contribute to the evidence base of structured replicable interventions with a wider range of applicability.

### **Review Aims:**

This review aimed to understand the impact of NBTIs on CYPs subjective wellbeing. It addressed the following questions:

- a) What are the pre- to post- NBTI changes on CYPs self-reported subjective wellbeing?
- b) How do CYP perceive the impact of NBTIs on their subjective wellbeing?

## Methods

### Design

The aim of this review was to identify how subjective wellbeing was changed and impacted following a NBTI. A narrative review was utilized allowing a textual synthesis of previously published data (Jahan et al., 2016). A goal of narrative reviews is to assess the breadth of evidence available on a subject and therefore both quantitative and qualitative literature was included to strengthen findings. There are criticisms of narrative reviews lack of adherence to systematic methods (Byrne, 2016). Therefore, the current review clearly outlines its methodological approach in how relevant literature was obtained and critically evaluated.

### Eligibility criteria

This review identified quantitative and qualitative studies evaluating the impact of NBTIs, on CYPs subjective wellbeing. Table 1 lists the inclusion and exclusion criteria, based on the PICO framework supporting a systematic and consistent approach to study selection (Eriksen, 2018). CYP who were below the age of 18 years (Lansdown & Vadhri, 2022) were included in the study. Studies involving both CYP and adults (those aged 18+ years of age) would be included if analysis and results of under 18's were presented separately, however no such papers were identified. Studies on blue space interventions, involving water-based activities, were also excluded. Haeffner et al (2017) argues blue space interventions are often used for different aims, measure different outcomes and offer different sensory experiences than green space interventions. They cover a large literature base, and would be more appropriate for analysis in a separate review. Including quantitative studies with only a pre-post

design, allows a direct examination of the impact of NBTIs on wellbeing over time.

Studies evaluating outcome measures unrelated to subjective wellbeing approaches (Evaluative, Experienced, Eudaimonic), e.g. cortisol levels, physical health or cognitive performance were excluded.

**Table 1.**

*Inclusion and exclusion criteria*

<b>Inclusion</b>	<b>Exclusion</b>
<ul style="list-style-type: none"> <li>• Participants under 18 years old</li> <li>• Direct and active exposure to green space</li> <li>• Quantitative and qualitative studies evaluating pre-post intervention or follow-up data collection</li> <li>• Studies with or without a control group</li> <li>• Studies evaluating self-report outcomes of subjective wellbeing relating to evaluative, experienced and eudaimonic approaches.</li> <li>• Available in English language</li> <li>• Studies from any country</li> <li>• Published in peer reviewed journal</li> </ul>	<ul style="list-style-type: none"> <li>• Participants outside of specified age range</li> <li>• In-direct or passive exposure to nature</li> <li>• Quantitative studies without pre-post study design</li> <li>• Blue space interventions</li> <li>• Quantitative outcomes unrelated to subjective wellbeing approaches and non-self-report outcomes</li> <li>• Dissertation, abstracts or book chapters</li> </ul>

## Search Process

A systematic literature search was carried out across four electronic databases (PsychInfo, Medline, Cochrane Library and Web of Science) in September 2022, using search terms set out in Table 2. The review adopted Tinkler & Hicks (2011) conceptualization of subjective wellbeing, including evaluative, experienced and eudaimonic approaches. This was reflected in the search terms, including aspects of life evaluation, positive and negative emotions and belonging and connection. To organize and generate search terms, review questions were separated into essential concepts such as nature, wellbeing, and CYP. Each concepts definition was examined, and a list of related terms and phrases were generated. Controlled vocabulary was identified from a series of database searches from which search terms were refined or added, to improve effectiveness. There were no parameters set on year of publication. This ensured the inclusivity and comprehensive examination of all relevant literature on the topic.

**Table 2.**

Terms used for the systematic literature search

garden* or green* or green space* or horticultur* or open space or outdoor* or natural environment or environmental volunteering or nature* or nature based therap* or nature-based*	AND well-being or wellness or quality of life or satisfaction or mental health or mental-health or emotion* or emotional health or psychological* or depress* or happiness or pleasure or	AND child* or youth* or teen* or adolescent* or young* or school* or school-age.ab
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or nature-play or park\* or stress or mood or anxiety or  
allotment\* or eco therapy self\* or self- esteem or  
or eco-therapy or wild play connection or belonging.ab  
or wilderness\* or  
wilderness therapy or  
wilderness-therapy or  
care-farming or care  
farming or farm therapy or  
farm-therapy or forest\* or  
forest-bathing or forest-  
schooling.ti

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### **Data extraction**

A data extraction form (Appendix A) was used to extract relevant information from the papers. This form was based on Cochrane's data collection form for intervention reviews (Higgins et al., 2021). Qualitative data was extracted along four fields; context and participants, study design and methods used, main findings and quality of findings.

### **Quality appraisal**

The synthesis of findings was supported by a rigorous quality appraisal process, identifying strengths and limitations within the studies. The quality appraisal informed the synthesis by highlighting areas of inconsistency and bias, facilitating a critical interpretation of findings and informing the conclusions drawn. Therefore, providing a more comprehensive understanding of the literature and increasing credibility of the findings.

To assess the quality of the studies, the Critical Appraisal Skills Programme (CASP) checklists (Singh, 2013) for quasi-experimental case-control studies, pre-to-post single-case studies, randomized control trials (RCTs) and qualitative studies were used (Appendix B). These checklists support the methodological critique of studies and have been validated for evaluative use. The CASP checklists do not provide a scoring system or method to quantify the evaluation of quality. Quality appraisal tools offering numerical ratings have been critiqued for their reductive nature and failing to identify nuance in methodological strengths and weaknesses. For example, two studies could have the same numerical rating however represent different methodological limitations carrying unequal weight (Zeng et al., 2015).

Most studies assessed by the CASP checklist (Singh, 2013) were concluded to hold various weaknesses, with the exception of Johnson et al (2020) and Fernee et al (2019, 2021) which were predominantly methodologically robust. Most studies were found to rate highly on clear aims, outcome measurement, data analysis and implications. Whereas components including participant recruitment, use of control, and follow up were commonly rated as weak. A more detailed exploration of the methodological issues and critiques can be found in the results and discussion section.

### **Approach to synthesis**

Data was extracted and synthesized using a textual narrative synthesis (Popay et al., 2006) due to its strengths in facilitating the discussion of both quantitative and qualitative literature (Jahan et al., 2016). A meta-analysis of quantitative data was not

carried out due to the heterogeneous nature of studies, which used several NBTIs and outcome measures. Similarly, a meta-synthesis of qualitative data was not used due to lack of richness and limited studies using a rigorous qualitative methodology.

Quantitative findings were synthesized separately to qualitative findings. Results from quantitative studies were categorised according to the aims of each wellbeing approach; evaluative, experienced and eudaimonic. This was carried out by examining each outcome measure, assessing concepts measured and reviewing subscales and individual items, before being categorised. Outcome measures with items relating to different approaches, were categorized based on the approach the majority items favored within the outcome measure (Table 5). Themes and subthemes generated in qualitative studies were examined and categorized according to the aims of each wellbeing approach. If a theme overlapped with more than one approach, examples pertaining to each approach would be synthesised and discussed in their related section. Themes found unrelated to any approach were not categorised. The categorisation of all outcome variables and themes were discussed with research supervisors to reach a consensus (Table 6).

## **Results**

### **Selected studies**

A total of 2379 papers were identified from journal databases. A PRISMA flow diagram visually summarises the screening process (Page et al., 2021) in Figure 1. All identified papers were screened for duplicates. Titles and abstracts were screened against inclusion and exclusion criteria listed in Table 2. A total of 116 papers were

reviewed in full (four papers were not retrievable), of which 11 were deemed suitable to be included in the review. Google scholar searches identified a further eight papers, two of which met inclusion criteria, resulting in a total of 13 papers. Papers will be cited using first author and year only.

## **Overview and critique of studies**

### Countries

Studies were carried out across the United States ( $n= 4$ ), United Kingdom ( $n = 3$ ), Western Europe ( $n= 3$ ), East Asia ( $n= 1$ ) and Oceania ( $n= 2$ ). Twelve of the 13 studies were based in Westernized countries, suggesting results may be most applicable to the population, culture and demographics pertaining to these countries. However, three had a majority of BAME participants (Sprauge, 2020; Sprauge 2022; Swank, 2015), therefore findings of these studies may allow for greater transferability beyond White Western communities.

### Design

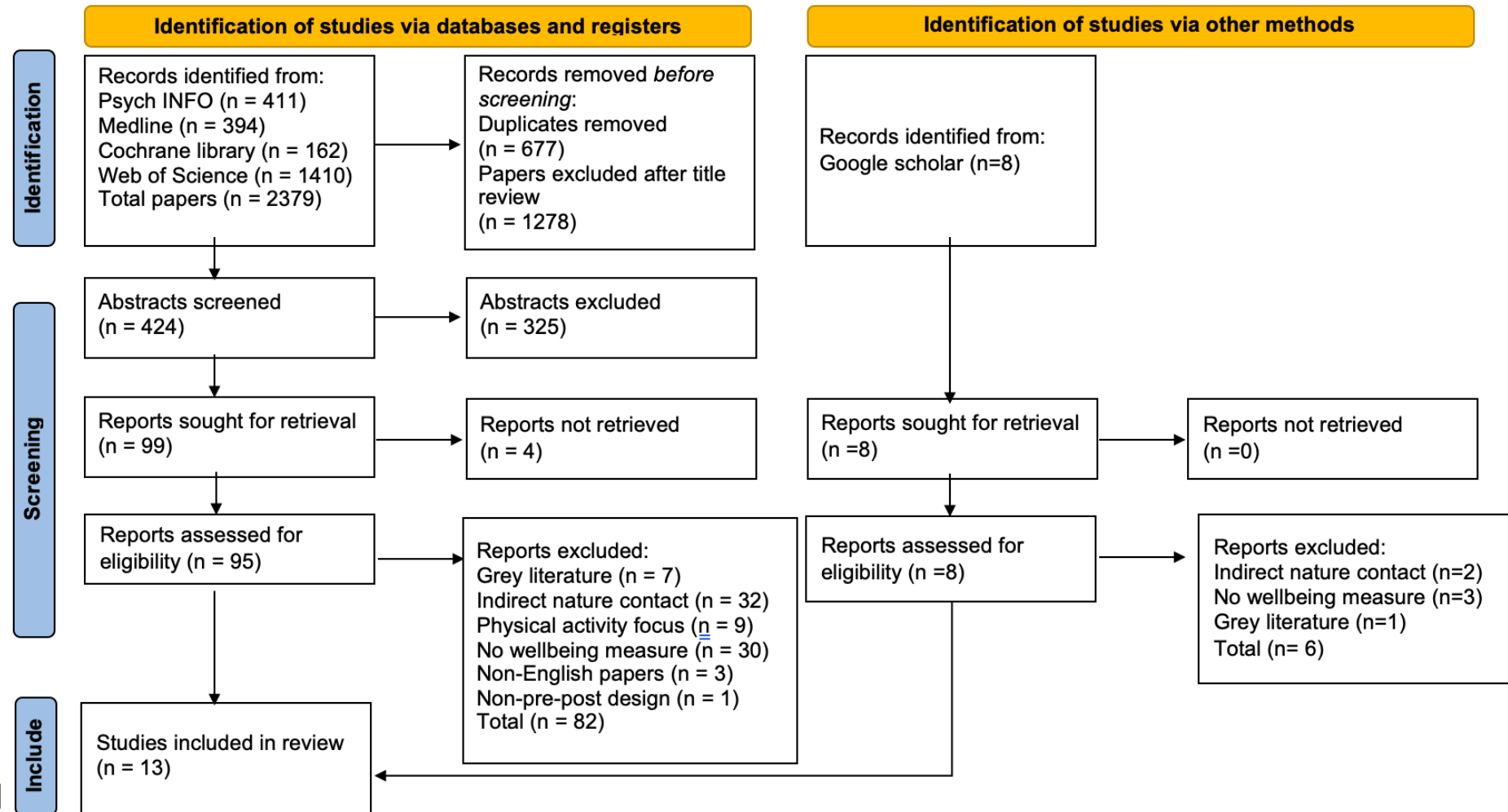
Seven papers were quantitative including both quasi-experimental case-control studies (Sprauge, 2022), pre-to-post single-case studies (Barrable, 2021; Barton, 2016; Bowen, 2016; Johnson, 2021; Rose, 2018) and one RCT (Kang, 2021). Four pre-to-post single-case studies used mixed quantitative and qualitative methods (Chiumento, 2018; Gabrielsen, 2018; Sprauge, 2020; Swank, 2015) and two used a qualitative methodology (Fernee, 2019; Fernee, 2021). Only two studies (Kang, 2021; Sprauge, 2022) utilised a control group of either indoor-based activities or passive nature exposure, which allowed the effects of NBTI to be isolated and observed. Therefore, it was not possible to make causal inferences.



### Intervention

The duration of NBTI ranged from half a day to weekly across six months. Types of NBTIs included wilderness therapy ( $n= 7$ ), horticulture and gardening programs ( $n= 2$ ), nature-based education ( $n= 2$ ), outdoor art therapy ( $n= 1$ ) and outdoor mindfulness programs ( $n= 1$ ). Wilderness therapy can be a standardized program ranging from 8-10 weeks (Crisp, 1998). A range of outdoor settings were used to facilitate the NBTIs such as parks, farms, forests, school gardens, game reserves. A range of activities were completed in each setting such as walking, hiking, canoeing, rock climbing, camping, sensory exercises, group team-building, and gardening. The heterogeneity within intervention length and activities completed, may result in difficulty providing meaningful conclusions about the effectiveness of NBTIs or generalizing findings to other populations.

Figure 1. PRISMA flow diagram screening process



### Sample

Sample sizes ranged from 10 to 816. While the age of participants ranged from five years old to 18 years-old, most studies (eight out of 13) were conducted with CYP between 12-18 years old. Therefore, results of this review may be more pertinent to the adolescent population than younger children. Participants' gender was reported in most studies (10 out of 13) and males and females were mostly evenly represented. Most studies utilised convenience sampling, increasing the risk of selective sampling bias. Participants and their families had to commit to NBTIs potentially taking weeks or longer. This risks selection bias, as consenting participants may have an underlying interest and hold positive views of nature engagement. This risks an overestimation of NBTIs effectiveness, impacting the validity and generalizability of findings. Many studies recruited participants within one school or mental-health setting in a fixed geographical location, limiting the transferability of findings.

### Data collection

Ten quantitative studies collected pre-post intervention data but only three (Gabrielsen, 2018; Johnson, 2021; Rose, 2018) included a follow-up, limiting conclusions to be drawn regarding the sustained impact of NBTIs. Although high levels of adherence to the NBTI were reported, studies were subject to incomplete data with an average attrition rate of 28%. Potential differences between remaining sample and drop-outs were not evaluated and therefore may act as confounding variables. Only two of the six qualitative studies (Fernee, 2021; Gabrielsen, 2018) followed up participants' one-year post-intervention illuminating perceived sustained impact of the NBTI. Twenty-eight different measures of wellbeing were utilised across studies, meaning results were highly heterogeneous. Some researchers used adapted or simplified versions of measures not validated for use with CYP or lacked

psychometric robustness (Chiumento, 2018; Rose, 2018), impacting the validity of results. Some qualitative studies presented sources of bias within data collection. Three studies (Chiumento, 2018; Sprauge, 2020; Swank, 2015) used focus groups to collect data, therefore risking participants being influenced by peer presence, influencing adherence to socially acceptable opinions (Bergen & Labonte, 2020). Swank's (2015) group facilitator was also the interviewer which may have challenged participants to share less positive views.

### Data analysis

Only five quantitative studies presented effect sizes within their results. This omitted important information regarding the strength of relationships between variables, differences between groups and the practical significance of the findings. Bowen (2016) only utilised a confidence interval of 90% possibly due to a small sample size. Within qualitative studies, Swank (2015) did not audio record interviews, which may have increased the risk of noting inaccurate data and errors in the interpretation. Chiumento (2018) did not include direct quotes from participants. This limited insight into the individual meaning participants made from their experience. None of the studies reported whether they gathered feedback from their participants to validate the emerging themes. Tables 3 and 4 summarise quantitative and qualitative findings, respectively, and include a summary of the study limitations elaborated on below. See Appendix C for a summary of the studies' quality evaluation based on the CASP tool (Singh, 2013).

**Table 3.***Summary of quantitative findings*

	<b>Lead author year country</b>	<b>Aim</b>	<b>Design</b>	<b>Intervention</b>	<b>Sample</b>	<b>Wellbeing measure</b>	<b>Main wellbeing outcomes</b>	<b>Effect size</b>	<b>Limitations</b>
1	Bowen 2016  AU	To examine the effects of wilderness therapy for adolescents with mental health difficulties	Cohort study. Pre, post, follow up design	Wilderness adventure therapy. 10-week program of 7 day activities, 2- day overnight and, 5-day expedition	$n=36$  $n$ (%) male: 15 (42) female: 21 (58)  Age: 12-18 $M = 14.6$ ; $SD = 1.6$	Beck Depression Inventory-II (Beck et al., 1996)  Youth self- report behavioural and emotional functioning (Achenbach, 1991)  Coopersmith Self-esteem Inventory (Coopersmith, 1981)  Resilience Questionnaire (Crisp, 2001)	Moderate to large statistically significant improvements in resilience, social self-esteem $p < 0.10$ . Retained at 3 month follow up.  Significant improvements in behavioural and emotional functioning and significant reduction in depressive symptomology for participants in clinical ranges $p < 0.10$ . Retained at 3 month follow up.	Social self-esteem ( $d = .26$ ) follow up ( $d = 0.6$ )  Resilience ( $d = .49$ ) follow up ( $d = -.30$ )  Behavioural and emotional ( $d = .7$ ) and follow up ( $d = .02$ )  Depression ( $d = .8$ ) and follow up ( $d = .03$ )	No control or comparison group. Longer term follow-up needed. 24% data values missing. Non-validated questionnaires (resilience, family functioning). 90% CI.

2	Barton 2016  UK	To measure the impact of wilderness expeditions on self-esteem (SE)	Cohort study. Pre, post design	63% participants took part in Wilderness expedition in South Africa  37% participants took part in Wilderness expedition in Scotland  Both ranged from 5-11 days	n=130  n (%) male: 57 (43) female 75 (57)  Age: 11-18	Rosenberg Self-Esteem Scale (Rosenberg, 1965)	Statistically significant increases in self-esteem and connectedness to nature following both expeditions. $p < 0.001$ .  Female self-esteem increased most. Interaction effect of expedition and gender $p < 0.05$	Not reported	No control group. No follow up. Effect size and power analysis not performed. Risk of ceiling effect. Healthy participants used, so unclear how children with MH difficulties would respond to intervention. Recruitment process unclear.
3	Rose 2018  AU	To examine the extent to which participation in structured outdoor programs is associated with improvements in adolescent health and well-being.	Cohort study. Repeated baseline and post-program design	Structured outdoor program  School 1 (9-day camp)  School 2 (5-day camp)  School 3 (3-day hiking)	n=160  n (%) male: 61 (38) female: 99 (62)  22% attrition  Age: 13-17 M= 15.0; SD = .46	The Generalized Self-efficacy scale (Schwarzer & Jerusalem, 1995)  Early Adolescent Temperament scale (Ellis & Rothbart, 2001)  Hemingway Measure of Adolescent Connectedness (Karcher, 2003)  The Nature Relatedness Scale (Nisbet et al., 2009)	Statistical significant changes on indicators fear and self-efficacy $p < 0.001$ and peer and school connectedness $p < 0.04$ .  No changes for depression, aggression, well-being, friend connectedness, teacher connectedness, or nature connectedness.	Not reported	No control group. Longer follow up needed. Abbreviated wellbeing measures used lacked reliability and validity. 45%, 70% and 61% data completion. Effect size and power analysis not performed, however large sample used.

4	Barrable 2021  UK	To examine how mindful engagement with nature can promote both nature connection and positive affect.	Cohort study. Pre, post, design	3 mindful activities (listening to nature sounds, mindful visualisation, role playing animal game) 1 day, 2 and half hours	n=74 n (%) male: 29 (48) female: 33 (44) no data: 12 (8)  Age: 9-10 M= 9.51	Positive Affect, Negative Affect Scale for Children (Laurent et al., 1999)  Nature Connection Index (Richardson et al., 2019)	Positive affect significantly increased post-activity $p>0.001$  Negative affect showed a small decrease $p<0.01$  NCI also significantly increased $p>0.001$	Small to medium size effect for positive affect ( $r^2=0.13$ )  Small sized effect drop in negative affect ( $r^2=0.02$ ).  NCI small to medium sized effect ( $r^2=0.23$ )	No control therefore unclear whether positive changes result of mindfulness or the outdoors. No opportunity for randomisation. Follow up was planned but unable to be completed due to covid-19. Convenience sampling. Intervention varied slightly across 4 schools.
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5	Johnson 2021 US	To evaluate how wilderness therapy impacts psychological functioning in adolescents with trauma	Cohort study. Pre, post, follow up design	Trekking expedition 80 days (10-12 weeks) across 2009-2019	n=816 n (%) male: 481 (59) female: 334 (41) Age: 13-17 M=15.36, SD = 1.25	Youth Outcome Questionnaire (Wells et al, 2003)	Significant reductions in overall distress $p < 0.001$ .  4 out of 7 self-reported benefits maintained at 6 months' post-discharge. This included emotional distress, somatic distress, relational problems, social behaviors and dysfunction $p < 0.001$ . 1 year post discharge one benefit was maintained. social behaviors $p > 0.001$ .	Total distress; effect size large ( $d = 0.83$ ).  6 month; Effect sizes medium to large ( $d = 0.38-0.95$ ).  1 year; Effect size large = ( $d = 0.94$ )	No control or comparison group. Low response rate for post discharge questionnaires. Convenience sampling.
6	Kang 2021  KR	To examine how a nature-based art therapy program impacts stress and self-esteem in adolescents	Cohort study. Pre, post, design	8 weekly outdoor art therapy sessions lasting 60min each	n=29 n (%) male: 18 (62) female: 11(38)  19.4% attrition  Art therapy= 18  Control (passive nature exposure) = 11	Daily Hassles Questionnaire (Hans, 1996) adapted for children.  The Self-esteem scale (Choi and Jeon 1993)	Statistically significant increases for stress scale post intervention across all subscales $p < 0.05$ .  Self-esteem also significantly increased post intervention, however only on sub-items of overall self-esteem and social self-esteem $p < 0.05$ .  No statistical significance for self-esteem at home or in school. No statistical	Not reported	Relatively small sample size. There was a high attrition rate in the control group, impacting the generalization of study implications. Sample located from one setting therefore limit to generalisability.



