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Influence of human–forest relationships on perceived happiness in Finland

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Abstract

1. The social functions of forest resources must be acknowledged for effective forest management, given the environmental challenges facing humanity. The current study assessed the dimensions of human–forest relationships that influence perceived happiness of people. We focused on Finland, where an industrialised forest-based market economy coexists with a widespread cultural appreciation of forests.
2. We conducted a web-based national questionnaire survey to collect data on human–forest relationships that influence perceived happiness in Finland. We explore the contribution of forest exposure, engagement, characteristic of human–forest bond such as biophilic values, and cultural ecosystem services to *forest happiness* in Finland.
3. *Finnish forest happiness* appeared to have three main dimensions: (i) the bond to natural-like forests through values raised from the experienced connection with nature (i.e. biophilic values), (ii) utilitarian forest engagements and (iii) forest exposure. Although both forest bond and forest engagements contributed to eudaimonic happiness, only utilitarian engagements and managed forest environment contributed to hedonic happiness. Eco-anxiety has formed an elemental part of the bond to natural-like forests, indicating that this dimension of *Finnish forest happiness* can also reduce perceived happiness.
4. Among the respondents, the happiness of hunters and men was correlated with utilitarian engagements and managed forests, and the happiness of women was more strongly associated with the bond to natural-like forest. The happiness of those adults who now or in their childhood lived in the countryside was related to utilitarian forest engagements and managed forest environments. The lived forest experiences and cultural background shape how people perceive forests and which aspects contribute most to their forest happiness.
5. Our finding on the importance of cultural contexts and personal values in shaping the human–forest relationship emphasises the integration of cultural perspectives in forest management and conservation efforts, in addition to economic and

ecological aspects. As people appeared to exist on a spectrum between anthropocentric and ecocentric views, forest policies should provide opportunities for all kinds of forest relationships and *forest happiness* in their living environment.

KEYWORDS
biophilia, cultural ecosystem services, environmental attitudes, green space, human–nature relationship, nature connectedness, social values, well-being

1 | INTRODUCTION

In the past decade, humanity has faced various environmental challenges, ranging from the climate crisis to ecological disasters. Together with the COVID-19 pandemic, these are suggested to have contributed to increasing mental health concerns and declining human well-being. Under such pressures, human well-being has been recognised as a key metric of environmental justice (Edwards et al., 2016) and national prosperity (Joshanloo et al., 2019) because of its inherent connection to productivity, longevity and the overall functioning of societies (Oswald et al., 2015). Numerous scientific studies showed how exposure to green spaces, such as forests, significantly enhances human well-being through psychological and physiological benefits (Arifwidodo & Chandrasiri, 2024; Fagerholm et al., 2021). However, maximising the potential of forests in supporting human well-being requires a quantitative understanding of how individuals perceive and value them and how these benefits are shaped by their preferences, interaction and cultural context.

Direct contact with forests has been found to induce positive psychological responses in humans, such as stress relief (Song et al., 2018) and reduced anxiety (Guan et al., 2017), as well as physiological responses, such as decreased heart rate (Lee et al., 2014) and increased immune function (Wu et al., 2017). Based on these findings, forest-based interventions have been developed to support physical, mental and social well-being benefits (Karjalainen et al., 2010; Wen et al., 2019). Besides these objective medical measures of well-being, studies have demonstrated how quality, quantity and exposure to green spaces affect the happiness of residents (Krekel et al., 2016; White et al., 2013). However, most of these studies were conducted in urban environments. Although the past decade has seen well-being studies on types of forest interactions (Shin et al., 2013), forest exposure (Jung et al., 2015) and perceived restorative effects of forest management practices (Simkin et al., 2021; Takayama et al., 2017), most have overlooked the cultural background of the subjects and the social functions of forests. However, as conceptualised in the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services's (IPBES) nature's contribution to people (NCP) approach, culture permeates through and across all contributions that people obtain from nature (Díaz et al., 2018). Furthermore, this approach emphasises that these contributions can be both positive and negative depending on the perception of humans (Díaz et al., 2018) and that they are largely co-produced by the interaction of natural and human-made assets (Bruley et al., 2021; Isaac et al., 2025). Therefore, recognising the impact of cultural background on the human–forest interaction is imperative in understanding the depth of the human–forest relationship and, thereby, the benefits of well-being.

Forests differ from other natural environments ecologically, socially, culturally and politically due to their deep integration with human culture (Halla et al., 2023). Later, rapid industrialisation and urbanisation, which resulted in a change in land use, contributed to a disconnection from forests (Ritter & Dauksta, 2013). During the same time, the human–forest relationship shifted from co-existence to a more distant and often exploitative interaction driven by evolving societal demands. With increasing environmental challenges and growing awareness of the contribution of nature to climate change mitigation, people have increasingly acknowledged the ecological functions of forests. Recently, there has been an emerging emphasis on the cultural and social values of forests (e.g., spiritual values, humanistic values) in research and policy attempts (Lidestav et al., 2020), to restore the deteriorated human–forest relationship by prioritising the personal and emotional benefits forests offer, such as happiness. However, support for the socially beneficial human–forest relationship has proven difficult in industrialised countries that still predominantly prioritise the instrumental values of forests (IPBES, 2022).

Finland, being one of the most forested European countries, has taken a leading role in advancing forest and well-being research in multiple dimensions. Studies have explored public preferences for forests (Silvennoinen, 2017; Tyrväinen et al., 2003), the values and attitudes of forest owners (Koskela & Karppinen, 2021; Muttilainen et al., 2023), the perceived restorativeness of differently managed forests (Simkin et al., 2020, 2021), nature-based recreation (Korpela et al., 2014; Tyrväinen et al., 2017) and the diverse well-being impacts associated with forests (Tyrväinen et al., 2014). However, the happiness perspective has so far been understudied in Finland and globally, particularly on how specific forest characteristics, the different values associated with the forest, and various forest engagements and management approaches contribute to people's subjective experience of happiness. Forest policy-makers who typically focus on the physical aspects of the forest that are easy to quantify, often overlook the social functions of forests that contribute to people's happiness (Halla et al., 2023; Takahashi et al., 2021).