					Ages: 7-13		significant changes observed in control group.		
7	Sprague 2022  US	To evaluate the impact of a nature-based education intervention on health-related quality of life of low-income youth.	Quasi-experimental	15-week nature education (classroom) alongside field trips  Control: Usual school activities	n=362  n (%) male: 175 (52) female: 160 (48)  I: 297 C: 65  Age: 9-15 M=11.9; SD= 1.0  90.7% Black 9.3% Other	Health Related Quality of Life (Wasson et al., 1994)	Intervention group demonstrated statistically significant improvements in each HRQoL domain, whereas the control group demonstrated statistically significant reductions in each HRQoL domain. All statistically significant p<0.001	Not reported	No randomisation. No follow up. Limited generalisability as focussed on students in specific geographical location. Social desirability when answering questions as participants were not blinded to study aims.
8	Sprague 2020	To examine the health and educational outcomes of a nature-based education intervention for urban low-income, non-white children	Cohort study. Pre, post design	15-week nature education (classroom) alongside field trips.	n=122  n (%) male: 61 (50) female: 61 (50)  Age: 9-15 M=11.9; SD= 1.0	Health Related Quality of Life (Wasson et al., 1994)	Significant improvements in all HRQoL domains p<0.05. HRQoL scores improved by 46%. Emotional health functioning increased p<0.001. School functioning increased p<0.001. Family functioning increased p<0.001.  Older children (12-15) larger improvements than younger children (10-11)	Not reported	No follow up or control group. Limited generalisability as focused on students in specific geographical location. Social desirability when answering questions as participants were not blinded to study aims.

9	Swank, 2015  US	To explore the use of a garden group counselling intervention to address children with mental health difficulties, self-esteem.	Cohort study. Pre, post design	Gardening counselling group. 1 hour weekly, for 6 weeks.	n=31  n (%) male: 26 (84) female: 5 (16)  Age: 5-12  71% Black, 23% White, 3% Hispanic, and 3% Other	Piers-Harris Children's Self-Concept Short Scale (Piers & Herzberg, 2002)	Significant improvements in self-concept among participants following group p<.05. Both younger (5-7) and older (8-12) children significantly improved self-concept and increased behavioural adjustment over time p<.05	Not reported	Selective sampling bias. No control, no longitudinal follow up. Four children in study who were outside the range of norming. Lack of representativeness due to small sample and lack of generalisability to other racial/ethnic groups. Effect size and power analysis not performed.
10	Chiumen to 2018  UK	To understand the impact of a therapeutic horticulture intervention on the mental wellbeing on children with mental health difficulties	Cohort study. Pre, post design	School-based therapeutic horticulture intervention. 2 hours monthly for 6 months	n= 36  n (%) male: 22 (61) female: 14 (39)  Age: 10-11 (n= 12) 9-11 (n=12) 11-14 (n=12)	Wellbeing Check Cards based upon the 7-item Warwick-Edinburgh Mental Well-being Scale (Stewart-Brown et al., 2009)	No statistically significant improvement in wellbeing post-intervention. Overall lower wellbeing scores across domains.	Not reported	No follow up or control group. Wellbeing check cards were not a validated and deemed limited in its ability to detect change over time and Warwick-Edinburgh Mental Well-being Scale not validated against sample age group. Timing of measure during first and last intervention sessions may have impacted validity of results.

11	Gabrielsen 2018  NO	The effectiveness of a wilderness therapy intervention for adolescents within a mental health care setting.	Cohort study. Pre, post, follow up design	Wilderness therapy. 8 single days and 2 overnight trips of 3 and 6 days over 8- 10 weeks.	n= 32 n (%) male: 11 (34) female: 21 (66)  39% attrition  Age: 16-18 M= 16.5; SD=0.57	Sense of coherence (Antonovsky, 1993)  General Perceived Self-Efficacy (Schwarzer & Jerusalem, 1995)  Satisfaction with Life Scale (Diener et al., 1985)  Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983)  5 Facet Mindfulness Questionnaire (Baer et al., 2006)  Life Effectiveness Scale (Neill et al., 2003)	No statistically significant changes in pre- post outcomes.  However, life effectiveness and depression improved in one year follow up $p < 0.01$ as well as anxiety, self-efficacy and sense of coherence $p < 0.05$ .	Effect size moderate $d = 0.49$	No control group. Considerable attrition. Heterogeneous sample. Severity of mental health difficulties was varied and not controlled for, due to small sample size and lack of statistical power to perform analysis. Lengthy measures used may have resulted in participant fatigue. Multiple t-tests used so increased chance of type 1 error.
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**Table 4.***Summary of qualitative findings*

<b>No</b>	<b>Lead author, year</b>	<b>Aim</b>	<b>Sample</b>	<b>Method and analysis</b>	<b>Main findings</b>	<b>Limitations</b>
8	Sprauge, 2020  US	To explore health and educational impact of a nature-based education intervention for urban low-income, non-white children	n=122  n (%) male: 61 (50) female: 61 (50)  Age: 9-15 M=11.9 ; SD= 1.0	10 focus groups for each classroom (10-25 children) lasting 30 minutes. Thematic analysis.	Seven themes:  1. Engaging Learning Environment (26%)  2. Promoting Environmentally Conscious Decisions (39%)  3. Family Engagement (6%)  4. Promoting Healthy Behaviors (6%)  5. Promoting Physical Activity (9%)  6. Leadership and Team Building Skill Development (4%)  7. Academic Support and Mentorship (10%).	Risk of bias as socially acceptable opinions may emerge due to peer presence. Unable to explore individual experience in depth. Lack of information on role of interviewer and considerations of potential bias.
9	Swank, 2015  US	To explore children's perceptions of their experience within the garden group counselling intervention	n=31  n (%) male: 26 (84) female: 5 (16)  Age: 5-12	Following each session, participants created drawings and discussed them with group staff in unstructured group interviews. Phenomenological analysis.	Three themes:  1. Knowledge about nature, gardening, and plants  2. Participants' moods and feeling calm and happy  3. Social skills and learning to work together	Purposive sampling bias. Possible social desirability bias due to researcher being group facilitator. Discussions not recorded therefore notes may lack accuracy.

10	Chiumento, 2018  UK	To explore children with mental health difficulties subjective experience of a therapeutic horticulture intervention	n=36  n (%) male: 22 (61) female: 14 (39)  Age: 10-11 (n= 12) 9-11 (n=12) 11-14 (n=12)	Mental Wellbeing Impact Assessment (MWIA). Two, 2-hour workshops pre-and post-intervention. The MWIA consisted of children developing a definition of wellbeing, and plotting wellbeing factors within 3 domains, according to their importance and impact the intervention had on each one. The MWIA was analysed thematically.	Three themes: <sup>30</sup>  1. 'Enhancing Control' - an increase in self-help.  2. 'Increasing Resilience' - an increase in emotional wellbeing.  3. 'Participation and Social Inclusion' - an increased sense of belonging.	Use of the adult terminology for MWIA factors raises questions about how these were understood by children. Lack of adaptation. Unable to explore individual experience in depth.
11	Gabrielsen, 2018  NO	The explore adolescents within a mental health care settings subjective experience and perceived outcomes of a wilderness therapy intervention	n=12  n (%) male: 5 (42) female: 7 (58)  Age: 16-18	Participant observation and two rounds of semi-structured interviews taken at both post and 12-month follow up data collection. First two stages of critical realist model as guideline for analysis (initial description and analytical resolution).	Two themes:  1. Influential processes at the time of the post-test.  2. Post-treatment processing and perceived positive effects of intervention.	Volunteer sampling may have resulted in respondents who had positive experiences of the outdoors. Although, participants described substantial variability in their experiences of the intervention. Lack of in-depth analysis and interpretation.

12	Ferneer, 2019  NO	To explore the therapeutic mechanisms underlying a wilderness therapy intervention for adolescents	n=14  n (%) male: 6(43) female: 8 (57)  22% attrition  Age: 16-18	Participant observation. Semi-structured interviews 2-4 weeks after. Critical realist analysis.	<p style="text-align: center;">31</p> <p>Three themes and eight subthemes:</p> <ol style="list-style-type: none"> <li>1. The Wilderness; a) Venturing Outdoors, b) From Chaos to Calm, c) Disconnect to Reconnect.</li> <li>2. The Self; a) Physical Feat, b) Body Mind Restructuring.</li> <li>3. The Psychosocial Self; a) Group Synergy, b) Vulnerability and Support, c) Therapy the Natural Way.</li> </ol>	2 clinical groups interviewed; those in treatment and those awaiting treatment, therefore high degree of variability and lack generalisability to other clinical populations. Critical realist analysis is value-laden, however multiple researchers involved in analysis.
13	Ferneer, 2021  NO	To explore the perceived outcomes of a wilderness therapy program for adolescents one year following the intervention	n=10  n (%) male: 4 (40) female: 6 (60)	Semi-structured interviews, 12 months following (Ferneer et al., 2019) interview. Critical realist analysis.	<p>Six themes:</p> <ol style="list-style-type: none"> <li>1. The Nature Remedy: new perspectives and strategies.</li> <li>2. All Shook up or Shaking it off: on emotional regulation.</li> <li>3. Body Mind Insight: stabilizing dynamics.</li> <li>4. Acceptance of Self: a source of confidence and patience.</li> <li>5. Isolation to Socialization: crossing that 'mountain'.</li> <li>6. Re-establishing Agency: becoming one's own person.</li> </ol>	Critical realist analysis is value-laden. Same lead researcher in study, therefore to mitigate allegiance effects two co-others represented an outsider perspective during analysis. Impact on memory and heavily layered interpretations when reflecting on experiences one year later.

## Review findings

This review aimed to understand the impact of NBTIs on CYPs subjective wellbeing. Firstly, quantitative review findings relating to review question A will be discussed. Each section is structured by each wellbeing approach (evaluative, experienced and eudaimonic) and further categorised according to NBTI type. Secondly, qualitative review findings relating to review Question B will be discussed and structured in the same way, including illustrative quotes from the papers.

### Review Question A) What are the pre- to post- NBTI changes in CYP self-reported subjective wellbeing?

To examine pre-post changes in wellbeing, results from quantitative studies were divided along three subjective wellbeing approaches; Evaluative (n=3), Experienced (n=8) and Eudaimonic (n=13) (See Table 5).

**Table 5.**

*Categorisation of wellbeing measures along subjective wellbeing approaches*

Study	Evaluative	Experienced	Eudaimonic
<b>Bowen (2016)</b>		Beck Depression Inventory-II (Beck et al., 1996) Youth self-report behavioural and emotional functioning (Achenbach, 1991)	Coopersmith (1981) Self-esteem Inventory Resilience Questionnaire (Crisp, 2001)

<b>Barton (2016)</b>		Rosenberg Self-Esteem Scale (Rosenberg, 1965)
<b>Rose (2018)</b>	The Early Adolescent Temperament Scale (Ellis & Rothbart, 2001)	The Generalised Self-Efficacy Scale (Schwarzer & Jerusalem, 1995) Hemingway Measure of Adolescent Connectedness (Karcher, 2003) The Nature-relatedness Scale (Nisbet et al., 2009) Ryff Wellbeing Scale (Ryff & Keyes, 1995)
<b>Barrable (2021)</b>	Positive Affect, Negative Affect Scale for Children (PANAS-C) (Laurent et al., 1999)	The Nature Connection Index (NCI) (Richardson et al., 2019).
<b>Johnson (2021)</b>	Youth Outcome Questionnaire (Wells et al, 2003)	
<b>Kang (2021)</b>	Daily Hassles Questionnaire (Hans, 1996) adapted for children.	The Self-Esteem Scale (Choi & Jeon 1993)
<b>Sprauge (2022)</b>	Health Related Quality of Life (Wasson et al., 1994).	
<b>Sprauge (2020)</b>	Health Related Quality of Life (Wasson et al., 1994).	



<b>Swank (2015)</b>			Piers-Harris Children's Self-concept Short Scale (Piers & Herzberg, 2002)
<b>Chiumento (2018)</b>			Wellbeing Check Cards based on Warwick Edinburgh Mental Wellbeing Scale (Stewart-Brown et al., 2009).
<b>Gabrielsen (2018)</b>	Satisfaction with Life Scale (Diener et al., 1985)	Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983) 5-facet Mindfulness Questionnaire (Baer et al., 2006)	Sense of Coherence Scale (Antonovsky, 1993) General Perceived Self-Efficacy Scale (Schwarzer & Jerusalem, 1995)

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## Evaluative wellbeing

Three studies reported the effects of three types of NBTIs, on an evaluative wellbeing.

### Wilderness adventure therapy

Gabrielsen's (2018) study evaluated an 8-10 week wilderness therapy intervention for CYP within a mental health service. Measures of Satisfaction with Life (Diener et al., 1985) and Life Effectiveness (Neill et al., 2003) were administered before, after and at one-year follow up. Although life satisfaction and all other measures saw no significant improvements following the intervention, life effectiveness improved with a medium effect size of  $d=0.49$  at one-year follow-up. During this period, there may have been other contributing factors to change such as accessing alternative service treatment, or

natural improvement over time. The highest scoring item stated, 'I enjoy my spare time' yielding a large effect size of  $d=0.86$ . However, the 39% attrition rate suggests the follow-up sample may not be representative of the total sample.

### Nature-based education

Sprauge (2020; 2022) evaluated a 15-week nature-based education program and measured evaluative wellbeing using HRQoL (Wassen et al., 1994). Sprauge (2022) found the intervention group had significantly higher HRQoL scores than the control group completing usual school activities post-intervention, controlling for pre-intervention scores, all at  $p<0.001$ . Sprauge's (2020) uncontrolled study reported HRQoL scores improved significantly pre-post intervention ( $p<0.05$ ). Older children aged 12-15 had larger pre-post improvements than the 10-11 year-olds. Although the study did not report effect sizes, they used a large sample.

### Summary and synthesis

All three studies found significant pre-post intervention improvements within the evaluative wellbeing, suggesting NBTI may provide an opportunity for greater satisfaction with life in clinical and non-clinical populations. The results are somewhat weakened by Gabrielsen's (2018) high attrition rate. Sprauge (2020; 2022) reported strong significant results, however generalisability of the findings is limited due to using homogenous samples from one area. The lack of studies using control groups limits the conclusions drawn as to whether pre-post changes are attributable to NBTIs.

## Experienced wellbeing

The impact of NBTIs on an experienced wellbeing was examined by six out of 11 quantitative studies across four NBTI types.

### Wilderness adventure therapy

Bowen (2016) found following a 10-week program pre-post intervention changes were large and significant (effect size  $d=0.80$ ) among participants with a clinical presentation of depression but not significant for non-clinical participants. At three-month follow-up, positive changes in the clinical group were retained. However, Gabrielsen (2018) found no significant pre-post differences in anxiety or depression post-intervention or at 12-month follow up. The authors reported potential post-intervention processes influencing data collection, as participants reported sadness the NBTI had ended and some experienced mental-health setbacks. Therefore, post-tests may have been administered prematurely. The study also had a high attrition rate at follow-up (39%). Rose (2018) evaluated a one-two-week programme in healthy school children, utilizing a repeated baseline and post program design and found no significant pre-post changes in depression.

Bowen (2016) found significant improvements in participants with clinical levels of behavioural and emotional difficulties post-intervention (moderate to large effect size  $d=0.7$ ), with gains retained at three-month follow up. Findings were not significant for non-clinical participants. Rose (2018) found significant changes in adolescent temperament pre-post intervention within fear and anxiety subscales ( $p<0.001$ ), suggesting students had opportunities to work through fears during NBTI. However, the study did not utilise a follow up to evaluate longitudinal changes. Johnson (2021) utilised the Youth Outcome Questionnaire (Wells et al., 2003) evaluating emotional

and behavioural outcomes following a 10-12- week program. Adolescents reported a reduction in distress pre-to post program, with a large effect size  $d=0.83$ . At six-month follow up changes on four out of seven sub-scales were maintained, with effect sizes ranging from moderate  $d=0.38$  to large  $d=0.95$ . Social behaviors were the only sub-scale maintained at one-year post discharge (large effect size  $d=0.94$ ). Although the study had no control or comparison group it used valid and reliable wellbeing measures, administered reliably pre-and post-intervention and follow-up. It employed a large enough sample to detect changes and participants were recruited from more than one setting. This allowed results to be more generalisable.

### Mindfulness

Barrable (2021), evaluated the impact of a three-hour outdoor mindfulness programme across four schools on positive and negative affect. Positive affect significantly increased pre-post intervention with a small to medium effect size ( $r^2=0.13$ ). There was a small significant pre-post intervention reduction in negative affect ( $r^2=0.02$ ). There was no control or follow-up therefore long-term retention of these changes was unclear and causal relationships cannot be inferred. The intervention had a moderate sample over four schools which increased generalisability.

### Art therapy

Kang (2021) utilised the Daily Hassles Questionnaire (Hans, 1996) evaluating the impact of an eight-week outdoor art-therapy program on stress. Self-reported stress significantly reduced pre-post intervention across all subscales ( $p<0.05$ ). No significant changes were observed in the control group. The study randomized allocation to groups, however suffered from high attrition in the control group (19.4%)

and had a low sample size. Therefore, findings could be coincidental and must be interpreted with caution.

### Summary and synthesis

Five out of six studies found significant pre-post intervention improvements in experienced wellbeing. Only Bowen (2016) and Johnson (2021) evidenced sustained changes at follow-up. Within wilderness therapy, depression only improved for participants experiencing clinical levels, although mindfulness and art-based NBTIs improved positive and reduced negative affect within non-clinical populations. This suggests NBTIs may have differential effects for clinical versus non-clinical populations. A lack of control groups means between-group differences cannot be observed and pre-post changes may not solely be due to NBTIs.

### **Eudaimonic wellbeing**

Eudaimonic wellbeing was the most widely reported, with eight out of 11 studies exploring this across four NBTI types.

### Wilderness adventure therapy

Bowen's (2016), 10-week program measured self-esteem for participants with mental health difficulties. Pre-post intervention examination of self-esteem found one out of four subscales, social self-esteem, significantly improved (moderate effect size  $d=0.4$ ). At three-month follow up, general wellbeing was the only significant subscale (moderate effects size  $d=0.39$ ). Barton (2016), 5-11-day program measured individual self-esteem within healthy participants and found significant improvements pre-post intervention ( $p<0.001$ ) with self-esteem increasing most within female

participants ( $p < 0.05$ ). The authors considered the possibility of ceiling and floor effects due to high self-reported self-esteem pre-intervention, limiting the magnitude for improvement and difficulties in change being quantified.

Barton (2016), evaluated nature connectedness (Mayer & Franz, 2004) and found a significant increase ( $p < 0.001$ ) pre-post intervention. Rose (2018) also measured both interpersonal connectedness (Karcher, 2003) and nature relatedness (Nisbet et al., 2009) and found significant improvement on two subscales; peer and school connectedness ( $p < 0.04$ ). Nature relatedness demonstrated no significant changes between pre-and post-intervention. As students reported similar outcomes across three schools, this suggests robustness within the findings. Rose (2018) also measured eudaimonic wellbeing using the brief Ryff Wellbeing questionnaire (Ryff & Keyes, 1995), demonstrating no significant improvements pre-post intervention. The authors suggests the abbreviated Ryff Wellbeing scale, had poor psychometrics properties (Seifert, 2005), impacting the validity of the results.

Gabrielsen's (2018) eight–10-week program within a mental health setting measured self-efficacy, the ability to cope with life's demands, and found no significant pre-post intervention changes. The study had methodological limitations, such as a lack of control group, and high attrition rates. However, Rose (2018) also evaluated self-efficacy across three populations of healthy school children, pre-post a one-two week program, and found significant changes ( $p < 0.001$ ).

### Mindfulness programmes

Barrable (2021) found significant pre-post-intervention increases in nature-connection index (Richardson et al., 2019) following a three-hour mindfulness intervention (large effect size  $r^2 = 0.23$ ). There was a level of heterogeneity with three of four schools showing a significant increase in nature connectedness. One school was impacted by

adverse weather and spent less time outdoors. This may have confounded findings, impacting participants' attitudes and connection within nature.

### Horticultural therapy

Swank (2015) evaluated a six-week program utilising self-concept (Piers & Herzberg, 2002). The study found younger (5-7) and older (8-12) children reported a significant increase in self-concept pre-post intervention ( $p < 0.05$ ). However, the study utilised a small sample and a lack of control or follow-up. Chiumento (2018), evaluated a six-month program using the Warwick Edinburgh Mental Wellbeing Scale (Stewart-Brown et al., 2009) adapted for use within school children. However, no significant pre-post intervention changes were found and overall wellbeing reduced across domains. The measure was not validated for use within the population and was deemed limited in its ability to detect change. Also, the timing of measures completed at the first and last NBTI session, may have impacted the validity of the results.

### Art therapy

Kang (2021), eight-week program found overall self-esteem and social self-esteem were positively impacted pre-post intervention ( $p < 0.05$ ). However, there were no significant changes in self-esteem at home or school. The sample was small and participants were recruited from one setting, limiting the generalisability of study findings.

### Summary and synthesis

Six out of eight studies found significant changes across measures of eudaimonic

wellbeing. Three studies highlighted positive findings for social self-esteem and interpersonal connectedness, suggesting peer relationships may be an important factor within NBTIs in developing eudaimonic wellbeing. The variation in significance of pre-post intervention changes within nature-connectedness raises curiosity as to why outdoor programs facilitated in the natural world may not always result in a positive change.

### **Review Question B) How do CYP perceive the impact of NBTIs on their subjective wellbeing?**

Six studies presented qualitative findings exploring the perceived impact of NBTIs on the subjective wellbeing of CYP.

**Table 6.**

*Categorisation of themes within subjective wellbeing approaches*

<b>Study</b>	<b>Evaluative</b>	<b>Experienced</b>	<b>Eudaimonic</b>
<b>Sprauge (2020)</b>	Promoting Environmentally Conscious Decisions		Engaging Learning Environment  Family Engagement
	Promoting Healthy Behaviours		Leadership and Team Building Skill Development
	Promoting Physical Activity		Academic Support and Mentorship.
<b>Swank (2015)</b>		Participants' moods and feeling calm and happy	Social skills and learning to work together



<b>Chiume nto (2018)</b>	'Enhancing Control' - an increase in self-help.	'Increasing Resilience' - an increase in emotional wellbeing.	'Participation and Social Inclusion' - an increased sense of belonging.
<b>Gabriels en (2018)</b>	Post-treatment processing and improved functioning	Influential processes at the time of the post-test.	Post-treatment processing and improved functioning
<b>Ferne (2019)</b>		The Wilderness; a) Venturing Outdoors, b) From Chaos to Calm, c) Disconnect to Reconnect.	The Psychosocial Self; a) Group Synergy, b) Vulnerability and Support, c) Therapy the Natural Way.  The Self; a) Physical Feat, b) Body Mind Restructuring.
<b>Ferne (2021)</b>	Re-establishing Agency: becoming one's own person.	All Shook up or Shaking it off: on emotional regulation.  Body Mind Insight: stabilizing dynamics.	Acceptance of Self: a source of confidence and patience.  Isolation to Socialization: crossing that 'mountain'.  The Nature Remedy: new perspectives and strategies.

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## Evaluative

Four studies provided data on the perceived impact of three NBTI types on evaluative wellbeing.

### Horticulture

Chiumento (2018) evaluated a six-month horticultural program for CYP with behavioural, emotional and social difficulties, conducting two rounds of structured interviews using the Mental Wellbeing Impact Assessment. At 12-month follow-up participants reported making healthier choices around food, exercise and feeling better able to care for oneself. The study did not include any direct quotes from interviews, so examples could not be explored.

### Nature Education

Sprauge (2020) found following a 15-week nature-based education program, participants reported a greater awareness and appreciation of their health, *“I would put down the screens and go outside and enjoy what’s around you”* resulting in a perceived improvement in their quality of life.

### Wilderness therapy

Gabrielsen (2018) evaluated an 8-10-week wilderness therapy program and found participants’ improvements only manifested at 12-month post-intervention *“I am very certain it takes time before noticing a difference”* suggesting participants need time to consolidate and reflect on changes. Similarly, Fernee (2019) evaluated a 10-week wilderness therapy program and found no self-reported improvements in evaluative wellbeing post-intervention. However, within Fernee’s (2021) 12-month follow-up study, participants noticed changes in life *“I have learnt so much and now I manage to take care of myself”*. Some participants, contrastingly, did not report evaluative benefits of the outdoors, *“I grew up in nature so I am used to nature, it does not exactly have any therapeutic meaning to me”*, suggesting previous exposure and familiarity to the natural environment may impact on perceived evaluative wellbeing.

## Summary and synthesis

Overall, four studies found NBTI had a perceived impact on evaluative wellbeing. Improved self-knowledge and new life skills were perceived to improve evaluative wellbeing. However, a lack of in-depth data analysis and follow-up interviews limit further conclusions regarding the long-term impact of NBTI and factors contributing to improvements in wellbeing.

## **Experienced**

Five studies provided data of the perceived impact of two NBTI types on experienced wellbeing.

## Horticulture

Swank's (2015), conducted group interviews, following a six-week horticultural program for CYP with emotional and behavioural difficulties. Participants reported improved mood and calmness when outdoors, *"I learnt it makes me feel happier to be in the garden"*. This was echoed by participants with mental health difficulties in Chiumento (2018), who reported an increase in emotional wellbeing and resilience to difficult emotions, post six-month intervention.

## Wilderness therapy

Gabrielsen's (2018) conducted individual interviews following an 8-10-week

wilderness therapy intervention with adolescents from a mental-health setting.

Participants reported increased emotional control post-intervention, *“Once I got away from everything I became a lot less stressed, it was wonderful”*. This was echoed in Fernee’s (2019) study conducted with participants from a mental health setting, reporting nature had a calming effect and increased their attention to the environment *“it was wonderful quiet and peaceful and there was not so much chaos around me...”*. Fernee’s (2021) 12-month follow-up found participants reported more confidence in regulating one’s emotions, *“sometimes if I am too stressed I just sit down and chill for a while, then I can keep going again”*, demonstrating emotional regulation skills may have been obtained from NBTIs.

### Summary and synthesis

Five out of six studies found NBTI had a perceived impact on experienced wellbeing, with participants reporting a sense of calm and emotional control. Horticultural studies suffered from methodological limitations including lack of follow-ups and group interviews, which may have increased social-desirability, limiting the validity of results.

### **Eudaimonic**

Six studies provided data on the perceived impact of three NBTI types, on eudaimonic wellbeing.

### Nature education

Participants in Sprauge’s (2020), 15-week program reported greater inter-personal connections with others, *“I learnt how to work with people”* as well as feeling more

competent *"I like to learn facts cause it makes me feel smarter"* suggesting knowledge gained from the intervention supported a sense of pride.

### Horticulture

Swank's (2015) findings suggested the nature of tasks within the NBTI allowed group cohesion *"we all worked together"*. Similarly, within Chiumento's (2018) study participants reported an increased sense of belonging following a six-month program, facilitated by working together and having a valued role.

### Wilderness therapy

Fernee's (2019) evaluation of a 10-week program, found participants connected with each other through sharing similar vulnerabilities *"I felt no one would judge me because everyone struggled with something"*. However, there were some individuals who did not feel part of this unity *"it should have been a group that had more similar challenges to me"* suggesting group dynamics are an important factor within NBTIs. Additionally, participants reported the natural environment allowed space and time to build relationships, *"sitting in a room is not the same as hiking in the woods... when you hike together you get to know each other"*. Fernee (2021), found participants reported increased self-acceptance 12-months post-intervention, *"my self-esteem has improved, I like my personality much more"* and surpassing expectations placed on them *"You sort of think I am not as lazy as my mom used to tell me. I can do things! Just look at me now"* depicting a sense of accomplishment.

### Summary and synthesis

Six studies found NBTIs had a perceived impact on eudaimonic wellbeing.

Participants reported peer-support increased their sense of connection, as well as overcoming physical challenges and improving self-esteem. Although Fernee (2019, 2021) are methodologically robust qualitative studies and provide rich data, the limited sample size means generalisability of findings are limited.

### **Outcome of Synthesis**

Overall the current review evaluating pre-post changes and the perceived impact of NBTIs on CYP subjective wellbeing reveals some promising findings. Within evaluative wellbeing, all three quantitative studies measuring evaluative outcomes highlighted significant improvements, suggesting NBTI contribute to greater life effectiveness and HRQoL. Qualitative findings echoed this demonstrating CYP had developed skills to support their mood and health improving their life satisfaction. These findings were commonly illustrated in longitudinal follow-up outcomes, demonstrating time following NBTIs may be integral to consolidate learning. However, limitations were noted such as high attrition rates and lack of control group impacting the generalizability of findings.

Within experienced wellbeing, four out of six studies measuring evaluative wellbeing, found significant pre-post changes including positive affect, negative affect and emotional and behavioural difficulties. NBTIs appeared to have differential effects on clinical versus non-clinical populations, as depression only significantly improved in participants within clinical ranges. Additionally, only two studies evidenced sustained changes at follow-up. The lack of control groups hinders the ability to conclusively attribute changes to NBTIs. In one study where no significant pre-post quantitative changes were identified, perceived impact was qualitatively evident and demonstrated participants increased capacity to regulate their emotions at follow-up. This was supported in other qualitative studies highlighting

CYP sense of calm within nature.

Within eudaimonic wellbeing, eight out of eleven studies measuring eudaimonic wellbeing found significant pre-post changes in self-esteem, social self-esteem and interpersonal and nature connectedness. This was echoed in all six qualitative studies highlighting the importance of social context and demonstrating a perceived improvement within self-perception and peer relationships. Two studies illustrated no changes in eudaimonic wellbeing, likely due to poor outcome measure standardization and psychometric validity.

In conclusion, while most studies demonstrate benefits within evaluative, experienced and eudaimonic wellbeing, some variations exist across different populations and contexts. The synthesis suggests the need for more robust research with control groups, large sample sizes, and longer follow-up periods to provide greater insight into the impact of NBTIs on wellbeing. Overall the findings support the inclusion of NBTIs as a valuable intervention to promote CYP wellbeing.

## **Discussion**

The aim of the current review was to understand the changes and perceived impact on CYPs subjective wellbeing following an NBTI. Firstly, the review aimed to explore what the pre- to post-NBTI changes were on CYPs self-reported subjective wellbeing, exploring meaningful change over time. From 11 quantitative studies included, 10 illustrated significant pre-post intervention changes within evaluative, experience and eudaimonic approaches, suggesting NBTIs may positively impact CYPs subjective wellbeing. Three studies found significant pre-post intervention changes for evaluative wellbeing, particularly HRQoL and life effectiveness post-intervention and at 12-month follow up. Four studies found significant pre-post intervention changes

for experienced wellbeing with decreased negative and increased positive affect to moderate and large effect. Six studies demonstrated significant pre-post-intervention improvements within eudaimonic wellbeing, including self-esteem and nature and interpersonal connectedness.

Secondly, the review aimed to understand how CYP perceive the impact of NBTIs on their subjective wellbeing. All six qualitative studies illustrated a perceived impact on evaluative, experience and eudaimonic approaches. Within evaluative wellbeing, improved self-knowledge and healthier life choices were perceived to improve quality of life. This required long-term consolidation following the NBTI. Within experience wellbeing an increased sense of calmness and management of difficult emotions were reported. Lastly, within eudaimonic wellbeing a perceived impact on sense of belonging, achievement and pride were identified following NBTI engagement.

In summary, of the 13 studies included, 12 illustrated a positive impact on wellbeing, evaluative, experience and eudaimonic approaches. This echoes previous evidence that NBTIs beneficially impact subjective wellbeing (Mygind et al., 2019; Roberts et al., 2020; 2018; Vanaken et al., 2018, Weeland et al., 2019; Tilmann et al., 2020). The review evaluated both quantitative and qualitative literature to strengthen the synthesis of findings and corresponding conclusions. However, there was a high degree of heterogeneity in measures, methodologies and populations studied, meaning it may be difficult to draw meaningful conclusions about the effectiveness of NBTIs or generalize findings more widely.

The utilization of Tinkler and Hicks (2011) wellbeing definition provided insight into CYPs evaluative wellbeing and how they perceived their quality of life following NBTIs. Overall findings suggest NBTIs may facilitate improve quality of life through a greater



appreciation of health. This finding supports studies illustrating quality of life is linked to healthier lifestyles, and has a protective role in maintaining health (Bullinger & Quitmann, 2014; Martin-Maria et al., 2017; Steptoe et al., 2015). It was noted of 11 quantitative studies only three included outcome measures capturing evaluative approaches. Therefore, further inclusion of evaluative outcome measures are needed in studies assessing NBTIs. Four out of six qualitative studies captured the impact on evaluative wellbeing including improved functional skills and the ability to take care of oneself. This highlights NBTIs may support CYP to fulfill their individual needs and support development, improving life satisfaction (Martela et al., 2023).

The findings highlighted participants improved mood and emotional control following NBTI engagement. This supports Kaplan (1989) and Ulrich's (1981) theories of nature restoration, suggesting mindful attention or 'soft-fascination' in nature activates the parasympathetic nervous system improving experienced wellbeing. The findings are in accordance with studies, such as Hepburn et al (2021) who identified mindful attention was a predictive factor associated with lower self-reported stress and higher experienced wellbeing. This suggests developing NBTIs which involving active engagement with nature may impact experienced wellbeing more greatly (Lumber et al., 2017). Future research could compare active versus passive nature interventions to explore this further.

Review findings also suggest interpersonal connection played an important role in improving eudaimonic wellbeing. CYP often spend lengths of time together in NBTIs completing tasks relying on teamwork, leading to the development of friendships. The suggestion peer relationships improve following NBTIs is supported by previous literature on social outcomes of outdoor program participation (Sklar et al., 2006). Future research can examine what aspects of NBTIs support relationship formation

and its mediating role in eudaimonic wellbeing. Findings also suggest overcoming challenges within NBTIs supported the development of self-esteem. The prominence of findings within facets of self-esteem and relationships within this life stage, is consistent with Erikson's (1968) psychosocial model, stating competence and belonging are integral to support adolescent development. This suggests NBTIs may be helpful in nurturing healthy identity development leading to improved wellbeing.

Overall, Tinkler (2015) suggests building evidence of interventions contributing to evaluative, experience and eudaimonic wellbeing, can support organizational bodies decision making regarding the wellbeing of CYP nationally. Evidence within the current review demonstrating some long-term benefits of NBTI's on wellbeing including quality of life, may suggest NBTI's can be a helpful intervention to improve CYP's societal development and wellbeing.

### Strengths and Limitations

The review focused on a broad age range within childhood and adolescence, allowing results to be applied to a wider population. Examining the impact of NBTIs on the three approaches to wellbeing (evaluative, experience, eudaimonic) was a significant development from previous systematic reviews, allowing for a deeper understanding of how wellbeing is impacted by NBTIs and its implications for how they may be used. Including qualitative methods also allowed for a fuller understanding of the perceived impact of NBTI on CYPs wellbeing. Additionally, the quality assessment of included studies allowed for an overall conclusion to be made regarding the strength of the evidence. Despite conducting a comprehensive search within primary databases, additional papers were identified through Google Scholar. This may be due to a broader range of data sources and dynamic indexing systems. Cautiousness should

be applied to the validity of sources due to lack of standardized indexing leading to inclusion of less rigorously assessed data. An additional limitation was the subjectivity and bias involved in categorizing findings into wellbeing approaches, despite being corroborated with the wider research team. Additionally, the primary studies are limited in the representativeness of samples, meaning findings from this review may not be transferable to CYP in non-westernised countries. Moreover, previous experience can result in individual differences within one's affiliation to nature either having biophilic or biophobic orientation (Khan, 1997). Sampling methods used in studies may attract individuals with a biophilic orientation who have an underlying interest in nature, which may impact the validity of findings.

### Clinical implications

Some of the studies conducted with CYP recruited from mental health settings, found NBTIs may reduce psychological distress and improve subjective wellbeing. The BPS guidelines suggests NBTIs can be more effective than indoor therapy in increasing equity of care, accessibility and ownership (Cooley & Robertson, 2020). This may be particularly helpful to support CYP who face barriers to accessing traditional forms of therapy (Roberts et al., 2021). Therefore, there may be potential within clinical psychology to utilise NBTIs to support CYPs psychological wellbeing. This review may inform a need for staff training within this emerging area of practice, to develop skills and overcome organizational barriers to implementation (Cooley, 2022). The remaining studies were completed in schools with CYP identified to experience social, emotional and behavioural difficulties, suggesting NBTIs can also be utilised in non-clinical settings to improve wellbeing. The governments 25-year environmental plan (HM Government, 2018) states it will aim to support disadvantaged children form closeness with nature, within and outside of schools to support health and wellbeing.

This review can help demonstrate the value of investing in interventions which promote active engagement with nature, such as NBTIs, and provide a framework for measuring its effectiveness. The review highlighted a minimum of half-day NBTI may have a positive impact on subjective wellbeing and facilitate a greater sense nature connection (Barrable, 2021). This suggests short-term interventions, which are less resource intensive, and more easily implemented, may also be effective.

Review findings suggest NBTIs may impact HRQoL positively (Sprauge 2020, 2022). The bi-directional relationship between subjective wellbeing and physical health has been identified in research (Steptoe et al., 2015). NICE (2005) have not produced guidance for the treatment of CYP with health conditions and associated psychological difficulties, therefore findings could promote much needed exploration into NBTIs to support the wellbeing of CYP with health conditions.

#### Directions for future research

The review findings tentatively suggest improvements in wellbeing, following NBTIs are consolidated over time, suggesting the importance of evaluating long-term outcomes of NBTIs. This may also identify a potential need for NBTI after-care to support individuals in consolidating skills, or in having continued access to nature, supporting sustained change and improved quality of life. Studies utilising a control group or RCTs need to be conducted to establish whether there is a causal relationship between NBTIs and wellbeing compared to indoor therapeutic interventions. This evidence would strengthen the case for clinical and policy interventions to consider the important role natural environments play in child and adolescent development. Furthermore, the inclusion of both clinical and non-clinical

populations and a range of clinical outcome measures used within selected studies likely resulted in certain intervention effects being more easily captured within clinical groups impacting validity of findings. It may be important to consider how the evaluation of NBTI's can be tailored for clinical and non-clinical populations such as the use of symptom specific or general wellbeing measures.

It is important to examine mediators for the development of meaningful therapeutic interventions (Kazdin, 2007). Therefore, future research should explore the mechanisms mediating effects of wellbeing and nature in CYP. For example, mindful attention is hypothesized to have a mediating role in the association between connection to nature and psychological wellbeing (Huynh & Torquati, 2019). Thus, identifying mediating effects could prove clinically useful in the development of NBTIs. Qualitative findings highlighted familiarity with the natural environment and group dynamics negatively impacted the perceived effectiveness of NBTIs. Therefore, future studies evaluating the impact of NBTIs should measure these variables or utilize mixed methods study designs to subjectively explore individual differences. The components involved in each NBTI varied considerably across studies. For example, studies suggest larger natural environments have a greater impact on wellbeing (Wallner et al., 2018). Therefore, evaluating the impact of different environments on wellbeing, could be beneficial.

## **Conclusions**

The current review aimed to evaluate the existing evidence for the impact of NBTIs on subjective wellbeing in CYP. The findings suggest active engagement with nature through NBTIs may have a positive impact on subjective wellbeing across evaluative experienced and eudaimonic approaches and may be a beneficial intervention to

support CYP development. However, the findings across the 13 included studies are somewhat inconsistent and demonstrate the need for additional research to understand why these differences occurred. Future research can address current methodological limitations by developing RCT and longitudinal follow-up designs to elucidate the impact of NBTI on subjective wellbeing in CYP over time.

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## **Section B**

**An Interpretative Phenomenological Analysis of the experience of a nature-based therapy intervention for children with long term health conditions and associated psychological difficulties.**

**Word Count: 7993 (7965)**

## Abstract

**Background:** Children and young people (CYP) are currently at higher risk of developing mental health difficulties. The additional biopsychosocial challenges CYP with long-term health conditions (LTC) face exacerbates this risk. Research findings state nature-based therapeutic interventions (NBTIs) may have a positive impact on CYPs wellbeing. However, research exploring the experience of NBTIs within CYP with LTC and associated psychological difficulties (APD) is limited. Therefore, additional research is needed to determine whether NBTIs may be an effective intervention to support their wellbeing. **Method:** Ten participations aged 10-13 who attended a NBTI took part in one-to-one semi-structured interviews that explored their journey through the NBTI, its impact on mental, physical wellbeing and sense of self, what they attributed any changes to, and the meanings attached to their experiences. **Analysis:** The interviews were analysed using Interpretative Phenomenological Analysis (IPA). Four Group Experiential Themes were developed from the analysis; 'Overcoming Illness-Identity', 'Freedom to Choose', 'Sense of Connection' and 'A Mindful Presence' **Discussion:** Participants experienced improved self-esteem, a deepened sense of belonging within their peer group and nature, and an improved ability to regulate emotions. Future research could examine what mechanisms of NBTIs mediate positive change. Including NBTIs in treatment planning for CYP with LTC and APD could support wellbeing.

## Introduction

The biophilia hypothesis (Wilson, 1984) states humans possess an innate tendency to seek connections with nature, promoting internal wellness. There is substantial research to date illustrating both physiological and psychological benefits of nature exposure. Twohig-Bennett and Jones (2018) meta-analysis demonstrated significant reductions in blood pressure, salivary cortisol, diabetes and cardiovascular mortality after time spent outdoors. Numerous studies have also found contact with nature greatly increases positive affect, self-compassion and mindfulness, while reducing negative affect and impulsivity (Coventry et al., 2021; McMahan & Estes 2015; Repke et al., 2019; Swami et al., 2020). The Stress Reduction Theory (Ulrich, 1981) may explain these restorative effects of nature, suggesting exposure to nature facilitates psychological and physiological processes easing our stress response, and can even lead to faster recovery from physical illness (Ulrich, 1984). Moreover, Kaplan's (1989) Attention Restoration Theory suggests exposure to nature allows engagement in 'soft-fascination', facilitating reflection and introspection alongside engagement in an activity, which can improve our cognitions and mental clarity.