This study aimed to assess the dimensions of human–forest relationships that influence the perceived happiness of people in

Finland. We addressed two key questions: (i) What are the key dimensions of the human–forest relationship that influence people's perceived happiness? (ii) What values attributed to forests collectively contribute to individual happiness? The contemporary Finland studied here represents a country in which an industrialised market economy coexists with a widespread cultural appreciation of forests (Raatikainen et al., 2024). We offer a fresh perspective on *forest happiness* dimensions to enhance understanding of people's connection with forests and the core values associated with forests, which are crucial for forest management.

2 | CONCEPTUAL FRAMEWORK AND HYPOTHESIS

The concept of '*Forest Happiness*' is developed in this study by exploring how forest exposure, engagements with them, their characteristics and the existing human–forest bond contribute to the happiness that people perceive in forest environments. The concept is inspired by previous research that highlights improved well-being through forest-based interventions (Doimo et al., 2020) and the promotion of happiness in urban green spaces (Syamili et al., 2023). Here, we present the theoretical concepts and constructs of environmental psychology that guided the study design.

We identified four human–forest aspects from the previous human–nature relationship concepts/literature that we hypothesised to influence *forest happiness* in Finland, namely forest exposure, forest engagement, forest characteristics and human–forest bond. Figure 1 illustrates the detailed conceptual framework of the study with measures of the four aspects of the human–forest relationship and examples of how these aspects contribute to perceived happiness.

The first aspect of the human–forest relationship is forest exposure. We explore forest exposure by assessing the frequency and duration of forest visits and the distance to nearby forests. The second aspect, forest engagement, is assessed through the preferred recreational and forestry activities in a forest setting. We also targeted forest activities because in Finland private small-scale forest ownership and forest as a livelihood are particularly relevant (Laakkonen et al., 2023). Both these aspects were inspired by the framework of pathways linking biodiversity to human health (Marselle et al., 2021).

The third aspect, forest characteristics, explored the happiness-enhancing attributes of forests. These attributes were identified from previous preferential studies on forest landscape (Doimo et al., 2020; Gundersen & Frivold, 2008; Silvennoinen et al., 2001; Simkin et al., 2020). In this study, we assessed forest characteristics by asking respondents to choose forest environments that enhance their happiness (such as young forest, managed forest or old-growth