Nature-based therapeutic interventions (NBTIs) are structured group-led programmes, involving active engagement with the natural world to promote wellbeing. Increasing concerns about deterioration of children and young people's (CYPs) wellbeing has contributed to a growing interest in potential benefits of NBTIs for children and adolescents (Tillman et al., 2018). UK CYP are currently experiencing higher mental health needs than previous years, with 1 in 6 individuals aged 5-16 experiencing a mental health problem in 2020, up from 1 in 9 in 2017 (Peytrignet et al., 2022). Although the underlying causes are complex, there is growing evidence for Covid-19's impact and associated social isolation on CYPs mental health (Loades et al., 2020).

CYP are now spending less time outdoors and more time online than their predecessors (Larson et al., 2019), leading to concerns regarding the negative impact of CYPs disengagement from the natural world. CYPs wellbeing is integral to their psychosocial development, relationships and identity formation (Erickson, 1978). Therefore, supporting wellbeing in early life can prevent persisting difficulties in adult life (Costello et al., 2016). Systematic reviews evaluating the impact of NBTIs on CYPs wellbeing found actively engaging with the natural world, improved self-esteem, nature connectedness, behavioural functioning and reduced stress and depression (Arola et al., 2022; Roberts et al., 2020, Tillman et al., 2018, Zhang et al., 2020). However, existing literature on the effect of NBTIs with CYP exclude CYP experiencing psychological difficulties alongside long term health conditions (LTC).

There are 1.7 million CYP in the UK living with LTC including asthma, diabetes and epilepsy (NICE, 2019). CYP with LTC are four times more likely to suffer from social and emotional difficulties than their physically healthy peers, particularly anxiety, depression, low self-esteem, and loneliness (Maes et al., 2017; Moore et al, 2019). This may be explained by the additional biopsychosocial challenges affecting CYP with LTC such as increased pain, restrictions on recreational activities, school absence, frequent hospital visits and unexpected medical procedures (Golden et al., 2008). The limitations imposed by a LTC can also increase feelings of disempowerment, making accessing psychological support feel further stigmatising and lead to delayed access to treatment (Lerwick, 2016).

There is evidence NBTIs are effective for improving psychological wellbeing in adults with LTC with associated psychological difficulties (APD). A systematic review conducted by Trostrup et al (2019) including five clinical and quasi-experimental studies, found NBTIs may have a significant effect on self-esteem, self-compassion,

positive affect, and body image. Additionally, Taylor et al's (2022) systematic review of twelve quantitative studies and one qualitative study, demonstrated NBTIs may improve anxiety, depression, and fatigue. However, the current evidence for the experience of NBTIs for CYP with LTC and APD is limited, predominantly focusing on physical health outcomes (Lee et al., 2014) rather than psychological wellbeing. There is a small collection of research exploring the experience of outdoor summer camps for CYP with LTC. Using qualitative methodologies, this has highlighted NBTIs can support children with LTC experience freedom, creativity, body empowerment and relaxation. However, these studies mainly explored the experience of the intervention, emphasising peer relationships and skill building, rather than engagement with the natural world, and fail to explore the meaning children with LTC and APD may derive from being in nature (Desai et al., 2013; Gillard & Allsop, 2016; Moola et al., 2014). Van der Riet et al (2017) conducted a narrative study exploring the effect of healing gardens on CYPs wellbeing and found this provided a destigmatising environment where CYP could shed their illness identity and stimulate their imagination. However, the study suffered from methodological limitations and solely obtained experiences of staff facilitating the NBTI, excluding CYP perspectives.

The BPS guidelines suggests NBTIs can be more effective than indoor therapy in increasing equity of care, accessibility and ownership (Cooley & Robertson, 2020). However, studies have shown professionals rarely implement NBTIs within treatment planning due to a lack of experience and organisational barriers (Cooley et al., 2020; Wilkinson et al., 2019). A systematic review by Moore et al (2019) evaluating psychological interventions for CYP with LTC and APD found the most effective interventions were those offering a safe space, freedom, self-esteem, hope and social connection, therefore NBTIs may effectively facilitate this. NBTIs offer CYP an opportunity to experience new challenges, alongside peer support, which can increase



self-confidence and development of a positive sense of self (Duerden et al., 2012).

This is important for CYP with LTC who have often developed illness-defined representations of self (Law et al., 2014) and have restricted access to nature, increasing vulnerability to psychological distress (Jimenez et al., 2021). Therefore, NBTIs could be integral to supporting the healthy psychosocial development of CYP with LTC and APD (Erikson, 1968). Moreover, considering the increased risks of covid-19 transmission, NBTIs provide an opportunity for safer socially-distanced interventions with CYP with LTC who possess additional health vulnerabilities (Cooley & Robertson, 2020).

The NHS has highlighted the importance of integrating mental and physical healthcare and the social, health and economic benefits arising when delivering integrated care (Department of Health and Social Care, 2011). This research is grounded within the NHS values of 'Commitment to Quality of Care' and 'Improving Lives' as it will help develop a deeper understanding of CYP experiences of NBTIs. This research can help develop recommendations to inform the provision and quality of services, thus having the potential to improve the delivery of innovative and person-centred psychological support for CYP with LTC.

### **Study aims**

The current study aimed to develop an understanding of the lived experience of CYP with LTC and APD participating in a NBTI designed to support wellbeing, using interpretative phenomenological analysis (IPA). The study was guided by the research questions: What is the impact of NBTI's, if any, on CYP with LTC and APD wellbeing and what do participants attribute this impact to?

## **Methods**

### **Ethics**

The research proposal obtained approval from the university (REF: RTT260291) (Appendix N) and an NHS research ethics committee (REF: 22/NE/0042) (Appendix O) meaning all key elements of the research design including procedure met ethical standards. As research was conducted with children who are considered unable to provide informed consent for participation, both parental/carer permission and child assent were required. Therefore parents/carers and children were required to sign, date and return the document to the lead researcher, or complete them with the researcher via video call. It was emphasised participants were free to withdraw or modify their consent at any point. Participants were informed the information and personal details shared would remain confidential and anonymised, however if a concern of risk of harm to any individual was raised, confidentiality would be broken for safeguarding to take place. It was noted participants with LTC may experience fatigue and feel burdened by a lengthy interview. Therefore, participants were offered opportunities to take a break or end the interview if they wished. If it was evident during the research project CYP or parents/carers may be distressed, support available to families would be highlighted at the end of the interview. Within the results section, pseudonyms have been used to protect anonymity.

### **The Nature-based Intervention**

Participants recruited for the study took part in a NBTI within a woodland nature reserve. The woodland intervention (WI) is facilitated by a psychology service within a

paediatric department of an NHS hospital site. The WI takes places over the course of 76 one day, in groups of 8-10 children and involves mindfulness and forest school activities including fire lighting, nature arts and crafts, sensory games and cooking. The age range for CYP attending is 9-13 years old. Erikson's (1968) psychosocial developmental theory states for CYP within this preadolescent stage, there is an increased importance to learn new skills, develop competence and achieve an identity. The WI was designed with developmental theory in mind, supporting CYP with LTC and APD healthy development and to strengthen their identity alongside their LTC.

### **Participants**

Ten participants were recruited to the study. This is in line with guidance around use of IPA (Smith et al., 2021) as it provides a manageable amount of data to allow for similarities and differences in responses to be explored while enabling in-depth analysis and reflection. This is deemed an appropriate sample size for doctoral projects (Pietkiewicz & Smith, 2014). Demographics are summarised at group level to preserve participant anonymity (Table 8). LTCs included asthma (n=2) celiac disease (n=1), neurofibromatosis-1 (n=1), cancer (n=1), bronchiectasis (n=1), respiratory and liver disease (n=1), immunodeficiency disorder (n=1), epilepsy (n=1), foetal alcohol spectrum disorder (n=1).

**Table 7.***Participant demographic information*

<b>Demographic Categories</b>	<b>Group Level Statistics</b>
Age	<i>Ran= 10-13, M= 12.2, SD= 2.6</i>
Gender	<i>F= 80%, M=20%</i>
Ethnicity	<i>White English= 70%, Mixed White and Black African = 20%, Other Mixed Background= 10%</i>
Interventions attended	<i>Ran= 1-4, Mode= 1, Median= 2</i>

**Recruitment**

Purposive sampling was used to recruit participants from the paediatric psychology service of an NHS hospital. CYP referred to the service had a range of long-term, chronic physical health conditions including, diabetes, cancer, Crohn's disease and gastrointestinal issues, alongside psychological difficulties such as low mood and anxiety. On referral to the WI, service clinicians discussed the research study with parents/carers and their child. Participant information sheets (see Appendix D) and an introductory video was disseminated giving time for parents/carers to review the information and discuss this with their child. If an interest was expressed in taking part service clinicians passed on contact details to the lead researcher following verbal consent from the parent/carer. Please see Table 7 for inclusion and exclusion criteria.

**Table 8.***Inclusion and Exclusion Criteria*

<b>Inclusion</b>	<b>Exclusion</b>
<p>aged 9-13 years old</p> <p>with a diagnosis of a long-term physical health condition</p> <p>open to the psychology service within the paediatric department of the hospital.</p> <p>who have attended at least one woodland intervention</p>	<p>at current high risk of self-harm or suicide, as per their most recent assessment in the psychology service of a paediatric department</p>

**Design**

The study applied a qualitative design using IPA (Smith et al., 2021), which is a qualitative methodology aimed at exploring how people make sense of, relate to and perceive subjective experiences and often transformative events. This approach was deemed the most appropriate to achieve a rich exploration of how CYP with LTC and APD, experience and derive meaning from a NBTI. Individual, semi-structured interviews were carried out with ten participants. IPA has a philosophical underpinning

consisting of phenomenology, hermeneutics and ideography (Smith et al., 2021).

Firstly, phenomenology posits human experience is subjective and can be understood by examining the meanings by which individuals apply to it. Secondly, dual interpretation, referred to as the double hermeneutic process, involves a dialogical process, in which the researcher and the participant's perspectives are assimilated to create a deeper understanding. Lastly, ideography aims to understanding the complexity in each case, rather than generalising experiences to a wider group. This involves inductive reasoning to generate themes grounded in data rather than preconceived theories (Eatough & Smith, 2017). Therefore, IPA will allow for a detailed examination of CYP with LTC and APD, understanding the essence of their experience of the NBTI.

### **Data collection**

Semi-structured interviews were conducted, see Appendix E for full interview schedule. Demographics were collected at the start of the interview, prior to audio recording. The questions were designed and informed by IPA and were open-ended, exploring participant's individual experiences, focussing on thoughts, feelings, and perceptions (Smith et al., 2021). The interview schedule started by exploring CYP hopes for the WI, experiences of the WI, changes they noticed, sense they made of these changes and how they feel this impacted their lives. The interview schedule was flexible and the direction and content of the interview was guided by each individual participant and their unique responses.

### **Data Analysis**

As IPA takes an idiographic approach, each interview transcript was analysed

individually, before producing general themes or statements, ensuring analysis was centred in the unique experiences of each participant (Smith et al., 2021). The analysis proceeded through the following steps; 1) data familiarisation by twice reading through transcript, 2) creating initial Exploratory Notes (EN), protracting initial descriptions, analytic comments and linguistic interpretations, 3) deriving Experiential Statements (ES) by grouping and summarising EN into preliminary constructs, 4) ES grouping into connected themes called Personal Experiential Themes (PET), 5) PETs for all cases were compared identifying similarities and differences, determining group experiential themes (GET) and subthemes encapsulating the entire dataset. (See Appendix H-K for how GETs were formed). Finally, initial transcripts were reread to quality assure theme validity and protract verbatim quotations to illustrate final themes.

participants sharing real experiences, this knowledge is subjective.

## **Quality Assurance**

Smith et al (2021) refers to three principles of quality assurance in IPA. Firstly, sensitivity to context and awareness of the interactional nature of data collection. Secondly, commitment and rigour within systematic methods, ensuring credibility. Lastly, transparency and coherence in the documentation of the research process (Yardley, 2015). Quality assurance was achieved by employing the hermeneutic cycle of suspicion and empathy, questioning assumptions and biases in the data alongside attending to individual stories and meanings attributed to experiences. Researcher reflexivity was key in developing awareness of biases, assumptions and pre-conceptions influencing data interpretation, therefore a bracketing interview was carried out (Appendix L) (Rolls & Relf, 2006). Potential influences on the research process were also discussed in supervision. A reflexive log (Appendix M) was completed at regular stages within the research process (Smith, 2006). Theme

development was discussed at regular intervals with two research supervisors and one research consultant to authenticate the integrity of theme development (Alase, 2017) 81

## **Positioning**

As a trainee clinical psychologist who values engaging with nature, holistic approaches to therapy and paediatric psychology, I may hold inherent views about the benefits of this intervention. However, I lack an understanding of how CYP with LTC and APD experience an NBTI and wanted to understand how personal meaning and change in wellbeing was attributed to this experience. A critical realist approach will be applied within this methodology and data analysis (Willig, 1999). This positioning understands there is no objective truth and individual experience is shaped by social, historical and contextual factors, meaning despite

## **Procedure**

Following an expression of interest in engaging in the research, parents/carers were contacted by the lead researcher to discuss the study information. During this stage, two participants had decided they no longer wanted to take part due to feeling too anxious to be interviewed, or a lack of time. Those who opted to take part completed a written consent and assent form (Appendix F) which was emailed to participants. Subject to personal preference this was either completed and returned via email, or completed via video call immediately prior to the interview. Participants were given the option to attend interviews via an online platform conducted within a private space, or in-person in a confidential location within the hospital. All participants opted for online interviews. Participants either chose to attend on their own, or with a parent/carer, to support their sense of safety. Interviews were audio recorded, lasting from 35 to 60



minutes. The researcher provided a de-brief at the end of each interview, with the parent/carer and child participant to assess emotional wellbeing and provide contact details for support if requested. Interviews were transcribed and anonymised by the researcher prior to analysis. All study participants were provided with a summary of the research findings on completion of the project (Appendix G).

### **Expert by Experience Involvement**

Feedback was gathered from two CYP and one parent accessing support from the NHS hospital paediatric psychology service, who were not taking part in the study.

Feedback was obtained on characteristics of the interview schedule, such as length of interview, and developmental appropriateness of language used. The schedule was also subject to review and adaptations as data collection progressed with participants.

## **Results**

Four GETs were developed from the interview data (See Table 8). The GETs and their associated subthemes will be discussed below. Pseudonyms have been used within this section to protect participant anonymity.

**Table 9.***Overview of Group Experiential Themes and Subthemes*

<b>Group Experiential Themes</b>	<b>Subthemes</b>
Challenging Illness Identity	Desires and fears for change
	Exceeding Expectations
	Pride and accomplishment
Freedom to Choose	A release from restriction
	Agency to feel safe
	Creative exploration
Sense of Connection	A shared struggle
	Weaved into nature's road
A Mindful Presence	Engaging the senses
	Focusing the mind

**Theme 1: Challenging Illness Identity**

Many participants believed living with a LTC, meant being unable to engage with certain activities or goals, due to experiencing fatigue or mobility issues, which had impacted their sense of self-efficacy. This GET encapsulated the way participants felt the WI offered an opportunity to challenge perceived limitations relating to their illness. Participants were surprised by their achievements and this shifted how they viewed and experienced their illness identity. Many described a sense of accomplishment and feeling hopeful about their futures.

### ***Desires and fears for change***

Almost all participants expressed living with a LTC had impacted their ability to be active and had spent lengths of time indoors. Participants expressed the WI presented an opportunity to connect with previously inaccessible values:

*'I wanted to like get better, to be like more fit and just do more stuff. So, it was almost a relief to get out and do that kind of stuff'...* (Oliver)

The sense of hope the WI offered in relieving feelings of stuckness was prevalent in many participants. This was expressed by Amara who felt the WI would allow her to take positive risks and connect her with her ability rather than her disability:

*'Usually I make it so I'm in my comfort zone a lot, but I wanted to be able to push myself so I feel like I'm able to actually achieve something...'*

However, alongside their desires, many participants expressed an awareness of the potential challenges the WI may present, such as the length of the day or physically demanding activities.

*'I was worried about what we're going to do. I can get tired a lot, with hypermobility...'*  
(Summer)

Participants seemed to express their cautiousness and anticipation of potential threats to their illness. For some, this raised self-doubt and negative self-talk, exacerbating their anxiety: *'Will I screw it up...'* (Noah)

However, for all participants it seemed the benefits of the NBTI outweighed their fears, allowing them to move through these feelings.

### ***Exceeding Expectations***

There was a sense from participants living with a LTC often meant having limited experiences and opportunities to challenge yourself. Therefore, a chance to participate in stimulating activities, felt like a welcome surprise:

*'Cos I guess before I wasn't able to do much and just staying indoors a lot so it kind of surprised me that like, I would actually get to do like, things like that. It felt nice and was like, oh I actually can do things again...'* (Noah)

Noah seemed to describe how restrictions from his LTC had impacted his sense of what he was able to do and the WI had allowed him to perceive a greater sense of what he was capable of. This was shared by many participants including Rachel, who was surprised by the expectations facilitators placed on participants:

*'Well, I really didn't think they would expect us to do so much. I thought we were going to be like, all sat down talking about things we did...'*

For many participants, this novel experience of feeling encouraged after a period of not feeling able, was highly motivating and supported self-confidence. Rachel shared although she had not expected to be able to light a fire, she had strived to work hard to complete the activity: *'I felt really happy and relieved because one, my back was really hurting and two I had never made one before, and it was like really surprising I did it...'*

It appears by participating in a novel, physically demanding activity, Rachel could explore the boundaries of her body's capability, feeling reassured in her ability.

### ***Pride and Accomplishment***

All participants expressed a sense of gratification from participating in the WI. There was a shared belief the difficulty and perseverance required to complete the activities such as fire lighting was integral to feeling accomplished. Kaylee reflected this was a personal learning experience, developing resilience and shaping a more hopeful perspective in response to life's challenges:

*'It felt, like, really satisfying. It felt like I've done something. Like an important moment to remember I just need to keep trying things if I want to. Well, practice makes perfect, basically...'*

Values of perseverance were similarly explicit for other participants, who expressed accomplishment was not solely derived from the successful completion of the nature-based activities, but by 'trying your best' and overcoming personal obstacles. This feeling of validation was shared amongst participants, who described this as a visceral feeling:

*'When you first lit the fire, it warmed you up physically and mentally because it was quite cold, it was also kind of nice to know you lit something...'* (Grace)

Grace's awareness of a physical and mental warmth, suggested a felt sense of contentment within her body, following the fire lighting activity. Through completing challenging activities, participants seemed to have developed a sense of pride in their own tenacity. This seemed important for participants to cope with the daily adversity of illness. This resulted in participants shifting from self-doubt to increased sense of confidence and hope regarding their future:

*'I felt like if I can do this, it makes me feel like wow, I can do much more now...'* (Noah)

## **Theme 2: Freedom to Choose**

This GET represented how the WI as well as the natural environment empowered participants to freely explore and make choices. Participants often described having reduced opportunities to make decisions for themselves due to their LTC, therefore the WI provided a novel, valued opportunity to express choice.

### ***A release from restriction***

The participants reflected on the invitational nature of the WI, allowing them to take care of their needs, listen to their bodies and make personal choices, alongside an implicit sense of freedom within nature:

*'To feel I can do what I want, and go where I want, when I want, to makes a big difference. Because I've had a lot of like, controlling things with my epilepsy...'*

(Kaylee)

Kaylee had described experiences of being closely monitored and restricted from activities to manage her seizures, therefore the choice to explore without limitation felt freeing. This distinction between cautiousness and freedom was echoed in other participants comparing nature to the restriction of hospital settings:

*'Cos in hospital everything is usually like this is a risk or be careful about that thing. So, it felt like woah! I was not expecting that...'* (Grace)

Grace's expressive language indicates the excitement and surprise to exercise her independence. This sense of freedom within nature was reported to have a positive healing impact on participants perceived physical health, permitting greater ownership over their bodies. Noah who attended the WI shortly after a lobectomy expressed feelings of expansiveness and a capacity to breathe freely in nature:

*'Inside it's like you just have this air but outside you get like lashes of air going through you- it just felt nice and open and like relief to be there...'*

### ***Agency to feel safe***

Many participants expressed the significance of having agency to navigate their safety within what they perceived, at times, to be an overwhelming environment. Oliver, who was diagnosed with cancer, shared feeling accustomed to time alone while recovering from surgery, therefore valued the choice to be apart from the group:

*'Yeah it was nice to have the time alone sometimes. As I hadn't really been around people in a while. It's nice to have that option as well...'*

Being granted the flexibility to make intuitive choices to regulate one's own emotions and feel secure, was meaningful for many participants, who struggled with anxiety. Alongside the flexibility in rules on the WI, some participants felt the openness of nature allowed them to have ownership over their environment:

*'I think if it was indoors and we were in one space, or a room, I wouldn't have been able to feel as calm...'* (Beth).

The harmony of safety and freedom was explicitly important for many participants to feel secure enough to challenge themselves. Lydia expressed her gratitude for fair rules coinciding with her goals:

*'There were only a few rules and they were sensible rules...'*

However, navigating this balance for all participants was tricky, with some feeling exposed and vulnerable to dangers towards their health, particularly around the campfire:

*'I felt like it was too dangerous. It kept getting into my lungs and my eyes and I felt like it could have been a bit more safer...'* (Amara)

### **Creative Exploration**

Many participants felt the agency to explore connected them with their creativity. This was described by Noah when participating in clay modelling which permitted him freedom to embrace irregularity:

*'It was really fun because you got all messy and it's really fun when I get messy because it's like you're exploring new things and doing new things...'*

This sense of novel exploration was particularly important for participants who had missed opportunities due to their LTC. Other participants expressed how engaging in creative activities supported their self-expression:

*'I just think art like... shows what you like the most. And when you do it in nature, it feels a lot more fun. It's like when you have a flat surface the bottom is always going to be nice and smooth, but I think it's better when you have like loads of different patterns around it from the wood stool and mine had loads of bumps and holes in the bottom. It was really nice...'* (Rachel)

Rachel conveyed how clay modelling within nature provided a richer texture to her experiences. It appeared some participants felt controlled by their illness, having to exercise caution in daily tasks and adhere to strict to medical regimes. Creativity



permitted freedom and allowed participants to momentarily let go of control. The process of exploration also extended to participant's identity:

*'It brought a new side to me. Like not a new side but like, it made me like try new things...'* (Oliver)

This indicated Oliver already had some sense of these aspects of himself, which were not fully realised until engaging in these experiences. Many participants shared an increased sense of courage to explore the previously unexplored.

### **Theme 3: Sense of Connection**

This GET captured the increased sense of connection participants experienced towards their peers and towards nature. Due to experiencing shared adversity relating to illness, participants developed an innate understanding between one another. Participants also developed a sense of belonging within the nature, drawing inspiration from the natural world around them.

#### ***A shared struggle***

Participants expressed anxiety about meeting new people, prior to the WI. However, once present all participants spoke of sharing an intuitive sense of belonging. Grace likening her experience of meeting others for the first time, to 'little kittens' coming together:

*'So, it was like you were one of the little kittens and then you had to be introduced to all the other kittens. And we all were there. It's kind of hard to explain, but we were all there...'*

This alludes to a shared vulnerability amongst peers and comfort in overcoming

isolation. The sense of belonging being 'hard to explain' was echoed by many participants, representing the difficulty in expressing this unspoken connection. Participants seemed to appreciate simply being with others who had experienced "struggle". They emphasised shared hardship promoted empathy and understanding, despite not sharing a diagnosis:

*'Although they might not have the same condition as me, and it might not have been as extreme. I knew they still had some condition. So, I think I felt quite nice about that. I knew I wasn't left out...'* (Sienna)

There was a sense participants drew inspiration from one another's' resilience and their connection facilitated an interrelating of feelings, reflecting vicariously through one another:

*'I saw all the other kids kind of like picking up cards and it just.... it was really interesting and it made me think about how brave I had been. There was this kid, who picked up 'Brave' and it just felt nice to see other people noticing what they haven't... it made me feel really kind of like, happy and I didn't know... warm...'* (Kaylee)

Kaylee reported feeling warmed by her empathy with another group member. This had supported her to realise her own bravery in having recently undergone brain surgery to manage her epilepsy. As well as an unspoken sense of connection, it also seemed participants established a sense of connection through conversation. The WI facilitated a personal environment where participants felt validated through dialogue:

*"You're in more private places. Like one girl was telling me about her illness and all this stuff that happened to her and it was really nice to hear that..."* (Beth)

This was valued amongst participants, who often expressed they would have liked more time to make connections. Some participants, such as Noah expressed this through a desire for collectivism, rather than individualism, finding more meaning through shared activity:

*“Maybe do more like team building activities than just doing by yourself”*

***‘Weaved into nature’s road’***

Additionally, all participants reported developing a connection to nature during the WI. This was symbolically described by Lydia as feeling *“weaved into nature’s road”* illustrating a sense of feeling intertwined with her environment. Many participants similarly detailed developing an awareness of humans’ instinctive affinity for nature, described through a sense of belonging:

*‘I guess in nature, everything just feels like it really belongs. We would think animals belong. We would even think that people might belong there too...’* (Summer)

Summer expressed living organisms exist in their most authentic and genuine form within nature, suggesting she herself felt closely affiliated to her surroundings on the WI. This was echoed by Amara who described a sense of interconnectedness with nature:

*‘It’s a part of us. So basically, when we were with nature, it connects with us, as part of us. It’s who we are...’*

The use of ‘we’ was often expressed in the language participants used to describe their relationship to nature, emphasising participant’s embodiment of this interconnectedness and feeling part of a larger whole. This was demonstrated by the way in which participants interacted with their natural environment on the WI, seeing themselves as part of the natural landscape:

*‘It felt like we were all connected and with nature. Like one time it rained and I think when you’re there you don’t mind getting wet as much cos you think, oh well everything is getting wet anyway so you might as well...’* (Beth)

Other participants, such as Rachel expressed battling with her anxieties on the WI and thoughts of leaving the day. She reported drawing inspiration from the resilience of

natural life on the WI which supported her to cope:

*'I was just listening to it [birds chirping] and I thought, well, they've managed to get through with their whole life, they've managed, because they have predators. I was thinking, well, our life is basically a predator for us, but we can manage to live through it... and I was thinking that's going to help me a lot...'*

By empathising with other living organisms, Rachel experienced a sense of equality in nature. Empathy for nature was expressed by many participants and seemed to be facilitated by active engagement with nature, through nature mindfulness and using natural resources within creative exercises. For some participants, this ignited gratitude and supported them to have a more mindful relationship with nature and a desire to preserve it:

*'Yeah, we have to basically think about the things, think about what we're doing before we do it. I should feel thankful. I shouldn't throw my food in the bin for nothing because, I could just give it away to someone who actually needs it...'* (Sienna)

#### **Theme 4: A Mindful Presence**

This GET represented how nature engaged participant's senses, supporting a mindful engagement to the present moment. This mindful presence aided participants to feel calmer and think more clearly, supporting them to regulate their emotions.

##### ***Engaging the senses***

Due to experiences of anxiety, fatigue and pain, participants often described having increased sensitivity to sensory input and feeling overstimulated in their daily lives.

Many reported the calm of nature felt like a distinctly different sensory experience:

*'In the city you hear cars, talking, shouting, like electronic noises. And in the woods, it's*

*just like sounds of birds, and bit of talking from the people your with... It's quite nice, because you kind of have that big change of scenery that really makes you think about how different it is...'* (Summer)

Participants expressed alongside nature soothing the senses, it was also equally stimulating and promoted a mindful curiosity towards one's surroundings. Summer expressed how due to her sensory sensitivities she could often feel overwhelmed, and socially withdraw. The natural world provided her with sensory restoration supporting her capacity to engage in and nurture her interpersonal relationships:

*'Well, sometimes after school if my mum asked me how was my day, I might not have wanted to say. But after [the WI], I was always like, "oh yeah, so first we did this"...'*

The sense nature facilitated stimulation and soothing was pertinent for many participants. Some described feeling engaged in and calmed by the natural rhythms of nature. Kaylee described enjoying the sensation of the wind, which created balance and predictability.

*'I like the feel of the flow and everything. It's just really calming...'*

Amara similarly likened her experience of engaging her sense of smell during the candle making activity to 'floating', representing a sense of ease and motion within nature:

*'It made me feel like it was kind of like floating, made me feel really calm...'*

Alongside a feeling of airiness in nature, participants also reported a sense of earthiness and stability in nature, possibly mirroring the connection to different elements of nature:

*'It's like I don't know, like grounding. I mean it's just nice to be able to see it all around me and kind of feel it all and everything...'* (Kaylee)

Participants' use of language relating to their experience of 'feeling' within nature, indicated their immersion within their senses. It also appeared meaningful

participants were relating to their physical bodies positively, experiencing pleasure rather than discomfort related to their LTC.

### ***Focusing the mind***

Participants expressed this sense of mindful presence in nature supported them to focus their thoughts and attention more purposefully within the present, rather than ruminating on the future or past. For some participants, this supported them to cope with anxious thoughts on the WI:

*'I might think, oh is my mum going to pick me up does she know where I am and stuff like that. And when you think of a noise, or smell, or something you can see, it kind of makes that worry go away...'* (Beth)

This suggested sensory engagement within nature was a useful tool to ground oneself in the present, allowing participants to gain perspective on their thoughts. This seemed to underlie Summer's feelings, of the natural environment easing more troublesome worries of life:

*'I feel you don't really have to worry about much in nature. That's more like natural worrying instead of like proper worrying...'*

Summer suggests worrying may innately be part of the human condition but can be managed better in nature. Other participants expressed being in nature changed the essence of their thinking and attention, allowing them to expand their focus and reflect on themselves and their experiences:

*'I feel like my attention is usually like, kind of like short attention and I can focus for a short time. But when I'm outside I feel like I can focus and everything and I look at the big picture and everything like everything's that happened over the past few days...'*

(Noah)

Many participants described a sense of introspection facilitated by the natural world allowing them to make sense of themselves and their experiences with clarity.

Amara described similar feelings of how nature supported her to feel grounded and present with her thoughts, which allowed her to feel like a more genuine representation of herself:

*'It made me more down to earth. Sometimes my head is in the clouds and I don't concentrate, and I'm just focusing on one thing, but sometimes when I'm down to Earth, I'm like, okay, I can relax now. I can be who I am now...'*

This suggests participants perceived mindful presence facilitated by nature could empower them to embody a more confident and less anxious self.

## **Discussion**

This study aimed to explore the impact of NBTI's, if any, on CYP with LTC and APD wellbeing, and what participants attribute this impact to. The GETs developed from the data were 'Overcoming Illness-Identity', 'Freedom to Choose', 'Sense of Connection' and 'A Mindful Presence'. The study findings highlighted a perceived positive impact of NBTIs on participants mental, physical wellbeing, and sense of self, as well as aspects of their experience participants attributed changes to, such as feeling challenged, enhanced creativity, agency and choice, peer togetherness, belonging within nature, and sensory soothing. These key findings will be discussed in relation to study aims, research questions and wider literature.

### ***Overcoming Illness Identity***

The WI was thought to support participants to confront illness-defined self-perceptions through completing nature-based activities and developing confidence in their abilities. This is supported by literature exploring NBTIs with adults and CYP with LTC (Gillard & Allsop, 2016; Moola et al., 2014; Roberts et al., 2020; Tillmann et al., 2018; Trostrup et al., 2019; Zhang et al., 2020). The current study also highlighted participants desire to challenge themselves and feel challenged by others. Moore et al (2019) explains CYP with LTC often face constraints and limitations on activities exacerbating their condition and miss opportunities available to their peers resulting in feelings of disempowerment. Therefore, interventions assisting CYP with LTC to push themselves out of their 'comfort zone' and connect with their abilities was important in developing self-esteem.

### ***Freedom to Choose***

Participants expressed that an enhanced sense of creativity during the WI supported them to explore 'new sides' of their identity. Barbot and Heuser (2017) suggests creativity can support CYP's self-expression and enhance identity formation. This supports the idea NBTIs support healthy identity development and may be important for CYP with LTC experiencing APD and negative self-perceptions. Participants expressed how the WI facilitated ownership of personal space supporting their agency. This supports research suggesting nature-therapy facilitates a more balanced power dynamic than indoor therapy (Cooley & Robertson, 2020) and allows CYP with LTC to define oneself outside of illness (Van der Riet et al., 2017). In the current study participants expressed the importance of containment and having sensible rules, supporting the idea of 'safe yet empowering' environments for NBTIs (Moore et al., 2019). It is unclear from our findings whether participants had an existing positive affiliation with nature associated with their pre-illness identity, which supported their sense of safety and ability outdoors.



## **Sense of Connection**

Connection was an integral outcome of the WI, with participants describing feeling accepted and understood, supporting emotional wellbeing. This echoes research illustrating the short-term benefits in social acceptance for CYP with LTC following an NBTI (Desai et al., 2013; Gillard & Allsop, 2016; Moola et al., 2014). The current study highlighted participant's social anxiety prior to the WI alongside their desire for additional time to develop connections. It is possible participants experiencing anxiety, may have additional challenges in engaging with peers socially (Loades et al., 2020). Research suggests CYP and LTC experience increased loneliness in comparison to peers (Maes et al., 2017) and peer support may be linked to improved wellbeing in NBTIs (Duerden et al., 2012). This highlights NBTIs for CYP with LTC and APD may require specific adaptation to support relationship development. Although most studies exploring CYP with LTCs experience of NBTIs have been separated by diagnosis (Desai et al., 2013; Gillard & Allsop, 2016; Moola et al., 2014). Participants in the current study highlighted the importance of 'being with' others who experienced a 'shared struggle' rather than a shared condition. Although it is important to understand the specific needs and experiences of different groups, the current research highlighted there may be opportunities to bring CYP with different LTC together within a supportive environment.

The theme of connection also extended to the natural world, a unique finding within this study. Participants expressed an innate belonging to nature supporting the biophilia hypothesis (Wilson, 1984). By disconnecting from nature due to LTC related challenges, participants seemed to have disconnected to their eco-psychological self (Barrows, 1995). A sense of belonging is crucial within the identity formation stage of child development (Erikson, 1978) and is of increasing importance to CYP with LTC,

who are more likely to experience stigmatisation and othering from peers (Pittet et al., 2010). Therefore, developing a relationship with nature can support this, providing similar benefits in alleviating loneliness and isolation as human connection (Williams et al., 2021). Participants also expressed the environment of the WI created a sense of equality within nature, 'we were all connected, and with nature'. This may have facilitated a shared human bond to the natural world, alongside their LTC, which may have deepened their sense of interpersonal connection.

### ***A Mindful Presence***

Participants conveyed mindful presence facilitated during the WI supported them to regulate their emotions and strengthen introspection, supporting their emotional wellbeing. This supports Ulrich's (1981) stress reduction theory and Kaplan's (1989) attention restoration theory. Studies exploring NBTIs echo this, identifying increased relaxation, positive affect and decreased anxiety and depression in CYP and adults with LTC (Moola et al., 2014; Taylor et al., 2022; Trostrup et al., 2019). Research suggests mindful presence mediates the association between nature exposure and wellbeing (Swami et al., 2020). In the current study participants expressed mindful engagement with nature provided sensory restoration supporting them to manage their anxiety and connect with a more genuine sense of self. Research indicates outdoor mindfulness may be more effective than indoor mindfulness for CYP with psychological difficulties (Owens & Bunce, 2022). This suggests nature mindfulness can be a useful tool in supporting CYP with LTC manage APD. Participants in the current study valued the invitation to listen to their needs, choose how they participate, and seek respite when overwhelmed. It is possible facilitating the NBTI alongside nature, encouraged mindful attention, allowing participants to intuitively manage anxieties, empowering their sense of self.

## ***Limitations***

The current research utilised a qualitative methodology, presenting tentative findings underlying a human experience of an NBTI and is not designed to infer casual relationships or generalizable findings. However, findings are transferrable, meaning insights can be applied to contexts or settings sharing similar characteristics. A limitation of the current research is those who agreed to participate in the NBTI may have been more likely to have an existing biophilic relationship to nature and benefit from the intervention as opposed to those who have a biophobic relationship (Khan, 1997). Additionally, over half of recruited participants had attended more than one intervention, meaning they likely had positive experiences of the intervention. Alternatively, participants may have been more likely to discuss experiences positively, due to the belief the researcher worked within the NHS site leading to social desirability bias. Additionally, as recruitment was mainly communicated through parents/carers, there may have been CYP wanting to be included, but whose views have not been represented. Discussing health-related challenges can be an emotive topic, and participants seemed drawn to talking about joyful experiences of the NBTI, at times refraining from situating their experiences within their personal health-related experiences. The therapeutic relationship is key in developing trust with CYP (Green, 2006), therefore participants may have found it difficult to discuss sensitive experiences with someone they had not met previously. Additionally, CYP with LTC may be more susceptible to fatigue impacting the length of the interviews and the affordance of time for rapport building.

### ***Clinical Implications***

This study supports previous research exploring the experience of NBTIs with CYP with LTC, highlighting improved peer connections, self-esteem and relaxation.

However, it provides additional insight exploring the meaning CYP with LTC and APD derived from being in nature and how changes were mediated. The current study may have implications for clinical professionals supporting CYP with LTC and APD. The findings suggest including short-term NBTIs within treatment planning may provide benefits, including increased confidence in one's abilities, strengthened connection towards peers and nature, and an improved ability to emotionally regulate. NICE (2004) have not produced guidance for the treatment of CYP with LTC and APD, demonstrating the importance of the current study's findings. The guidance for adults with LTC and APD recommends the use of low-intensity interventions, however there are multiple factors impacting the effectiveness for CYP, such as developmental appropriateness, reliance of caregivers to access treatment and building therapeutic engagement (Moore et al., 2019). NBTIs can provide an opportunity to overcome many of the barriers CYP face in accessing therapy in traditional settings. For example, improving accessibility (Lerwick, 2016), balancing power dynamics and supporting agency and freedom (Cooley et al., 2020). Covid-19 has welcomed new ways of working, however novel practices still carry inherent anxiety. Thus, professionals can lack confidence and face organisational barriers when implementing nature-based therapies (Cooley et al., 2020; Wilkinson et al., 2019) and efforts to overcome these barriers is important. Cooley (2022) proposes a model of environmentally safe uncertainty to aid clients, practitioners and services to conserve a safe and open critical curiosity towards the implementation of outdoor therapies. As well as safe experimentation, through initially spending small amounts of time in nature within therapy.

### ***Research Implications***

This study provided an initial step towards understanding the lived experience of NBTIs among CYP with LTC and APD. As this study explored the immediate experiential aspects of the NBTI, the long-term efficacy of NBTIs in supporting wellbeing is unclear. Due to the variability in how NBTIs are delivered, future research could explore how different NBTIs are experienced, using different natural environments, to understand how CYP with LTC and APD derive meaning from different contexts. Additionally, it is difficult to ascertain what extent changes can be attributed to nature, as opposed to skill building and peer connection. Therefore, more research is required to ascertain what aspects of nature are particularly meaningful and mediate change. As NBTIs are not currently widely implemented within paediatric settings, future case-study research could explore the implementation of nature-therapy within services, understanding the impact on clients, practitioners, service outcomes and potential barriers (Nilsen, 2015). Future studies can establish rigorous methodology such as randomised control trials (RCTs) to ascertain the causal impact of NBTIs on the wellbeing of CYP with LTC and APD.

### **Conclusion**

This study contributed to the exploration of the impact of NBTIs on CYP with LTC and APD wellbeing. The current study highlighted the perceived positive impact on emotional, physical wellbeing and sense of self CYP with LTC and APD derived from being on the WI. Many of these findings were consistent with existing literature suggesting NBTIs can increase confidence in one's abilities, support freedom and creativity, strengthen group belonging, and support relaxation. However, the current study also illustrated what aspects of the NBTI participants attribute this impact to.

Participants reported an increased sense of agency, facilitated by the invitational nature of the NBTI and ownership of space within nature. Secondly, a sense of belonging and empathy to the natural world was facilitated by completion of nature-based mindfulness activities. Lastly, participants were supported to regulate their emotional difficulties and connect with a more genuine sense of self, through sensory engagement with nature. It appears NBTIs may support healthy development within adolescents with LTC and APD and strengthen aspects of their identity alongside their LTC. More research is needed to identify mechanisms within the NBTIs and the natural environment facilitating positive change, as well as rigorous methodology, such as case-studies, and RCTs to support the evidence base for NBTIs with CYP and APD, supporting implementation across paediatric settings.