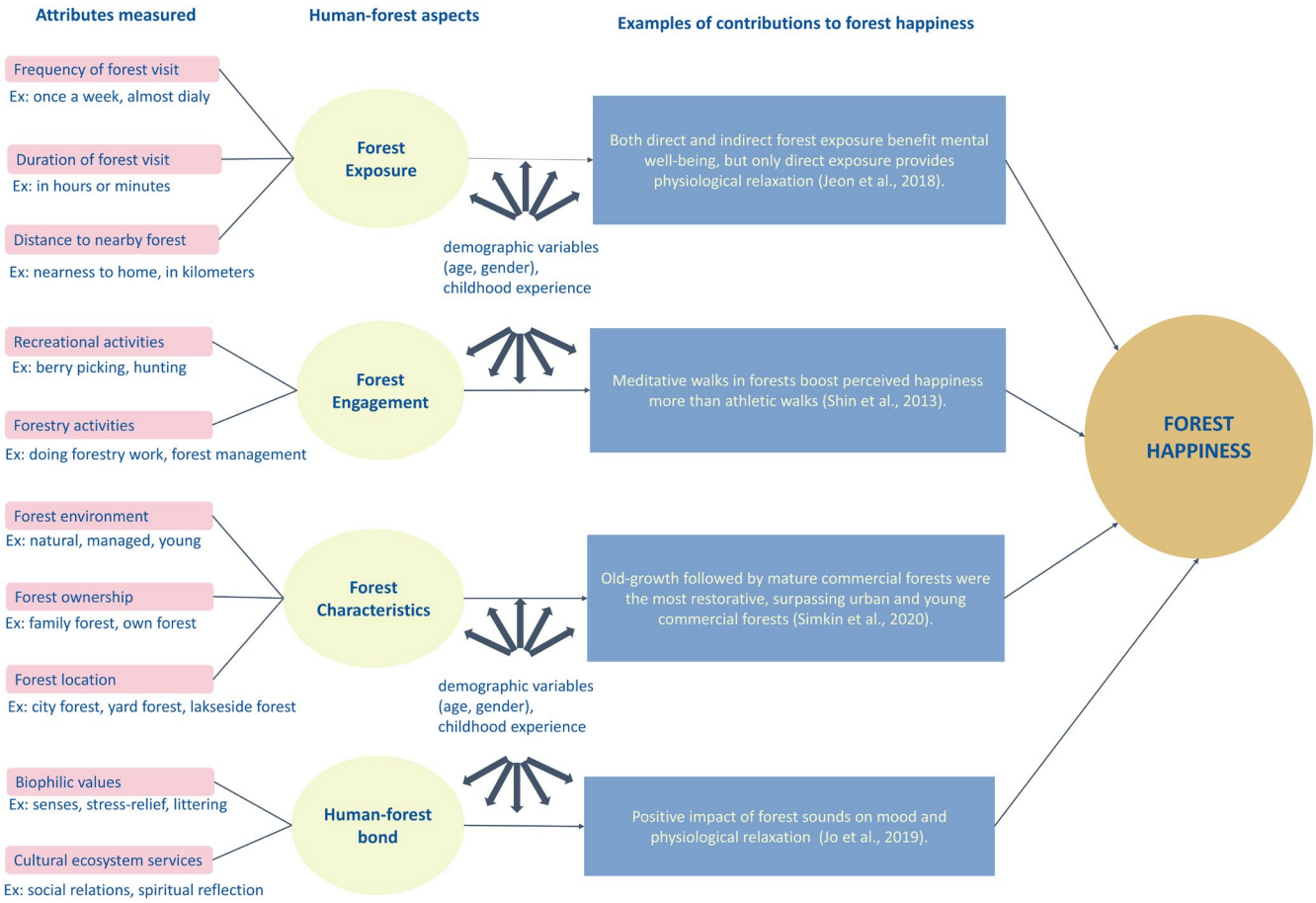

FIGURE 1 Conceptual framework of the study.

forests), status regarding forest ownership (such as own forest, family forest) and forest location (such as city forest, yard forest, forest near summer cottage and lakeside forest).

The fourth aspect, the human–forest bond, was inspired by one of the three dimensions of the human–nature relationship described by Flint et al. (2013): the character of the human–forest bond. Here, the bond describes how individuals relate to, value the forest and interact with the forest environment in terms of their emotional and experiential connection. In this study, the human–forest bond was conceptualised by integrating biophilic values and cultural ecosystem services (CES). Biophilic values represent the diverse ways humans connect with and appreciate nature, encompassing utilitarian, naturalistic, aesthetic, humanistic, moralistic, dominionistic and negativistic perspectives (Kellert, 1993). The CES classification categories considered in this study include spiritual values, social relations, sense of place, cultural values, aesthetic values and recreation (MEA (Millennium Ecosystem Assessment), 2005; Potschin & Haines-Young, 2013). To adapt these values to the Finnish context, we aligned them with social values developed (both positive and negative) for urban green spaces in Finland (Tyrväinen et al., 2007). Here we also wanted to cover the often-overlooked cultural ecosystem disservices (Hirons et al., 2016; Romanazzi et al., 2023), which are acknowledged in the NCP framework and are here incorporated within biophilic values and social values.

We conceptualised perceived happiness (Figure 2) from the well-being philosophy of hedonism and eudaimonism (Ryan & Deci, 2001), reflecting the overall sense of happiness of individuals. Hedonic well-being is considered subjective happiness and is defined as pleasure attainment and pain avoidance and consists of three components: satisfaction with life, the presence of a good mood and the absence of a bad mood (Kubovy, 1999). Eudaimonism, in turn, is closely related to psychological well-being, which includes six aspects: autonomy, personal growth, self-acceptance, life purpose, environmental mastery and positive relatedness (Ryff & Keyes, 1995). Happiness as an outcome is frequently equated with hedonism, while happiness accompanied by significance aligns with eudaimonism, but these well-being philosophies are not mutually exclusive. In this study, we assessed perceived happiness using a predefined scale that evaluates various aspects of hedonism and eudaimonism.

We hypothesise that all four human–forest aspects defined above collectively contribute to individuals' *forest happiness*. We expect these aspects to constitute distinct, yet interrelated dimensions of *forest happiness*.

3 | MATERIALS AND METHODS

3.1 | Study area

The study was carried out in Finland, where forests are considered a major source of economic and social well-being of the population. Finnish forests cover around 77% (20.3 million ha) of the land area (Natural Resources Institute Finland, 2023) and account for one-sixth of the total value of Finland's exports (Ministry of Agriculture and Forestry, 2024). Most Finnish forests are owned by non-industrial private forest owners who account for 60% of the forests. The average size of a forest holding is 30 ha, and the number of private forest owners is approximately 620,000 (14% of the Finnish population) (Natural Resources Institute Finland, 2019). More than 13% (2.94 million ha) of Finnish forests are protected, comprising forests in statutory protected areas and biodiversity conservation sites in commercial forests (Natural Resources Institute Finland, 2022). Private ownership and unhindered legal access to all forest land are crucial to the appreciation of forests by Finnish society (Björklund et al., 2023).

3.2 | Study design

To efficiently and economically collect nationwide data on *forest happiness* within relatively short time frames (Dillman & Bowker, 2000) and in a standardised way, we constructed a web-based questionnaire survey. The sampling framework consisted of people who reside in Finland, including nationals and internationals. The target population was people over 15 years of age. To make it inclusive, the questionnaire was constructed in Finnish, Swedish and English.

Once the survey was designed, it was pre-tested by conducting seven cognitive interviews using the think-aloud method to test the reliability and validity of the questionnaire design (Boeije & Willis, 2013). Cognitive interviewing is a qualitative method specifically designed to investigate whether a survey question satisfies its intended purpose (Willis, 2004). The think-aloud method is a

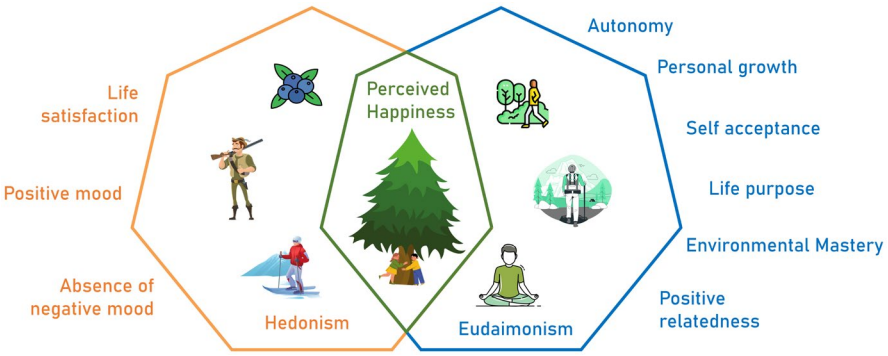

FIGURE 2 Framework of perceived happiness.

cognitive interviewing technique wherein participants are asked to actively verbalise their thoughts as they attempt to answer the survey items (Ericsson & Simon, 1980). We reviewed the survey items based on the results of the cognitive interviews.