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## Section C

### Appendix of supporting information contents

Appendix A: Data extraction forms

Appendix B: CASP Quality Assessment Tools

Appendix C: Table of Quality Appraisal Ratings

Appendix D: Adult and Child participant Information sheet

Appendix E: Semi structured interview schedule

Appendix F: Consent and assent forms

Appendix G: Summary of research findings provided to participants

Appendix H: Sample transcript

Appendix I: Experiential statement into Personal Experiential Themes

Appendix J: Personal Experiential Themes across participants

Appendix K: Personal Experiential Themes into Group Experiential Themes

Appendix L: Bracketing Interview

Appendix M: Research Diary

Appendix N: Letter of ethical approval from Salomons ethics panel

Appendix O: IRAS NHS ethical approval

Appendix P: Submission details of journal- Environmental Psychology

Appendix Q: End of study letter to Salomons ethics panel

**Appendix A**

Cochrane Data Extraction Form

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## **Appendix B**

### **CASP Quality Appraisal Tools**

#### i) CASP Appraisal tool for Case Control Studies

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ii) CASP Appraisal tool for Cohort Studies

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iii) CASP Appraisal tool for Qualitative Studies

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## iv) CASP Appraisal tool for Randomised Control Trials

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## Case control studies quality appraisal ratings based on CASP checklist

Study	1. Did the study address a clearly focused issue?	2. Appropriate method to answer the question?	3. Were the cases recruited in an acceptable way?	4. Were the controls selected in an acceptable way?	5. Was the exposure accurately measured to minimize bias?	6. (a) Aside from the experimental intervention, were the groups treated equally? (b) Potential confounding factors?	7. How large was the treatment effect?	8. How precise was the estimate of the treatment effect?	9. Do you believe the results?	10. Can the results be applied to the local population?	11. Do the results of this study fit with other available evidence?
Sprauge et al., 2022	Yes	Yes	Yes; convenience sampling method	Can't tell; not asked if willing to participate as control, large disparity in no. of participants between groups	Yes; same length and time of intervention	a) Yes b) No	Large effect sizes	95% confidence interval	Yes	Yes	Yes; results fit with other research regarding positive effects of nature education on wellbeing

ii) Cohort studies quality appraisal ratings based on CASP checklist

<i>Study</i>	<i>1. Did the study address a clearly focused issue?</i>	<i>2. Was the cohort recruited in an acceptable way?</i>	<i>3. Was the exposure accurately measured to minimise bias?</i>	<i>4. Was the outcome accurately measured to minimise bias?</i>	<i>5. (a) Have the authors identified all important confounding factors?(b) Have they taken</i>	<i>6. (a) Was he follow up of subjects complete enough?</i>	<i>7. What are the results of this study?</i>	<i>8. How precise are the results?</i>	<i>9. Do you believe the results?</i>	<i>10. Can the results be applied to the local population?</i>	<i>11. Do the results of this study fit with other available evidence?</i>	<i>12. What are the implications of this study for practice?</i>
					<i>account of the confounding factors in the design and/or analysis?</i>	<i>b) follow up long enough?</i>		148				

<i>Bowen et al., 2016</i>	Yes; examine the effects of wilderness therapy for adolescents with mental health difficulties	Yes; purposive sampling children with mental health difficulties	Yes	Yes; however some non-validated questionnaires used	Yes; analysis of participants within clinical ranges of mental health symptomatology conducted separately	Yes; 3 months follow up	Statistical significant improvements in wellbeing (self-esteem, depression, functioning); small to moderate effect sizes	90% confidence intervals	Yes	Yes; can be applied to other children in outpatient mental health setting	Yes; results fit with research regarding positive effects of nature on wellbeing	Adventure therapy may have beneficial impact on aspects of wellbeing for children within mental health settings
<i>Rose et al., 2018</i>	Yes; examine how structured outdoor programs are	Yes; recruited from 3 schools purposive	No; range of times and lengths for different	Yes; repeated baseline and post program design	Yes; measured gender effects and comparison of intervention effects	No follow up, 22% attrition at post-	Statistical significant improvements to wellbeing (fear and self-efficacy) and peer	Effect size not reported, 95% confidence	Yes	Some degree of application to other schools	Partial; did not find significant effects on depression, or nature connectedness or	Wilderness expeditions may be beneficial for aspects of emotional wellbeing and
	associated with adolescent health and wellbeing	sampling	interventions			program	and school connectedness	interval			general wellbeing	connectedness in school children in Australia

<i>Barrable et al., 2021</i>	Yes; examine how mindful engagement nature can promote nature connection and wellbeing	Yes; convenience sampling across 4 schools in Wales	Yes; same intervention across schools	Yes; use of validated measures collected same time points	Yes; impact of rain reducing length of one intervention, follow up not completed due to pandemic	No follow up (planned but not completed)	Statistical significant improvements in positive affect and nature connectedness and reductions in negative affect	Small to medium effect sizes, 95% confidence interval	Yes	Yes; can be applied across schools within Wales	Yes; fits in with evidence regarding impact of mindfulness in nature impacting wellbeing positively	A half day mindful nature intervention may positively impact wellbeing in school children
<i>Johnson et al., 2021</i>	Yes; evaluate how wilderness therapy impacts psychological	Yes; purposive sampling from mental health	Yes; same intervention measured across 10 years	Yes; validated measure collected at same time point	Yes; no control or comparison group and low response rate post-intervention	Yes; 12 month follow up	Statistical significant reductions in overall distress, maintained at follow up	Large effect sizes, 95% confidence interval	Yes	Yes; can be applied across mental health settings in US	Yes; fits in with evidence for reduction in distress following nature contact	A wilderness therapy intervention for adolescent patients within mental
	functioning in adolescents with trauma	setting						150				health setting may reduce overall distress



<i>Spraug e et al 2020</i>	Yes; examine the health and education outcomes for nature education in low-income non white children	Yes; purposive sampling from eligible schools	Yes; all schools received same intervention	Yes; use of validated measures	Yes; age differences were accounted for and analysed separately	No follow up	Statistical significant increases on health related quality of life (46%) Older children had greater improvements	Effect sizes not reported, 95% confidence interval	Yes	Yes; can be applied to other schools within area with similar demographics	Yes; fits it with evidence of impact of nature on quality of life, not clear why older children benefited more greatly	Nature education may have a beneficial impact on health related quality of life in schools with students from low-income families
<i>Swank et al, 2015</i>	Yes; explore use of a garden group counselling intervention to	Can't tell how students with emotional difficulties	Yes; same intervention across groups	Yes; validated measures for age group	Yes; age differences analysed separately and missed data accounted for	No follow up	Statistical significant improvements in self-esteem and behavioural adjustment in both older	Effect sizes not reported, 95% confidence	Yes	Yes; can be applied to children within schools with emotion	Yes; fits in with evidence for improved wellbeing following nature contact	Gardening counselling may have a beneficial impact on self-esteem and behaviour in children with
	address children with mental health difficulties self-esteem	ties were identified and selected					and younger children	15% interval		al difficulties		emotional difficulties

<i>Chiumento et al, 2018</i>	Yes; understand the impact of a therapeutic horticulture intervention on mental wellbeing with children with mental health difficulties	Yes; purposive sampling identified children with behavioural and emotional difficulties	Yes; all children received same intervention	No; non-validated measures, administered at first and last session	Yes; age differences analysed separately, compared impact across different schools, administering measures on last day of school impacted results	No follow up	No statistically significant improvement in wellbeing post-intervention. Overall lower wellbeing scores	Effect sizes not reported, 95% confidence interval	Yes	Limited application to other settings due to the influence of confounding variables i.e. timing of measures	No; this does not fit in with research regarding the beneficial impact on nature on wellbeing	Horticultural intervention for children with behavioral and emotional difficulties do not have a significant impact on wellbeing.
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<i>Gabriel sen et al, 2018</i>	Yes; examine effect of wilderness therapy intervention on adolescents within mental health setting	Yes; volunteer sampling from mental health setting	Yes; consisted group structure, although conducted over different seasons, analysis accounts for this	Yes; pre-post intervention validated measures	No; large attrition rate, larger sample was needed to evaluate differences between groups, high degree variability in clinical, non clinical mental health difficulties	Yes; one year follow up	No statistical changes in pre-post outcomes. life effectiveness, anxiety and self-efficacy and coherence improved one year follow up	Moderate effect sizes, 95% confidence interval	Partially, impact of confounding variables post-intervention	Limited application to other settings due to the influence of confounding variables	Partially; Findings do not support evidence for benefit of nature contact on wellbeing. However, fits in with improved longitudinal effects of nature	Wilderness therapy for children with mental health difficulties, may improve wellbeing 12-month post-intervention
<i>Barton et al., 2016</i>	Yes; to measure impact of wilderness therapy expedition on self-esteem	Can't tell; unclear how attendees were selected for research study	Yes; wilderness therapy completed in different countries, minimized bias of environmental setting	Yes; validated measures used, collected at same time points in both groups	Yes; in group differences accounted for in analysis and comparison of wilderness therapy intervention groups	No follow up	Statistical significant increases in wellbeing (self-esteem and nature connectedness) in both groups	Effect sizes not reported	Yes; however risk of ceiling effect	Yes	Yes; results fit with research regarding positive effects of nature on wellbeing	Wilderness therapy may have a beneficial impact on aspects of wellbeing in children and adolescents

ii) Qualitative studies quality appraisal ratings based on CASP checklist

Study	1. Was there a clear statement of the aims of the research?	2. Is a qualitative methodology appropriate?	3. Was the research design appropriate to address the aims of the research?	4. Was the recruitment strategy appropriate to the aims of the research?	5. Was the data collected in a way that addressed the research issue?	6. Has the relationship between researcher and participants been adequately considered?	7. Have ethical issues been taken into consideration?	8. Was the data analysis sufficiently rigorous?	9. Is there a clear statement of findings?	10. How valuable is the research?
Fernee et al., 2019	Yes; to explore therapeutic mechanisms underlying a wilderness therapy intervention for	Yes	Yes; individual interviews and critical realist analysis	Yes; those awaiting treatment and those in service selected for participation, purposive sampling	Yes; semi-structured interviews within home, hospital, public settings	Researcher critically evaluated own role within working with adolescents, reflexivity	Yes; working with adolescents with mental health difficulties and issues of consent	Multiple researchers involved in analysis, completed all stages of critical realist analysis	Yes, 3 themes and 8 sub themes clearly stated.	Study contributes to understanding of processes of change within wilderness therapy
	adolescents					demonstrated	considered			

<i>Fernee et al., 2021</i>	Yes; to explore the perceived outcomes of wilderness therapy program for adolescents one year post-intervention	Yes	Yes; individual interviews and critical realist analysis	Yes; follow up study of participants from Fernee et al., 2019	Yes; semi-structured interviews within home, hospital, public settings	Same researcher involved from initial study. To mitigate allegiance effects, 2 other researchers were included in analysis	Yes; working with adolescents with mental health difficulties and issues of consent considered	Multiple researchers involved in analysis, completed all stages of critical realist analysis	Yes; 6 themes clearly stated	Study contributes to understanding of longitudinal changes following wilderness therapy. Support implications for wilderness therapy aftercare.
<i>Chiumento et al, 2018</i>	Yes; To explore children with mental health difficulties subjective experience of a therapeutic	Yes	Yes; however focus groups reduces insight into individual experience and increases	Yes; purposive sampling	Yes; however lack of adaptation from adult measures raises concerns how these were	Yes; researchers who conducted focus groups were not horticultural group facilitators to	Yes; ethics of working with children with mental health difficulties considered and	Analysis not thorough enough, not saturated enough, lack of interpretation	Yes; 3 themes identified from predefined definition from Mental wellbeing impact assessment	Contributes to understanding of impact on wellbeing. However further research needed insight to explore
	horticultural intervention		risk of bias		understood by children	reduce bias	researcher bias		ent (MWIA)	individual experience using age appropriate methods

<i>Gabrielsen et al, 2018</i>	Yes; The explore adolescents within a mental health care settings experience of a wilderness therapy intervention	Yes	Yes; individual interviews, however only first two stages of critical realist analysis	Yes; volunteer sampling, however may bias of participants who have positive experience of outdoors	Yes; two rounds of interviews at post-intervention and follow up	No; researcher bias not considered and impact of participant observation prior to interviews.	Yes; ethics of working with children with mental health difficulties considered and researcher bias	Analysis limited as only first two stages of critical realist analysis	Yes; 2 themes identified however no identified subthemes and lacks interpretation	Contributes to the understanding of the beneficial impact of wilderness therapy and how impact develops over time
<i>Sprauge et al 2020</i>	Yes; To explore health and educational impact of a nature-based education intervention	Yes	Yes; focus groups with students analyzed with thematic analysis	Yes; purposive sampling	Yes; interviews with each classroom who participated in intervention	No; researcher bias not considered, role of interviewer not stated	Not aware of ethics processes and evaluation within the study.	Analysis included multiple reviewers until consensus reached	Yes; 7 themes clearly identified	Contributes to understanding of experience nature education on low income, non-white children,
	on for urban low-income, non-white children						156			more rigorous examination of effects in future studies

Swank et al, 2015	Yes; To explore children's perceptions of their experience within the garden group counselling intervention	Yes	Yes; focus groups, drawings and unstructured interviews, analysed phenomenological analysis	Yes; purposive sampling	Yes; focus groups with groups of children, however audio not recorded	Yes; researchers who conducted focus groups were facilitators, bias considered	Ethics around consent considered	2 facilitators met and reviewed data and developed themes.	Yes; 3 themes clearly identified	Contributes to understanding of experience of children following group counselling, long term effects and comparison of indoor, outdoor effects suggested
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iii) Randomised control trials quality appraisal ratings based on CASP checklist

Study	1. Did the study address a clearly focused research question?	2. Was the assignment of participants randomised?	3. Were all participants who entered the study accounted for at its conclusion?	4. • Were the participants 'blind' to intervention they were given? • Were the investigators 'blind' • Were the people assessing/analysing outcome/s 'blinded'?	5. Were the study groups similar at the start of the randomised controlled trial?	6. Apart from the experimental intervention, did each study group receive the same level of care?	7. Were the effects of intervention reported comprehensively?	8. Was the precision of the estimate of the intervention or treatment effect reported?	9. Do the benefits of the experimental intervention outweigh the harms and costs?	10. Can the results be applied to your local population/in your context?	11. Would the experimental intervention provide greater value to the people in your care than any of the existing interventions?
Kang et al., 2021	Yes; To examine how a nature-based art therapy program impacts stress and self-esteem in	Yes; random assignment table used	Yes; 19.4% attrition	Yes; single-blind. Only the researcher doing the study knows which treatment or intervention the participant is receiving until the trial is over	Yes; The pre group homogeneity test results identified sex, age, stress level, and self-esteem to be homogeneous.	Yes; clearly defined study protocol	Yes; each outcome measure specified and results expressed. No effect size or power analysis	the confidence level of 95%, and the standard error of 5%	Yes; no cost-effective analysis completed, however statistical significant increases in self-esteem and reductions in stress	Study was conducted with a small (n=29) sample size. The dropout rate in the control group was high, resulting in a difference	Results show that nature-based group art therapy has a positive effect on children by alleviating stress, and



	adolescents						18	(p<0.05) No statistical significant changes observed in control group	in the number of the control group and the experimental group (11/18) This may impair the generalization of potential of the study	increasing self-esteem. To confirm the effectiveness of the intervention a broader range of study participants in future studies is needed
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**Participant Information Sheets**i) *Adult Participant Information Sheet***PARTICIPANT INFORMATION SHEET: PARENTS/ CARERS**

**Research project title: *Exploring the experience of nature-based therapy for children with long term health conditions and associated psychological difficulties.***

Hello. My name is Farhin Bhatti and I am a trainee clinical psychologist at Canterbury Christ Church University. I would like to invite your child to take part in this research study. Your child's participation is completely voluntary, if you decide they are not going to take part this will not affect their ongoing care at the hospital in any way. Before you decide I will go through this information sheet with you and answer any questions you may have.

The research study is being sponsored by the Department of Applied Psychology at Canterbury Christ Church University. This research study is supervised by Dr Tamara Leeuwerik (Senior Research Lecturer, Salomons Institute for Applied Psychology, t1227@canterbury.ac.uk) and xxxxxxxx (Clinical Psychologist, xxxxxxxxxxx).

**What is the purpose of the study?**

The study aims to explore your child's experience of the Woodland group. Although a lot of research has been done exploring outdoor nature-based therapy to support children with mental health difficulties. There has been less research on the benefits for those with long term health conditions such as, diabetes, cancer, chrohns disease and gastrointestinal issues, and their associated mental health difficulties, such as anxiety and low mood. I hope to find out more about this in this study.

**Why have I been asked to take part?**

Your child has been asked to take part in the study because they have shown an interest in attending the Woodland group. I am really interested to know about your child's experience of the day and any impact it might have had in their lives.

**Do I have to take part?**

It is up to you whether you would like your child to join the study. If you agree, I will ask you to sign a consent form before asking your child to sign an assent form. You are free to withdraw at any time, without giving a reason. Your decision will not affect your child's care in any way and they are very welcome to attend the Woodland group whether you take part in the research or not.

**What does the study involve?**

After your child attends the Woodland group, I will invite them to take part in an interview. The interview will be focussed on gaining an understanding of your child's experience of the day and how this has impacted their life. I would meet with your child either in person at XXXXXXXX Hospital or via video call on Zoom depending on

where they would feel most comfortable. I would then ask them a range of different questions about how they have experienced the Woodland group e.g. their decision to take part in the Woodland group, what they liked and disliked about the day, how the day has changed how they feel about themselves and their mental and physical wellbeing. The interview would take approximately 30min to 1 hour. If your child would like you to come along for support, you are welcome to sit in on the interview.

### **Expenses**

You and/or your child will be given a £10 shopping voucher for participation in the interviews (1 voucher per family).

### **What are the possible benefits of taking part?**

We hope that this research will give us a better understanding of how nature-based interventions are helpful for children with long term health conditions and associated psychological difficulties and could allow us to improve psychological support for them.

### **What are the possible disadvantages and risks of taking part?**

We hope that talking about their experience of the Woodland group will be a positive experience for your child and we do not anticipate any significant disadvantages or risks in taking part. If your child did seem to be finding the interview difficult, I would check whether they wished to continue. If not, I could arrange another time to see them or give them the option of withdrawing from the study if they preferred. At the end of the interviews, I would ask your child how they found the interview, and if they had any questions. If your child was distressed during or following the interview, I would contact you and think together about who would be most helpful for you and your child to talk to.

For example, you may want to contact your psychologist or therapist within the xxxxxxxxxxxxxx to discuss support options. There are also the following website available for support specifically for children;

- 1) Young Minds <https://youngminds.org.uk/find-help/for-parents/>
- 2) Child Line a free and confidential service for young people Telephone: 0800 1111 <http://www.childline.org.uk/>

### **What will happen if I don't want to carry on with the study?**

Should you decide that your child is going to participate in the study, you or they will be free to withdraw from the study at any time without having to give a reason. Their treatment at the hospital will not be affected in any way. If you or your child wishes to withdraw from the study, we would like to use your child's data collected up to your withdrawal. You will have up to 2 weeks after the interviews to choose if you want anything you said to be removed. After 2 weeks, this will not be possible as the information you gave us will have already been used in the research write up.

### **What if there is a problem?**

If you have a concern about any aspect of this study, you should ask to speak to me and I will do my best to address your concerns. You can contact me by leaving a message on the 24-hour voicemail phone number 01227 927070. Please leave a contact number and say that the message is for me, Farhin Bhatti, and I will get back

to you as soon as possible. Alternatively, you can email me on [fb180@canterbury.ac.uk](mailto:fb180@canterbury.ac.uk). If you remain dissatisfied and wish to complain formally, you can do this by contacting Dr Fergal Jones, Clinical Psychology Programme Research Director, Salomons Institute for Applied Psychology – [fergal.jones@canterbury.ac.uk](mailto:fergal.jones@canterbury.ac.uk)

### **Would my taking part in this study be kept confidential?**

Yes. We will follow ethical and legal practice and all information about your child will be handled in confidence. A code number will be used to identify your child, and I will keep the list that links codes to people's identity locked separately from the data. All data use is strictly within the Data Protection Act (DPA, 2018). Data will be kept locked away securely for ten years after the completion of the study and destroyed after this time. All audio tape recordings of interviews will be stored on a password protected encrypted USB stick. These interviews will be transcribed and anonymised. All audio files will then be deleted. Your child's responses to the survey questionnaires will be identifiable only by a unique participant code. If your child were to disclose details of risk to self or others during the interview or any time during the study, then I would need to discuss this with your care coordinator or other appropriate person or agency, who might then need to take further action. The following website contains further information on the University's research privacy notice if you wanted any further information on this <https://www.canterbury.ac.uk/university-solicitors-office/docs/research-privacy-notice.docx>

### **What will happen to the results of the research study?**

Anonymous data and findings from the study may be shared with research colleagues, presented at conferences and published in scientific journals. Anonymised quotes from the interview may also be included in the research write up. If you or your child is interested in receiving a report of the overall findings, let me know and I will send them to you when the study is finished.

### **Who is organising and funding the research?**

I am organising and leading this research study as part of my doctorate in clinical psychology. It is partially funded by my training organisation (Canterbury Christ Church University). This research study is supervised by Dr Tamara Leeuwerik (Senior Research Lecturer, Salomons Institute for Applied Psychology, [tl227@canterbury.ac.uk](mailto:tl227@canterbury.ac.uk)) and Dr xxxxxxxxxxxx(Clinical Psychologist, xxxxxxxxxxxx).

### **Who has reviewed the study?**

All research in the NHS is looked at by independent group of people, called a Research Ethics Committee, to protect your interests.

### **Further information and contact details**

Thank you for taking time to read this information sheet. If you would like to speak to me and find out more about the study or have questions about it answered, you can leave a message for me on a 24-hour voicemail phone line at 01227 927070. Please say that the message is for me, Farhin Bhatti, and leave a contact number so that I can get back to you. Alternatively, you can email me on [fb180@canterbury.ac.uk](mailto:fb180@canterbury.ac.uk).

***My research project is called: How do children in the paediatric psychology service, experience the Woodland groups?***

Hello. My name is Farhin Bhatti and I am a trainee clinical psychologist at Canterbury Christ Church University.



- I would like to invite you to take part in a research study. Before you decide, it is important that you understand why the research is being done and what would happen if you wanted to take part.
- Research projects are done to try and find out more about something. This is sometimes with people who use hospitals or clinics and sometimes with other members of the public. Research aims to find out new information to try and make things better for people.
- Please read this information carefully and talk to your parent or carer about the study. Ask me if there is anything that is not clear or if you want to know more. Take time to decide if you want to take part. It is up to you if you want to do this. If you don't then that's fine, you'll be looked after at the hospital just the same.

**What is the research for?**

We want to find out about how you found the Woodland group...

1. What was it like doing the different activities?
2. How did you feel about being outdoors?
3. How did the day make you feel about yourself?
4. What was helpful or unhelpful about the day?



There is not much research on this and we would like to see if outdoor therapy can help other children with health conditions too.

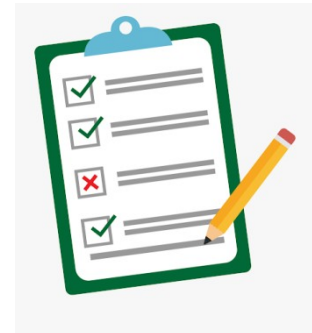
**Why have I been asked to take part?**

You have been asked to take part in the study because you have attended a Woodland group in the past, or you have said that you would like to attend a Woodland group in the future. I am really interested to know about your experience of the Woodland group and how it made you feel. We will be asking around 8-10 children to take part in the study.

### **Do I have to take part?**

No! It is entirely up to you. If you do decide to take part:

- You will be asked to sign a form to say that you agree to take part
- You will be given this information sheet and a copy of your signed form to keep.



You are free to stop taking part at any time during the research without giving a reason. If you decide to stop, this will not affect the care you receive from the hospital.

### **What will happen to me if I take part?**

Following the Woodland group, I would like to invite you to take part in an interview to tell us about how you found the day. We would like to ask you questions to find out:

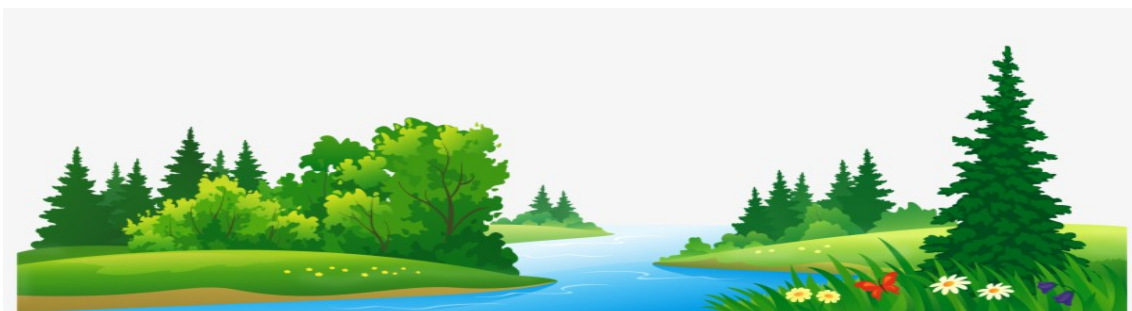
1. What it was like doing the different activities?
2. How did you feel about being outdoors?
3. How the day made you feel about yourself?
4. What was helpful or unhelpful about the day?

We can meet either in person, by video call (Zoom). You can invite your parent or carer to come with you if you would feel more comfortable. This would take approximately 30 minutes to 1 hour at most.

If you take part in our study you will receive a £10 shopping voucher!

### **Is there anything else to be worried about if I take part?**

We hope that taking part in the study for the woodland group will be a positive experience for you and we do not think there will be anything to be worried about. However, if at any time you want to stop the interview we can stop.



If you do need any further support following the interview I will talk with you and your

parent about the best person or service to offer this.

### **Why is it good for me to take part?**

We hope that this research will give us more information on how outdoor therapy, like the Woodland group, can help support children with long term conditions and improve the support provided.

What happens when the research study stops?

Your care at the hospital will continue. We will collect all the information together and we will let you know what our main findings are.

### **What will happen if I don't want to carry on with the study?**

If you leave the study, we would like to use the information you have given us until you stopped.

You will have up to 2 weeks after the interviews to choose if you want anything you said to be removed. After 2 weeks, this will not be possible as the information you gave us will have already been used in the research write up.



### **What if there is a problem?**

Tell us if there is a problem and you are unhappy with the research project, please talk to us and we will try and sort it out straight away. If you had a concern about this study, you can ask your parent or carer to contact me on the details at the end of this sheet.

Or if you would prefer you and your parent or carer can complain formally, by contacting Dr Fergal Jones, Clinical Psychology Programme Research Director, Salomons Institute for Applied Psychology [-fergal.jones@canterbury.ac.uk](mailto:fergal.jones@canterbury.ac.uk)

### **What will happen to my information?**

All information you share with us will be kept confidential and anonymous. This means no one will know your name or any personal information about you apart from the person who interviewed you. I may want to quote something you said to me in the interview and write this in my research paper, but no-one will be able to tell that it was you who said it.

What you talk about in your interview remains confidential. I will do my best to let you know if I have to share information with others. This might happen if you tell me something that makes me worry about your safety or the safety of others. Then I may have to talk to the clinic and your parents.

The interview will be typed up and will be stored securely at the university, without your name on it. Only I (Farhin Bhatti) and two research supervisors can look at the typed interview, but the research supervisors will not be told your name. Your name and contact details will be stored separately to the printed copy of our interview. After the study your name and contact details will be removed completely.

### **What will happen to the results?**

Anonymous data and findings from the study may be shared with research staff, presented at conferences and published in research journals. This means the research can be read by lots of people interested in this topic. Your name and other identifying information will not be included. I may want to quote something you said to me but no-one will be able to tell that it was you who said it. If you are interested in receiving a report of the results of the study, let me know and I will send them to you and your parent/ guardian when the study is finished.

**Who is organising and funding the research?**

I am organising and leading this research study as part of my doctorate in clinical psychology. It is partially funded by my training organisation (Canterbury Christ Church University).

Who has checked the study?

Before any research goes ahead in the NHS it has to be looked at by an independent group of people, called a Research Ethics Committee, to protect your interests.

**Further information and contact details**

Thank you for taking time to read this information sheet. If you would like to speak to me and find out more about the study or have questions about it answered, you can ask your parent to leave a message for me on a 24-hour voicemail phone line at 01227 927070. Please say that the message is for me, Farhin Bhatti, and leave a contact number so that I can get back to you. Alternatively, you can email me on [fb180@canterbury.ac.uk](mailto:fb180@canterbury.ac.uk)

**Do you want to take part?**

It is up to you whether you take part. Please email me or talk to me if you have any questions. If you take part you can change your mind and stop taking part at any time without having to give a reason. Your treatment at the clinic will not be affected in any way.



Thanks for reading!



**Semi-structured interview schedule****A) Introduction**

1. How old are you?
2. What country were you born in? Where are your parents from?
3. What health challenges do you have?  
*Prompt: How does this affect your life?*
4. How many Woodland Interventions (WI) have you attended?
5. Could you tell me about the item you have brought along?  
*Prompts: Why did you choose to bring/ make that item?*

**B) Before the WI**

1. What did you think of the WI when you first heard about it?  
*Prompts: Was there anything about it you felt excited about?*  
*Prompts: Was there anything you felt worried about?*
2. What kinds of things did you think you might do?  
*Prompts: How did you feel about that?*  
*Prompts: What did you think that might be like?*
3. What made you want to attend?  
*Prompts: What were the reasons that you decided to go?*  
*Prompts: Was there anyone that helped you decide?*

**C) During the WI**

1. Tell me about the activities you did on the WI?  
*Prompts: How did you feel...*  
*Prompts: What did you learn from the activities?*
2. Tell me about the other people in your group?  
*Prompts: How did it feel to be in a group?*  
*Prompts: Why did it feel like that?*
3. How was it different being outdoors compared to indoors?  
*Prompts: What was it like doing the activities outdoors compared to indoors?*  
*Prompts: What difference did it make for you being outside?*  
*Prompts: What made it a positive change?*  
*Prompts: What made it a negative change?*
4. Did anything surprise you? Did anything happen that you did not expect?

*Prompts: Was there anything you liked most about the day?*

*Prompts: Was there anything you didn't like about the day?*

*Prompts: Why...*

*Prompts: How did that make you feel?*

5. What could have been done differently?

*Prompts: Is there anything you wished happened?*

*Prompts: Was there anything that was missing from the day?*

*Prompts: Is there anything that could have improved to make it a better experience for you?*

*Prompts: Why would that have made it better?*

#### D) Following the WI

1. How would life be different if you didn't go on a WI?

*Prompts: Is there anything you think you would have missed?*

*Prompts: Why...?*

*Prompts: Tell me more...?*

2. Are there any changes you have noticed in yourself after the day?

*Prompts: Were there changes in how you felt about yourself after the day?*

*Prompts: How do you feel about being outdoors now compared to before the WI? Is there anything you are doing differently now?*

3. Why do you think those changes happened?

*Prompts: What was it about being outdoors that made these changes happen?*

*Prompts: Can you describe any thoughts and feeling about this?*

4. If another child was unsure about going on a WI, what would you tell them?

*Prompts: What would you say you learnt from the day?*

*Prompts: How would you say the day made you feel?*

5. What are your hopes for your future?

*Prompts: Anything you hope for?*

*Prompts: Anything you're worried about?*

## Appendix F

### Consent Forms

i) *Adult Consent Form*



Consent Form (Parent/Caregiver)

Title of Project: Exploring the experience of a nature-based intervention for children with long term health conditions and mental health difficulties

Salomons Institute for Applied Psychology  
One Meadow Road, Tunbridge Wells, Kent  
TN1 2YG  
[www.canterbury.ac.uk/appliedpsychology](http://www.canterbury.ac.uk/appliedpsychology)

Name of Researcher: Farhin Bhatti

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to think about the information, ask questions and have had these answered.
2. I understand that my participation and that of the child in my care is voluntary, and that we are free to withdraw from the study at any time without giving any reason. I can also choose to remove any information shared up to 2 weeks after the interview. This will not affect your child's participation on the Woodland group or other medical care within XXXX or legal rights.
3. I understand that data collected during the study will be looked at by the research team. I give permission for these individuals to have access to this data.
4. I understand that relevant data collected during the study may be looked at by the project supervisors Dr Tamara Leeuwerik and Dr xxxxxxxx I give permission for these individuals to have access to my data.
5. I understand that the interview may take place in person or via Zoom or phone, and I hereby give permission for this.
6. I understand that the interview will be digitally recorded for the purpose of data analysis, and I hereby give permission for the interview to be recorded.
7. I agree that anonymous quotes from my child's interview may be used in published reports of the study findings.
8. I agree to my child taking part in the above study.
9. I agree to take part in the above study.

10. Optional: I wish to receive a summary of the results on completion of the study.

11. Optional- I agree for my anonymous data to be used in further, ethically approved research studies.

Name of Parent/Caregiver \_\_\_\_\_

Date \_\_\_\_\_

Signature \_\_\_\_\_

Name of Researcher \_\_\_\_\_ Date \_\_\_\_\_

Signature \_\_\_\_\_

ii) *Child Assent Form*



Assent Form (Child)

Title of Project: How did children in the paediatric psychology service experience the Woodland group?

Name of Researcher: Farhin Bhatti

- 1. I confirm that I have read and understood the information sheet for the study. I have had time to think about the information and ask questions.
- 2. I understand that I do not have to take part and that I can change my mind at any time without giving a reason. I can also choose to remove any information I have shared up to 2 weeks after my interview. This will not affect my treatment at the hospital in any way and I can still attend the Woodland group.
- 3. I understand that information I share from my interview will be looked at by the research team.
- 4. I understand that personal information I provide to the researcher will be kept confidential and private.
- 5. I understand that the interview may take place in person or via video call e.g. Zoom.
- 6. I agree to the interview will be voice recorded.
- 7. I agree that quotes from my interview may be used in the study write up.
- 8. I agree to take part in the above study.
- 9. Optional- I wish to receive a summary of the results when the study has ended.
- 10. Optional- I agree for my anonymous data to be used in further, ethically approved research studies.

Name of Participant \_\_\_\_\_ Date \_\_\_\_\_  
 Signature \_\_\_\_\_

Name of Researcher \_\_\_\_\_ Date \_\_\_\_\_  
 Signature \_\_\_\_\_

## Summary of research findings provided to participants

Dear Participants,

I wanted to write to you to let you know about the woodland group research study that you took part in. We have now completed the research and I have written a summary below.

### **What we aimed to do:**

There is lots of evidence showing how nature therapy can help children and young people improve their physical and mental wellbeing. However, there isn't much research finding out how nature therapy can help children with long term health conditions. We understand that children with long term health conditions, like you, can face a lot of challenges. But there isn't much evidence on which types of the therapy are the best to support you. Therefore, we wanted to find if nature therapy helped you in any way and how it made you feel. What we find out about might be able to help other children with long term conditions, have access to nature therapy too.

### **How we did it:**

We spoke to 10 children aged 10-13, who had attended the woodland group like you did. We arranged meetings over Zoom, to ask them about their experiences of completing the different activities, what they thought about being in nature, any changes they noticed and why they thought these changes happened.

### **What we found out:**

From all the information participants shared with us, we found four main themes:

1. The woodland group helped participants to challenge themselves. They felt proud about their achievements and more hopeful about what they could do in the future.
2. The woodland group helped participants have more freedom and choice, supporting their confidence. Participants felt able to express themselves and be creative.
3. Participants felt connected to each other as they all struggled with something. This helped them feel more accepted. Participants also felt a deep connection to nature and felt like they belonged.
4. Participants felt being in nature activated their senses and helped them to stay focussed on the present, rather than their worries. This helped participants feel calmer and think more clearly.

### **What this means:**

Thanks to your participation, this study has helped us understand how nature therapy can help children and young people who have long-term health conditions and other difficulties. It is important for doctors and therapists to know about this so

they might be able to use nature therapy to help children and young people feel better. As there is not much research in this area, there is still a lot more to find out! However, we hope this study will help more children and young people in the future.

172

Thank you so much for taking part in this study, and helping us find out more about nature therapy.

Best wishes,  
Research Team

**Appendix H**

**Sample Transcript**

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## Example of organising Kaylee's Experiential Statements into PET's

### PARTICIPANT 10

Monday, 13 March 2023 13:16

#### IMPORTANCE OF AUTONOMY AND FREEDOM

Illness withdrew her independence, due to fears of risk, impacting her self-confidence p.14

Autonomy to make decisions to support own wellbeing on WWD, supported independence and empowerment p.13

Value of self-directed time to independently build connections with peers p.14

Being restriction in other settings e.g. school, increases the value of freedom p.14

WWD offers space to prioritise her own needs and regulate her emotions p.22/23

#### THE SAFETY OF THE WWD

Feeling safe to relax in nature, relieving feelings of threat and anxiety in the body 'less wired' p.19

Mindful awareness of nature facilitates calm creating safety p.19

Safety of environment depends on social temperament of group, calm outdoors versus anxious in schools p.20

Safety of environment depends on choice to be there versus (WWD) being forced to be there (school) p.20

Trust and safety with facilitators p.9

Collaboration with peers, feeling safe to ask for help and gaining accomplishment p.16

#### SOOTHED BY PREDICTABILITY

'Feeling the flow'-sensing the predictability of nature's rhythms can soothe anxiety p.10

Ritual of visiting same natural environment with family and friends is soothing amongst unpredictability of illness p.10

Consistent and trusting relationships is valued in unpredictability to life p.11

Familiarity and previous experience in nature supports enjoyment and comfortability p.11

Having WWD in same place every year is important to establish consistency p.11

#### SURPRISE OF MAKING FRIENDSHIPS

Isolated and judged by school peers, adapted to adversity by being her own friend, surprise to make friends on WWD p.7/8

More confidence to make friendships p.24

Surprised to make a friend on WWD, which increased feelings of safety p.20

#### RECONNECTING WITH COURAGE AND STRENGTH

1. WWD allowed introspection on personal qualities

Creating a Lion and tiger highlighted a personal connection to bravery, survival and independence p.7

Acknowledging courage is part of her life's story, strengthening her identity p.4

WWD activities allowed mindful self-reflection, allowing connection to her identity and courage p.3

Maintaining strength to hold on to hope amongst unpredictability of illness p.4

WWD supported introspection on strengths which supports self-esteem p.8

2. Activities supported sense of pride and accomplishment in abilities

WWD offers space to respect herself, recognise her strengths and capabilities and feel empowered p.22/23

Plant symbolises memories from WWD facilitating mindful introspection on her strength and growth p.18

Enjoyment in the process of overcoming difficulty in fire lighting task resulting in improved self-esteem p.15

Fire lighting resulted in confidence, fulfilment and self-belief in ability to achieve goals p.17

From shame to pride in her illness identity, p.24

#### VALIDATION THROUGH SHARED EXPERIENCE

1. Importance of shared struggle

Importance of shared struggle amongst peers on WWD reduced feelings of isolation and enabled connection p.12

Significance of group belonging, acceptance and shared struggle amongst peers with health condition p.9

Experiences of struggles with illness not feeling listened to heard- impacting self-esteem p.12

Innate connection between peers 'it's just a feeling' p.12

2. Vicarious introspection

Group-reflection stimulated empathy, hope, pride and shared resilience p.3

Vicarious introspection stimulated warmth and compassion p.4

WWD offers space for equality, shared understanding and connection p.22/23

Validation through sharing experiences with illness on WWD built empathy and respect p.13

### REGAINING HOPE FROM ILLNESS

#### 1. Challenges of illness

Significant impact of severe epilepsy on quality of life, inability to develop an identity outside of illness p.1

Traumatising experiences with illness, resulted in severe threat and anxiety p.1

Life-changing surgery 8 months ago, invasive and limiting, now regaining quality of life and independence p.1

WWWD provided an opportunity for respite, reconnecting with values through connection with nature p.2

Scarcity of quality time spent in nature opposed to just being outdoors p.10

#### 2. Growth of new beginnings

Plant symbolises new life, connection to nature and personal development p.3

Sense of fulfilment sharing responsibility to care for plant with Dad facilitating interpersonal and nature connection p.8

Plant growth symbolises mindful curiosity, excitement and hope p.9

Regaining quality of life, spending time on her music p.24

'Never lose courage' plant symbolises growth alongside illness p.6

### BEAUTY OF NATURE FACILITATING CALM P.10

#### 1. Beauty of nature stimulates mindfulness and calm

Visual radiance of WWWD nature stimulated feelings of awe p.5

'Aware of it all' mindful awareness to natural world through sensory exploration p.5

Mindful awareness of nature's beauty stimulates peace and calm p.13

Beauty of natural environment stimulates mindful awareness and sense of calm and ease p.9

Feeling calm, grounded and connected to nature on WWWD facilitated by sensory stimulation in natural world p.18

#### 2. Mindfulness supporting emotional regulation impacting sense of self and others

Mindfulness allows her to slow down, reflect and gain clarity and control of thoughts and emotions p.21

Mindfulness in nature also supports ability to form and maintain interpersonal relationships p.21

Mindful awareness stimulates gratitude and appreciation of natural world p.6

Humour in failure of clay modelling, acceptance of imperfection demonstrating emotional resilience p.6

Example of Organization of PET's into GET's

P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
<b>A. Challenging Health Related Anxieties P1</b>		<b>A. Reconnecting with pre-illness identity P3</b>	<b>A. Navigating safety and risk of nature P4</b>	<b>A. Healing impact of nature on health P5</b>	<b>A. Health-related fears of being in a group P6</b>	<b>A. Health related anxieties impact self-esteem P7</b>	<b>A. Establishing safety in the group P8</b>	<b>A. Innate personal connection to nature P9</b>	<b>A. Regaining hope from illness P10</b>
Anxiety of eating with others P1A		Desire to connect with pre-illness identity P3A	Impact of smoke to health P4A	Relief of going outdoors P5A	Fear of physical activities P6A	Self-doubt in abilities P7A	Managing risk with a health condition P8A	Feeling at home in nature P9A	Illness impacted quality of life P10A
Facing fears within the group P1A		Pride and confidence in abilities P3A		WWD increased value of health P5A	Navigating desire for connection and space P6A	Fears of being isolated P7A	Trust in facilitators P8A	WWD deepened connection P9A	Growth of new beginnings P10A
		Exceeding expectations of self P3A					Feeling protected in nature P8A		
<b>B. Restriction indoors to liberation outdoors P1</b>		<b>B. Feeling restricted to feeling liberated P3</b>	<b>B. Reducing beneficial impact of nature P4</b>	<b>B. Freedom to do what you want P5</b>	<b>B. Establishing safety P6</b>	<b>B. Social support facilitates safety P7</b>	<b>B. Social support shaping confidence P8</b>	<b>B. Importance of interpersonal connection P9</b>	<b>B. WWD provided a safe environment P10</b>
Discomfort of schools and hospitals P1B		Limitations of illness P3B	Previous experience in similar environment P4B	Permission to be messy P5B	Familiarly eased anxieties P6B	Social support shapes confidence P7B	Helping each other cross the finish line P8B	Fears of being in a group P9B	Feeling safe to relax P10B
Openness and freedom outdoors P1B		The empowerment of choice P3B	Adverse weather P4B	Less social rules P5B	Safety of natural environment P6B	Smaller groups facilitate safety P7B	Positive feedback P8B	Desire to connect others with disability P9B	Choosing to be together P10B
					Choice and freedom P6B	Collaboration rather than competition P7B		Social support facilitated confidence P9B	
<b>C. Freedom facilitates safety P1</b>	<b>A. Valuing the freedom to choose P2</b>	<b>C. Feeling safe to participate P3</b>	<b>C. Nature is energising P4</b>	<b>C. Initial anxiety and self-doubt P5</b>	<b>C. Nature simulates creativity P6</b>	<b>C. Natural environment enabled choice P7</b>	<b>C. Importance of agency for growth P8</b>	<b>C. Nature stimulates empathy for others P9</b>	<b>C. Valuing autonomy and freedom P10</b>
Appreciating sensible rules P1C	Choice can be taken away by illness P2A	Valuing rules that establish safety P3C	Stimulating creativity P4C	Doubt in one's abilities P5C	Art and music is inspired by nature P6C	Ownership of space P7C	Agency sparks creativity P8C	Empathy for animals P9C	Empowerment of choice P10C
Agency to eat where you want P1C	Choice is empowering P2A	Inclusivity of the day for all abilities P3C	Energising the physical body P4C	Suprise at activities offered P5C			Agency to manage own emotions P8C	Empathy for humans P9C	
Expressing individually through clothing P1C	Choosing to be together and connected P2A		Opportunity to be social with friends P4C						
<b>D. Sense of Awe in Nature P1</b>	<b>B. Calming the senses calming the mind P2</b>	<b>D. Mindful attention and calm P3</b>	<b>D. Nature calm the senses P4</b>	<b>D. Calming the senses calming the mind P5</b>	<b>D. Soothing the senses P6</b>	<b>D. Nature supports emotional regulation P7</b>	<b>D. Nature soothes anxiety P8</b>	<b>D. Nature supports emotional regulation P9</b>	<b>D. Beauty of nature facilitating calm P10</b>
Interactions with wildlife P1D	Nature engages the senses P2B	Nature sparked reflection and introspection P3D	Engaging the senses promotes mindfulness P4D	Sensory stimulation in nature P5D	Health impacts sensory sensitivity P6D	Calm and mindful attention P7D	Sensory stimulation in. nature P8D	Nature soothes the senses P9D	Mindful attention and calm P10D
The wonder of fire lighting P1D	Nature calms the body and the mind P2B	Engaging senses in present moment P3D			Sensory soothing eased anxieties P6D	Feeling more in control P7D	Focus on present moment P8D	Physical relaxation and calm P9D	Emotional regulation in nature P10D
An indescribable feeling P1D		Nature as a tool to relieve anxiety P3D				Improving relationships P7D			
<b>E. Moving with the flow of nature P1</b>	<b>C. Feeling connected to nature P2</b>	<b>E. Feeling connected to the natural world P3</b>	<b>E. Feeling at one with nature P4</b>	<b>E. Mindful reflection in nature P5</b>	<b>E. Connectedness with nature P6</b>	<b>E. Feeling connected to nature P7</b>	<b>E. Feeling part of nature P8</b>	<b>E. Connecting nature through senses P9</b>	<b>E. Soothed by predictability P10</b>
Nature is dynamic and engaging P1E	An innate human connection P2C	Curiosity P3E	Empathy with natural world P4E	Consolidating memories P5E	Belonging to natural environment P6E	Appreciation P7E	Belonging within natural environment P8E	Activities support connect to nature P9E	Feeling the flow of nature P10E
Being adaptable to the adversity of nature P1E	Maintaining connection to the natural world P2C	Gratefulness P3E		Emotional openness in nature P5E		Inspiration from nature P7E			
		Creativity		Increased focus and attention P5E		Fulfillment and purpose P7E			
<b>F. The joy of group belonging P1</b>	<b>D. Developing group belonging P2</b>	<b>F. Group differences impacted connection P3</b>	<b>F. Desire for friendship and belonging P4</b>	<b>F. Importance of group belonging P5</b>	<b>F. Interpersonal connection P6</b>	<b>F. Reconnecting with creativity P7</b>	<b>F. Group belonging and friendship P8</b>	<b>F. Dangers of nature P9</b>	<b>F. Validation through shared experiences P10</b>
Excitement to meet peers P1F	Shared differences facilitated closeness P2D	Differences in illness was a barrier P3F	Meeting others with health condition P4F	Overcoming fear and judgement P5F	Shared experience facilitates connection P6F	Beauty in imperfection P7F	Shared difficulties supported connection P8F	Nature poses risk to health P9F	Importance of shared struggle P10F
Being in it together P1F	Easier to make friendships on WWD P2D		Valuing shared differences P4F	Shared differences amongst peers P5F	Ease of nature supports connections P6F	Creativity supports self-expression P7F	Shared humour and laughter P8F	Lack of protection in natural world P9F	Vicarious introspection P10F
The value of new friendships P1F			Sadness not to make friends P4F	Desire for more time to connect P5F	Improved interpersonal relationships P6F		Having a shared goal P8F		
<b>G. Exceeding expectations of oneself P1</b>	<b>E. From self-doubt to confidence P2E</b>	<b>G. Impact of previous experience of nature P3</b>	<b>G. New skills and achievement P4</b>	<b>G. Pride and improving self-esteem P5</b>	<b>G. Pride and accomplishment P6</b>	<b>G. Building pride and confidence P7</b>	<b>G. Building confidence by feeling competent P8</b>	<b>G. Pride in learning and growing P9</b>	<b>G. Reconnecting with courage and strength P10</b>
Self doubt in one's abilities P1G	Self-doubt in abilities P2E	Familiarity with nature impacts enjoyment P3G		Adapting to adversity and challenge P5G	Tolerating self-doubt P6G	Novelty enables positive risk taking P7G	Doing better to feel better P8G	Desire to challenge self P9G	WWD allowed introspection on resilience P10G
Pride in overcoming challenging tasks P1G	Pride in completing tasks independently P2E			Sense of pride and accomplishment P5G	Determination to succeed P6G	Challenging own limitations P7G	Finding her voice P8G	Valuing progress over success P9G	Activities facilitated pride and accomplishment P10G
Changes following the day P1G	Feeling empowered by coping skills gained P2E				Sense of pride and achievement P6G	Increased sense of competence P7G	Novelty ans challenge of activities P8G	Surprise at achievements P9G	
						<b>H. Weather can impact enjoyment of nature P7</b>	<b>H. Previous exp of nature impacts enjoyment P8</b>		<b>H. Surprise of making friendships P10</b>