The survey was administered through the Webropol platform (Webropol 3.0) and was kept open from late April 2023 until November 2023 (dataset: Manoj Santhi & Tuittila, 2025). Local newspapers, magazines, exhibitions, flyers and social networks (e.g. X and Facebook) were used as advertisement channels to ensure effective study coverage across the different age groups. Research is conducted under the responsible conduct of research (RCR) of the Finnish National Board for Research Integrity, TENK. According to TENK's RCR guidelines, ethical approval was not necessary for this study as the survey was completely anonymous and no identifiable or contact personal information was collected. Therefore, there was no intervention in the safety risks for the research participants. Furthermore, participation was voluntary, with written informed consent provided. Despite our rigorous design, the study had certain limitations, particularly the length of the questionnaire, the dependence on the web-based survey and the choice of nonprobability sampling.

3.3 | The questionnaire

The questionnaire (Appendix SI) was a combination of close-ended questions with multiple choices and multiple selections in combination with matrix questions. It was structured in five thematic sections. Sections 1 and 2 investigated the aspects of forest exposure, forest engagement and forest characteristics, while Sections 3 and 4 addressed the aspect of the human–forest bond and measured perceived happiness. Section 5 gathered the background information of the respondents.

Section 1 evaluated the attributes associated with general visits to Finnish forests (namely frequency and duration of visits, with whom the respondents went to the forest, mode of transport and the life phases and situations that corresponded to the time spent by the respondent in the forest). Section 2 addressed the specific Finnish forest that had increased the happiness of the respondents. Here, respondents were given the freedom to select a specific Finnish forest that they associated with increased happiness. This 'happiness forest' was self-identified based on the experiences and emotions of the respondents, without predefined criteria or limitations. Subsequently, the respondents answered the remaining questions (on forest characteristics, frequency of visits, distance to the forest and forest engagements) based on their chosen 'happiness forest'. Those who couldn't choose their 'happiness forest' were advised to skip the questions associated with this section.

Sections 3 and 4 assessed the variables of the existing human–forest bond that enhanced and decreased perceived happiness through a set of statements (Table 1). Here, both biophilic values and CES, which highlighted the variables of the human–forest bond, were assessed using non-monetary methods, specifically stated preference approaches, by ranking in questionnaires (Cheng et al., 2019). The presence of negative emotions was acknowledged in this section since we also considered happiness from a eudaimonic point of view.

To quantify the perceived happiness of the respondents, we formulate a framework for self-reported happiness based on the chosen

TABLE 1 Framework of human–forest bond variables (Appendix SI: Question numbers 19, 21).

Human–forest bond variables	Categories of biophilic values (BV)/ cultural ecosystem services (CES)/ social value mapping (SV)
Beautiful landscape, unaesthetic	Aesthetic value (BV, CES), Beautiful landscape (SV)
Sensory experience (contact, colour, scent, sound), stress relief, reduction in anxiety and depression levels	Naturalistic value (BV), Valuable nature site (SV)
Material benefits	Utilitarian value (BV)
Opportunities for physical activities	Recreation (CES), Opportunities for activities (SV)
History, culture and traditions, nostalgic memories	Humanistic (BV), History and culture (SV, CES)
Social interactions	Social Relations (CES)
Opportunities to be alone in peace, space and freedom, silence and tranquillity	Reflection, spiritual enrichment (CES), Space and freedom (SV)
Insufficient or incorrect management	Dominionistic value, moralistic value (BV)
Forest disappearance due to clear-cutting, changes in land use, biodiversity loss and pollution	Moralistic value (BV), Unpleasantness (SV)
Dangerous, uncomfortable, noisy, crowded	Negativistic value (BV), Noisiness (SV), Scariness (SV)
Pests, natural hazards	Negativistic value (BV)

statements from four different standardised scales. Each statement represented a concept of either hedonism or eudaimonism. The chosen statements were short, simple and realistic to minimise the time needed to complete the questionnaire (Table 2).

In Section 5, respondents were asked to provide background information, such as residence, gender, age, employment, childhood residence and education (Marselle et al., 2021). Relevant in the Finnish context, they were also asked about forest ownership and participation in hunting.

3.4 | Data analysis

We conducted a Kruskal–Wallis test to examine the association between happiness and the different forest visit frequencies between seasons. We applied principal component analysis (PCA) with variables on forest exposure (numerical and ordinal), forest engagement (binary), forest characteristics (binary) and human–forest bond (ordinal) to determine the main dimensions of *Finnish forest happiness*. Therefore, we used data from those respondents who selected their 'happiness forest' that enhanced their happiness ($n = 941$). Before analysis, ordinal data were assigned ranks and nominal data were converted to binary. The analysis was performed on 90 variables, one of them continuous, 38 ordinals and 51 binaries. Based on a decrease in the amount of variance captured by subsequent components, we selected a varimax-rotated three-dimensional PCA solution for our analysis. Analysis was performed using the R package 'PCAmixdata' (Chavent et al., 2022), where the standard PCA was used for the reduction in dimensions of continuous and ordinal variables combined with multiple correspondence analysis to understand the relationship pattern of categorical variables correlated, especially binary variables (Chavent et al., 2022). The variables loaded in each component indicate the strength and direction of the relationship between the variable and the respective principal component (PC). By grouping correlated variables together, PCA reveals distinct, yet interrelated human–forest aspects that influence *forest happiness* while preserving the most important variation in the data.