Summary of GET's

OVERCOMING ILLNESS IDENTITY	FREEDOM TO CHOOSE	SENSE OF CONNECTION	A MINDFUL PRESENCE
1. EXCEEDING SELF EXPECTATIONS	1. A RELEASE FROM RESTRICTION	1. SHARED STRUGGLE	
<b>A. Challenging Health Related Anxieties P1</b>	<b>B. Restriction indoors to release outdoors P1</b>	<b>F. The joy of group belonging P1</b>	1. ENAGING THE SENSES
Anxiety of eating with others P1A	Discomfort of schools and hospitals P1B	Excitement to meet peers P1F	<b>D. Soothing the senses P6</b>
Facing fears within the group P1A	Openness and freedom outdoors P1B	Being in it together P1F	Health impacts sensory sensitivity P6D
<b>A. Health related anxieties impact self-esteem P7</b>	<b>C. Freedom facilitates safety P1</b>	The value of new friendships P1F	Sensory soothing eased anxieties P6D
Self-doubt in abilities P7A	Agency to eat where you want P1C	<b>D. Developing group belonging P2</b>	<b>B. Calming the senses calming the mind P2</b>
Fears of being isolated P7A	<b>B. Feeling restricted to feeling liberated P3</b>	Shared differences facilitated closeness P2D	Nature engages the senses P2B
<b>C. Initial anxiety and self-doubt P5</b>	Limitations of illness P3B	Easier to make friendships on WVD P2D	Nature calms the body and the mind P2B
Doubt in one's abilities P5C	The empowerment of choice P3B	<b>F. Desire for friendship and belonging P4</b>	Engaging senses in present moment P3D
Self-doubt in one's abilities P1G	<b>A. Valuing the freedom to choose P2</b>	Meeting others with health condition P4F	<b>D. Nature calm the senses P4</b>
Self-doubt in abilities P2E	Choice can be taken away by illness P2A	Valuing shared differences P4F	Engaging the senses promotes mindfulness P4D
Tolerating self-doubt P6G	Choice is empowering P2A	Sadness not to make friends P4F	<b>D. Calming the senses calming the mind P5</b>
<b>A. Establishing safety in the group P8</b>	Choosing to be together and connected P2A	<b>F. Importance of group belonging P5</b>	Sensory stimulation in nature P5D
Managing risk with a health condition P8A	<b>A. Healing impact of nature on health P5</b>	Overcoming fear and judgement P5F	<b>D. Nature supports emotional regulation P7</b>
<b>A. Health-related fears of being in a group P6</b>	Relief of going outdoors P5A	Shared differences amongst peers P5F	Calm and mindful attention P7D
Fear of physical activities P6A	<b>B. Freedom to do what you want P5</b>	Desire for more time to connect P5F	Mindful attention and calm P10D
2. FEARS AND DESIRES	Less social rules P5B	<b>F. Interpersonal connection P6</b>	<b>D. Nature soothes anxiety P8</b>
<b>A. Reconnecting with pre-illness identity P3</b>	Choice and freedom P6B	Shared experience facilitates connection P6F	Sensory stimulation in nature P8D
Desire to connect with pre-illness identity P3A	<b>C. Natural environment enabled choice P7</b>	Ease of nature supports connections P6F	Focus on present moment P8D
<b>A. Regaining hope from illness P10</b>	Ownership of space P7C	Improved interpersonal relationships P6F	<b>D. Nature supports emotional regulation P9</b>
Illness impacted quality of life P10A	Choosing to be together P10B	<b>F. Group belonging and friendship P8</b>	Nature soothes the senses P9D
Growth of new beginnings P10A	<b>C. Valuing autonomy and freedom P10</b>	Shared difficulties supported connection P8F	<b>E. Soothed by predictability P10</b>
<b>G. Pride in learning and growing P9</b>	Empowerment of choice P10C	Shared humour and laughter P8F	Feeling the flow of nature P10E
Desire to challenge self P9G	2. CREATIVE EXPLORATION	Having a shared goal P8F	<b>E. Connecting nature through senses P9</b>
Navigating desire for connection and space P6A	<b>F. Reconnecting with creativity P7</b>	<b>F. Validation through shared experiences P10</b>	Activities support connect to nature P9E
Surprise at activities offered P5C	Beauty in imperfection P7F	Importance of shared struggle P10F	2. CALMING THE MIND
3. PRIDE AND ACCOMPLISHMENT	Creativity supports self-expression P7F	Vicarious introspection P10F	<b>E. Mindful reflection in nature P5</b>
<b>G. Exceeding expectations of oneself P1</b>	<b>C. Nature is energising P4</b>	<b>B. Social support facilitates safety P7</b>	Consolidating memories P5E
Pride in overcoming challenging tasks P1G	Stimulating creativity P4C	Social support shapes confidence P7B	Emotional openness in nature P5E
Changes following the day P1G	Energising the physical body P4C	Smaller groups facilitate safety P7B	Increased focus and attention P5E
<b>E. From self-doubt to confidence P2E</b>	Opportunity to be social with friends P4C	Collaboration rather than competition P7B	<b>D. Mindful attention and calm P3</b>
Pride in completing tasks independently P2E	<b>C. Nature simulates creativity P</b>	<b>B. Social support shaping confidence P8</b>	Nature sparked reflection and introspection P3D
Feeling empowered by coping skills gained P2E	Art and music is inspired by nature P6C	Helping each other cross the finish line P8B	<b>D. Beauty of nature facilitating calm P10</b>
<b>G. New skills and achievement P4</b>		<b>F. Group differences impacted connection P3</b>	WVD allowed introspection on resilience P10G
<b>G. Pride and improving self-esteem P5</b>		Differences in illness was a barrier P3F	p9 connecting values
Adapting to adversity and challenge P5G	WVD increased value of health P5A	2. WEAVED INTO NATURES ROAD	p7 connecting values
Sense of pride and accomplishment P5G	Agency sparks creativity P8C	<b>C. Feeling connected to nature P2</b>	Emotional regulation in nature P10D
<b>G. Pride and accomplishment P6</b>	Permission to be messy P5B	An innate human connection P2C	Improving relationships P7D
Determination to succeed P6G	Expressing individuality through clothing P1C	Maintaining connection to the natural world P2C	Nature as a tool to relieve anxiety P3D
Sense of pride and achievement P6G	Agency to manage own emotions P8C		Feeling more in control P7D
<b>G. Building pride and confidence P7</b>	<b>C. Importance of agency for growth P8</b>	<b>E. Feeling connected to the natural world P3</b>	
Novelty enables positive risk taking P7G	3. AGENCY TO FEEL SAFE	Curiosity P3E	Emo reg feeling like true self P9D
Challenging own limitations P7G	<b>C. Feeling safe to participate P3</b>	Gratefulness P3E	<b>E. Moving with the flow of nature P1</b>
Increased sense of competence P7G	Valuing rules that establish safety P3C	Creativity	Nature is dynamic and engaging P1E
<b>G. Building confidence by feeling competent P8</b>	Inclusivity of the day for all abilities P3C	<b>E. Feeling at one with nature P4</b>	Being adaptable to the adversity of nature P1E
Doing better to feel better P8G	Appreciating sensible rules P1C	Empathy with natural world P4E	
Finding her voice P8G	<b>B. Establishing safety P6</b>	<b>E. Connectedness with nature P6</b>	
Novelty ans challenge of activities P8G	Familiarity eased anxieties P6B	Belonging to natural environment P6E	
<b>G. Pride in learning and growing P9</b>	Safety of natural environment P6B	<b>E. Feeling connected to nature P7</b>	
Valuing progress over success P9G	<b>B. WVD provided a safe environment P10</b>	Appreciation P7E	
Surprise at achievements P9G	Feeling safe to relax P10B	Inspiration from nature P7E	
<b>G. Reconnecting with courage and strength P10</b>	<b>F. Dangers of nature P9</b>	Fulfillment and purpose P7E	
Activities facilitated pride and accomplishment P10G	Nature poses risk to health P9F	<b>E. Feeling part of nature P8</b>	
Pride and confidence in abilities P3A	Lack of protection in natural world P9F	Belonging within natural environment P8E	
Exceeding expectations of self P3A	P.10 consistency of environment important	<b>A. Innate personal connection to nature P9</b>	
	choosing to be together	Feeling at home in nature P9A	
		WVD deepened connection P9A	
		<b>C. Nature differentiates ourselves from others P8</b>	

## **Appendix L**

### **Pre- Analysis Bracketing Interview**

#### **1. What are my interests relevant to this research?**

Having enjoyed working with young people in my training and pre-training experience, I found myself drawn to research projects within this area. I was always curious about paediatric psychology and on finding out paediatric psychological interventions were under researched I was interested to learn more about young people's experiences and what helps them cope. I also had an existing interest in holistic approaches to mental wellbeing and liked to use creative therapeutic approaches in my work. When finalising our research topic, recently emerging from the covid-19 lockdown, I was acutely aware of how nature had been such a valued resource to support me with my own wellbeing in lockdown, and this drew me to the area further.

#### **2. What are my personal issues in undertaking this research?**

I was aware of the differences and similarities there may be between myself and the young people and families. I was aware of my ethnic difference in contrast with the predominantly ethnically white geographical areas of the hospital site, I would be recruiting from. Simultaneously, as a female, I was aware that statistically females access psychology services more frequently and mothers are more likely to arrange appointments for their child. Therefore, reflecting on my own social GRACES and thinking what may be highlighting in the room with participants. Additionally, as an adult interviewing children, I considering how I may be viewed by participants and conscious of building a therapeutic rapport in formal interview setting which is different to how I may have worked young people therapeutically.

#### **3. Where does the power belong in my research project and where do I belong in that hierarchy?**

In terms of recruitment, parents and carers held the power in whether their child took part although children were also able to provide their assent, there may have been some children who wanted to take part but whose voices were not heard. As a researcher, I held power in arranging meetings with participants. In the interviews with children, I understood I held authority as an adult and power imbalances that may present, and being mindful of social desirability bias in participant's responses. Despite this, I was aware of my own lack of knowledge in areas such as the health conditions participants will have. Participants within the research will be experts of their own experiences. I was aware of power my supervisors held in marking my work therefore wanting to present myself and my work in a positive way.

#### **4. What are my personal value systems and may impact me subjectively?**

My own feelings about the benefits of the natural world and my personal values of spending time in nature being important for me. My own interest in holistic approaches



to psychological interventions, may lead me to experiencing positive emotions when hearing about the beneficial experiences of the type of intervention. My own desire to help and work in paediatric services in future may result in me viewing this type of work positively.

### **5. What are possible areas of conflict?**

Parents and carers could be barriers to child participants taking part in the research e.g. challenge why it is worth their child taking part. Conscious of my aim to recruit a sufficient sample and provide a meaningful justification to taking up family's time, in their busy lives filled with hospital appointments and in the midst of their child's treatment. Encouraging children to talk about experiences of the intervention in the context of their health condition, could be sensitive and raise difficult emotions for the child participant. The study's findings may highlight negative experiences of intervention. This may be perceived negatively by external supervisor and consultant who are facilitators of the intervention

### **6. What feelings could indicate a lack of neutrality?**

Rapport building with child participants may involve some personal disclosure and knowing appropriate boundaries and whether this will present a potential issue within the research. Children giving short answers or not feeling able to speak in depth about their experience may lead to frustration and additional probing by the researcher, risking a rupture. Alternatively, there may be a risk of the researcher asking leading questions to get participants to elaborate more.

**Appendix M**

**Reflexive Log (abridged)**

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**Appendix N**

**Letter of ethical approval from Salomons ethics panel**

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**Appendix O**

**IRAS NHS ethical approval**

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## Appendix P

### Submission details of journal- Environmental Psychology

The *Journal of Environmental Psychology* is the premier journal in the field, serving individuals in a wide range of disciplines who have an interest in the scientific study of the transactions and interrelationships between people and their surroundings (including built, social, natural and virtual environments, the use and abuse of nature and natural resources, and sustainability-related behavior). The journal publishes internationally contributed empirical studies and **systematic** reviews and **meta-analyses** of research on these topics that advance new insights.

As an important forum for the field, the journal publishes some of the most influential papers in the discipline that reflect the scientific development of **environmental psychology**. Contributions on theoretical, methodological, and practical aspects of all **human-environment interactions** are welcome, along with innovative or interdisciplinary approaches that have a psychological emphasis.

Research areas include:

- Psychological and behavioral aspects of people and nature
- Cognitive mapping, spatial cognition and wayfinding
- Ecological consequences of human actions
- Theories of place, place attachment, and place identity
- Environmental risks and hazards: perception, behavior, and management
- Perception and evaluation of buildings and natural landscapes
- Effects of physical and natural settings on human cognition and health
- Theories of proenvironmental behavior, norms, attitudes, and personality
- Psychology of sustainability and climate change
- Psychological aspects of resource management and crises
- Social use of space: crowding, privacy, territoriality, personal space
- Design of, and experiences related to, the physical aspects of workplaces, schools, residences, public buildings and public space

#### **MANUSCRIPT ELEMENTS AND FORMATTING REQUIREMENTS**

All manuscripts must contain the essential elements needed to convey your manuscript, including: Abstract, Keywords, Introduction, Materials and Methods, Results, Conclusions, References, Appendices, Tables and Figures with Captions, and any Relevant Artwork.

In addition, we encourage all original submissions to conform to the American Psychological Association style (see the Publication Manual of the American Psychological Association, 6th ed., 2009). Figures and Tables should be embedded in the main manuscript file next to the relevant text (not separately at the end).

#### **METHODS AND RESULTS**

To ensure high reproducibility standards in the field of environmental psychology, whenever possible, all manuscripts should include and report; a) confidence intervals, b) effect-sizes, c) appropriately visualize raw (experimental) data with error bars, d)

include a power analysis or discussion of how sample size was determined, and e) include a clear statement or discussion of institutional ethics review and approval.

In addition, descriptive statistics must be clearly reported, including standard deviations, correlations, and exact sample sizes for each cell in experimental designs. In general, it is preferred that exact p-values are reported. Exploratory research is welcome but should be explicitly labelled as such to avoid Hypothesizing After Results are Known (HARKing). All submissions require a data availability statement. To further facilitate transparency, analyses should be reported with and without exclusion criteria, outliers, and covariates. Guidelines on mediation and moderation analysis are more complicated, please see our editorial on how to best report such results in the *Journal of Environmental Psychology*.

Manuscripts that do not conform to these (new) standards will be desk rejected. Please consult our [Editorial](#) (van der Linden 2019) for further guidance and details.

### **REFERENCE**

References should also conform to the American Psychological Association guidelines (see the *Publication Manual of the American Psychological Association*, 6th ed., 2009). Numbered reference systems should be avoided. Use of DOI is generally encouraged. The reference style used by the journal will be applied to the accepted article by Elsevier at the proof stage. Note that missing data will be highlighted at proof stage for the author to correct.

### **Formatting requirements**

All manuscripts must contain the essential elements needed to convey your manuscript, for example Abstract, Keywords, Introduction, Materials and Methods, Results, Conclusions, Artwork and Tables with Captions.

If your article includes any Videos and/or other Supplementary material, this should be included in your initial submission for peer review purposes.

Divide the article into clearly defined sections.

### **Figures and tables embedded in text**

Please ensure the figures and the tables included in the single file are placed next to the relevant text in the manuscript, rather than at the bottom or the top of the file. The corresponding caption should be placed directly below the figure or table.

## Appendix Q

### End of study letter to ethics panel

**Background:** Research has explored the beneficial impact of nature-based therapeutic intervention (NBTI) on children and young people's (CYP) wellbeing. CYP are currently at greater risk of developing mental health difficulties and these issues are exacerbated within CYP with LTC who face number of additional biopsychosocial challenges. Research exploring the experience of NBTIs within CYP with long term health conditions (LTC) and associated psychological difficulties (APD) is limited. More research within this area is needed to understand how NBTIs are experienced by CYP with LTC and APD and whether this may be an effective intervention to support their wellbeing.

**Aims:** The current study aimed to understand the experience of a NBTI designed to support wellbeing for CYP with LTC and APD. This study aimed to:

1. Explore how CYP with LTC and APD experience a NBTI designed to support wellbeing?
2. Understand how do participants perceive the impact of a NBTI, if any, on their mental and physical wellbeing?
3. Understand how do participants perceive the impact of a NBTI, if any, on their sense of self?
4. To consider what aspects of a NBTI do participants attribute any changes in their wellbeing to?

**Method:** This study used interpretative phenomenological analysis (IPA) to explore participations experience of the NBTI. Ten participations aged 10-13 were recruited through purposive sampling methods from one NHS hospital site. Participants took part in one-to-one semi-structured interviews via video call after attending the NBTI. Participants and their parents/carers were asked to read parent and carer and child participant information forms and sign consent and assent forms prior to the interview.

**Results:** The results highlighted CYP experienced improved self-esteem, through being provided with opportunities to challenge themselves and therefore gained more confidence in their abilities. Participants expressed the importance of having agency to express themselves while feeling safe and contained within their environment. Participants reported a deepened sense of belonging within peer group, having all experienced a shared struggle, feeling validated and accepted. Participants also reported feeling a sense of belonging within the natural world, which was strengthened by activities completed on the NBTI that actively engaged them with their surroundings. Lastly, participants reported sensory engagement with nature supported them to feel present in the moment, stimulating feelings of calm and an introspection and an improved ability to regulate emotions.

**Conclusion:** This study offered insight into the experiences of CYP with LTC and APD following a NBTI and the meaning the attributed to being within nature.

The study had implications for clinical practice, as it would be beneficial to consider the use of NBTIs treatment plans for CYP with LTC and APD, and contributes to the limited evidence base for the provision of psychological support for this population. Future research could examine mechanisms within NBTIs that mediate change for CYP with LTC and APD. As well as completing randomised clinical trials to establish the causal relationship between NBTIs and improved wellbeing.