To evaluate the relationship between respondent characteristics, general forest visit behaviour and perceived happiness (including the various hedonic and eudaimonic aspects, see Table 2) with the *forest happiness* dimensions, we examined the correlation of these background variables with PCs. This was done with the 'envfit' function of the 'vegan' package of R (Oksanen, 2015). All statistical analyses were carried out using R version 4.3.2, and data were visualised with the package ggplot2 (v 3.3.0; Wickham, 2016).

4 | RESULTS

4.1 | Respondent characteristics

We received 973 complete responses (95% confidence range) during the survey period, of which 941 chose a specific Finnish forest that enhanced their happiness (Appendix SII). Female respondents were overrepresented in the survey (67.2% vs. 50.58% of Finland's population; UN (United Nations), 2024). The most frequent age group was

TABLE 2 Framework of perceived happiness (Appendix SI: Question number 18).

Well-being concepts		Statements	Source
Hedonism	Life satisfaction	I am satisfied with my life.	Satisfaction with Life Scale
	Presence of positive mood	I feel cheerful and in good spirits. I feel active and vigorous.	World Health Organisation Well-Being Index
	Absence of negative mood	I feel calm and relaxed.	World Health Organisation Well-Being Index
Eudaimonism	Autonomy	It is more important that I really enjoy what I do rather than that another person is impressed by it.	Questionnaire for Eudaimonic Well Being (Waterman et al., 2010)
	Personal growth	I believe I know my best potential and try to develop it whenever possible.	Questionnaire for Eudaimonic Well Being (Waterman et al., 2010)
	Self-acceptance	I've been thinking clearly.	Short Warwick–Edinburgh Mental Well-being Scale
	Life purpose	My life is centred around a set of core beliefs that give meaning to my life.	Questionnaire for Eudaimonic Well Being (Waterman et al., 2010)
	Positive relatedness	I feel close to other people.	Short Warwick–Edinburgh Mental Well-being Scale

41–65 years, followed by adults 31–40 years (Appendix SII). On the contrary, the most prevalent age group in the Finnish population is currently 20–39 years, closely followed by 40–59 years (UN (United Nations), 2024). Almost two-thirds of the survey respondents were employed (61.8%), followed by retired people (16.4%). However, 43% of the population is employed and 26% are pensioners according to Finland's current employment statistics (UN (United Nations), 2024). Although only 14% of Finland's population is identified as private forest owners (Leppänen & Torvelainen, 2015) without including familial ties, in our survey, more than half of the respondents or their families owned a forest. Hunters were overrepresented in the survey (17% vs. 5.33% of Finns; Finnish Wildlife Agency, 2025). Most of the participants were from suburban areas (45.27%), followed by those living in cities (21.79% vs. 86.4% of the urban population in Finland; UN (United Nations), 2024). Although suburban areas were also the most common place of childhood residency, the countryside and village centres ranked second and third, respectively. The international population was slightly underrepresented in the survey (6% vs. 10.2% of the Finnish population; UN (United Nations), 2024).

4.2 | Visit to the general forest

Almost two-thirds of the respondents (64%) stated that their lives would be considerably unhappier without their relationship with forests. In this section, respondents were allowed to select multiple options. Most of the respondents (70%) visited the forest alone, 50% with spouses, 35% with friends and 32% with pets. Around 27% accessed the forest by foot, 21.6% by car and 14% by bike. The respondents spent the most time in forests during their childhood years (7–12 years), followed by middle age (41–65 years). The life circumstances in which people spent the most time in forests were considered cheerful (35%), challenging (34%) and during the limitations of COVID-19 (28%). Walking (81.2%) was the most popular activity in forests, followed by picking berries/mushrooms/herbs (76.1%), socialising (74%), observing nature (73.4%), relaxing (69.4%), picnicking (69.1%) and spending time by yourself (67.5%). These findings on recreational activities align with the survey results of the 'Recreational Use of Nature 2020' survey (Neuvonen et al., 2022). The mean duration of a forest visit was 1 h and 36 min (SD = 1 h and 51 min). However, the duration of the visit was less than 1 h, as more than half of the respondents had forests within 300 m of their homes (Neuvonen et al., 2022). One of the possible explanations for our results on the long duration of the visit is that people travelled farther, such as more than 300 km, to visit forests that significantly enhanced their happiness or had sentimental value, such as childhood forests.

The frequency of visits to the forest was highest during summer, followed by autumn, spring and winter (Figure 3). This seasonal pattern aligns with previous findings, showing higher visitation rates in summer and spring compared to autumn and winter (Neuvonen et al., 2022). The effect of forest visit frequency on perceived happiness scores differs significantly between seasons (Kruskal–Wallis chi-squared = 157.72, df = 19, p-value <0.00). Compared to more frequent visitors, less frequent visitors show significantly lower perceived happiness levels, indicated by negative mean differences with statistical significance ($p < 0.01$). This difference is especially higher in spring and winter (p-value <0.01).

4.3 | Forest happiness dimensions

We conducted the PCA to identify key dimensions of *Finnish forest happiness*. A cumulative eigenvalue of 20.32 suggests that the first three PCs together explain a substantial amount of the structure of the dataset. Therefore, these three PCs, which encapsulate key aspects of the data structure, are collectively referred to as the dimensions of *Finnish forest happiness* in this study. As the analysis

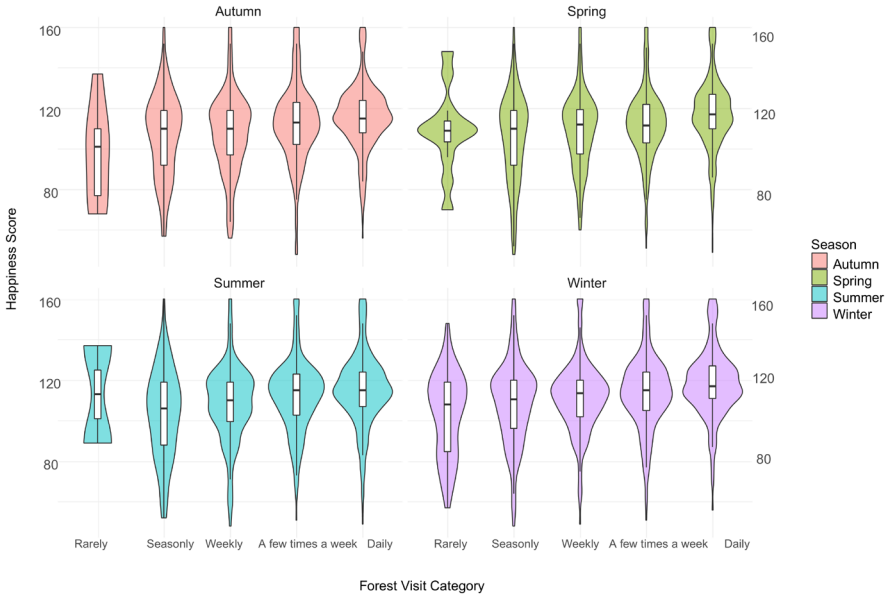

FIGURE 3 The distribution of perceived happiness scores across different categories of forest visits for each season. (The width of the violin represents the density of happiness scores. The white box in the centre shows the interquartile range [middle 50% of the data]. The black line inside the box indicates the median happiness score. The whiskers [thin vertical lines] show the extent of the data range, excluding outliers.)

incorporates both continuous and categorical variables, the variance is expected to be lower than in standard PCA but remains within the typical range for mixed data PCA.

The first principal component (PC1), which represents the first dimension of *Finnish forest happiness*, was primarily characterised by variables of the human–forest bond and secondarily by the forest characteristics of a natural-like forest setting. Based on these associations, the dimension of *forest happiness* reflected in PC1 is hereafter named '*bond to natural-like forests*' (Figure 4a; Appendix SIII).

The high-squared loadings of the human–forest bond variables in (ordinal) PC1 indicate that they strongly define PC1. These variables are related to three key biophilic values, such as naturalistic, moralistic and humanistic and the spiritual aspects of CES (Table 1). Naturalistic values (1.61) that enhanced *forest happiness* were colour (0.37), sound (0.35), scent (0.32), contact (0.30) and stress relief (0.27). In addition to variables that increased perceived happiness in this dimension (PC1), some variables decreased perceived happiness. Moral values (1.28) contributed to the variation by decreasing *forest happiness*, which were biodiversity loss due to intensive forest management (0.34), forest disappearance due to change in land use (0.33), pollution (0.31) and clear-cutting (0.30). These variables that disturbed individuals and decreased *forest happiness* were collectively referred to as eco-anxiety in this study and hereafter. Humanistic values (0.55) that increased *forest happiness* were nostalgic memories (0.20), forest relationships (0.20) and history, culture and traditions (0.15). The CES variables (0.84), which enhanced *forest happiness* (0.84), were silence and tranquillity (0.34), space and freedom (0.28) and opportunities for solitude (0.21) in the forest. Therefore, PC1 represents a spectrum of human–forest bonds that integrates both positive aspects of forest appreciation and negative aspects linked to eco-anxiety. This suggests that *Finnish forest happiness* and distress coexist within the same component, reflecting the complex human bond towards the forest. The comparatively low squared

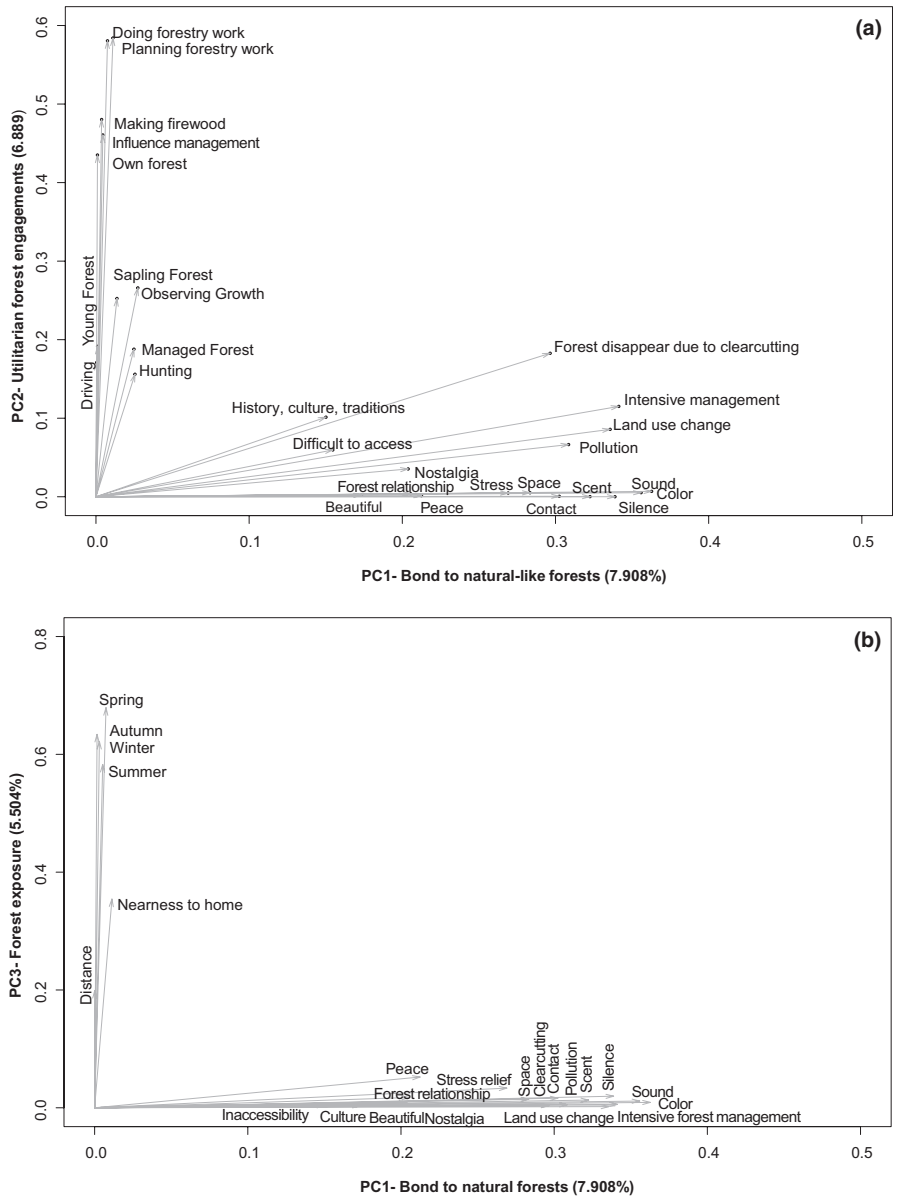

FIGURE 4 Contribution of variables for (a) principal component 1 (*bond to natural-like forests*) and principal component 2 (*utilitarian forest engagements*) and (b) principal component 1 (*bond to natural-like forests*) and principal component 3 (*forest exposure*). The longer the arrow, the higher the contribution, indicating a strong influence on the corresponding principal component. For squared loading values, see Appendix SIII.

loading variables (binary) associated with PC1 were forest characteristics, such as the presence of deadwood (0.11), natural forests (0.10) and old-growth forests (0.10). These loadings suggest that while these forest characteristics contribute to the variation in PC1, they are not as dominant as human–forest bond variables. Respondents may have preferred deadwood and natural-like forests either as part of their positive appreciation towards forests or as indicators of eco-anxiety, reflecting their environmental awareness.

The second principal component (PC2), representing the second dimension of *Finnish forest happiness*, was characterised by variables related to the aspect of forest engagement related to the utilitarian value and the characteristics of the forests more closely associated with managed forests. As forest engagements were not exclusively associated with the managed forest setting, the second dimension reflected in PC2 is hereafter named '*utilitarian forest engagements*' (Figure 4a; Appendix SIII). The high-squared loading variables (binary) associated with utilitarian activities related to forest management (2.1) and the low-loading variables (binary) related to recreational forest activities (0.53) suggest that PC2 captures a key contrast in forest engagement. The utilitarian activities related to forest management that contributed mainly to PC2 were planning forest operations (0.58), participating in forest work (0.58), burning wood (0.48) and participating in forest management (0.46). The recreational activities represented in PC2 were observing forest growth (0.26), hunting (0.16) and picking forest products (0.11). The managed forest characteristics associated with this component were forest ownership (0.43), sapling forests (0.25), young forests (0.19) and managed forests (0.18).

The third principal component (PC3), or the third dimension of *Finnish forest happiness*, is defined by forest exposure variables such as frequency of forest visits, proximity and distance to the forest. Therefore, this dimension reflected in PC3 is hereafter named '*forest exposure*'. The high-squared loading variables (ordinal) that contributed to PC3 included the frequency of visits during spring (0.68), autumn (0.63), winter (0.62) and summer (0.58), followed by proximity to home (0.35) and distance to the forest (0.20). PC3 suggests that regular forest exposure is a key determinant of *Finnish forest happiness*, and accessibility plays a crucial role in shaping exposure levels (Figure 4b; Appendix SIII).

4.4 | Relationships between background variables and forest happiness dimensions

The background variables considered in this analysis include perceived happiness, including both hedonic and eudaimonic aspects and the respondent characteristics. Among perceived happiness, hedonic aspects, such as the presence of a positive mood, the absence of a negative mood and life satisfaction, were strongly correlated with *utilitarian forest engagements* (PC2) (Figure 5; Appendix SIV). This suggests that the *utilitarian forest engagement* variables are strong predictors of the hedonic aspects of perceived happiness. However, the eudaimonic aspects of perceived happiness were correlated with both PC1 (*bond to natural-like forests*) and PC2 (*utilitarian forest engagements*), revealing variability across different eudaimonic aspects (Figure 5; Appendix SIV). Autonomy and purpose of life exhibited strong correlations with the *bond to the natural-like forests* (PC1). On the contrary, positive relatedness (positive relationship with others) and personal growth were correlated with both PC1 and PC2, while self-acceptance was strongly correlated with *utilitarian forest engagements* (PC2). The hedonic and eudaimonic happiness aspects had only a weak, mainly negative correlation with *forest exposure* (PC3) (Appendix SV).

The characteristics of the respondents, such as forest ownership, hunting, gender, childhood environment and residence, showed a weak but statistically significant association with PCA (Appendix SIV). Forest owners, hunters and males were correlated with happiness related to *utilitarian forest engagements* (PC2). On the contrary, the females were correlated with *forest happiness*, which was related to the *bond to natural-like forests* (PC1) (Figure 6a; Appendix SIV). Although male forest owners'

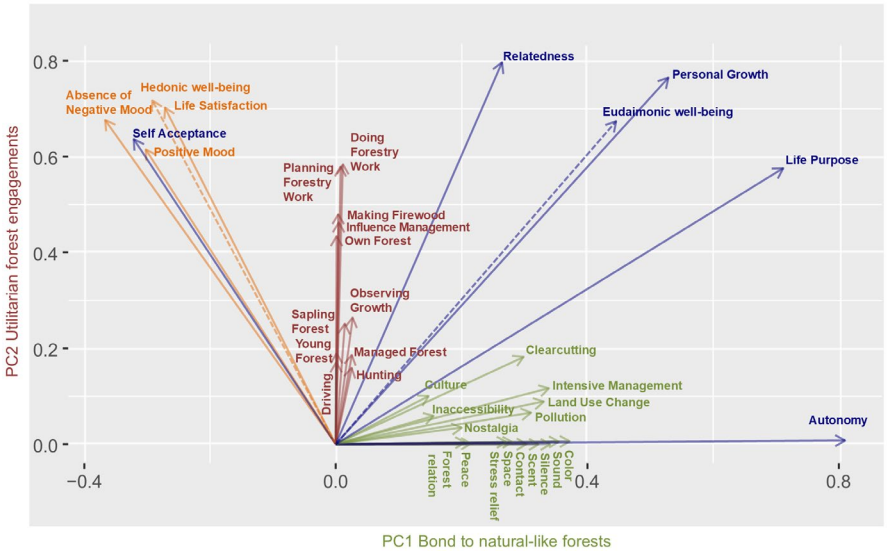

FIGURE 5 Correlation between principal component 1 (*bond to natural-like forests*) and principal component 2 (*utilitarian forest engagements*) with perceived happiness aspects. Different aspects of perceived happiness, treated as ordinal variables, are represented as vectors. The length of each vector indicates the strength of the correlation with the PCs. For exact values, see Appendix SIV.

FIGURE 6 In (a) Correlation between principal component 1 (*bond to natural-like forests*) and principal component 2 (*utilitarian forest engagements*) with the characteristics of the respondent. In (b) Correlation between principal component 1 (*bond to natural-like forest*) and principal component 2 (*utilitarian forest engagements*) with forest ownership presented by gender. The characteristics of the respondents, treated as binary variables, are shown as group centroids and the relative positions of the group centroids in the ordination space reflect the differences between the characteristics of the respondents. For correlation values, see Appendix SIV. FiW, making firewood; FoW, doing forestry work; MgF, managed forest; ObG, observing growth; OwnF, own forest; PFoW, planning forestry work; YoF, young forest.

happiness was more closely related to *utilitarian forest engagements* (PC2), both the *bond to natural-like forests* (PC1) and *utilitarian forest engagements* (PC2) contributed to *forest happiness* of female forest owners (Figure 6b; Appendix SIV). The lack of forest ownership was negatively linked to *utilitarian forest engagements* (PC2) (Figure 6b).

Individuals currently living in the countryside and those who spent their childhood there showed a positive association with *forest happiness* tied to *utilitarian forest engagements* (PC2), but a negative one with *bond to natural-like forests* (PC1) (Figure 6a) and *forest exposure* (PC3) (Appendix SV). However, those currently living in cities, as well as those who spent their childhood in city environments, exhibited a negative association with *forest happiness* tied to *utilitarian forest engagements* (PC2) (Figure 6a) but a positive association with *forest exposure* (PC3), the latter being stronger for current city residents (Appendix SV). Similarly, *forest happiness* of individuals currently living in suburban areas and with a childhood spent in the suburbs was negatively linked with *utilitarian forest engagements* (PC2) but positively associated with both *bondto natural-like forests* (PC1) (Figure 6a) and *forest exposure* (PC3), with the latter associations being relatively stronger for childhood residence (Appendix SV).

5 | DISCUSSION

Our study revealed that *Finnish forest happiness* can be conceptualised through three main dimensions: (i) *bond to natural-like forests* (PC1), (ii) *utilitarian forest engagements* (PC2) and (iii) *forest exposure* (PC3). The first two dimensions are partly conflicting: the utilitarian forest engagements and managed forest characteristics that brought *Finnish forest happiness* along the second dimension decreased *forest happiness* along the first dimension, characterised by human–forest bond variables and forest characteristics of natural forests. Another finding is that eudaimonic happiness was positively associated with both the *bond to natural-like forests*

and *utilitarian forest engagements*, but hedonic happiness was only linked to the latter. However, both perceived happiness aspects were negatively correlated to *forest exposure*. Male respondents tended to associate *Finnish forest happiness* with *utilitarian forest engagements* and females with the *bond to natural-like forests*. This pattern was also observed among male forest owners, but the *Finnish forest happiness* of female forest owners was associated with both dimensions. *Forest exposure*, the third dimension, was positively correlated with current residence or childhood spent in the city and suburban area and negatively correlated with residence or childhood living in the countryside and village centres. Despite these correlations, we underline that each individual has a unique life history and therefore exhibits a unique combination of happiness dimensions.

5.1 | Eudaimonism through forest bonds and engagements

Autonomy, life purpose, personal growth, positive relatedness and self-acceptance were the key eudaimonic aspects of happiness assessed in this study. Among these, autonomy and life purpose were more strongly associated with the *bond to natural-like forests*, echoing the findings by Nisbet et al. (2011), who linked these eudaimonic aspects, along with personal growth, to nature connectedness. Similarly, a recent Finnish study reported that nature can support all dimensions of eudaimonic well-being by enabling deeper connections with self, others and non-human nature (Järekari et al., 2025). Additionally, our results revealed that personal growth and positive relatedness were equally influenced by both the *bond to natural-like forests* and *utilitarian forest engagements*. This partially aligns with a Slovakian study, which demonstrated that practices that enhance forest diversity, sensory experiences and recreational activities positively influence subjective well-being (Výbošťok et al., 2024). These engagements can support personal growth by providing social opportunities to foster skills, community involvement, cultivate a sense of accomplishment and financial support. Thus, in the Finnish context, forest bonds and the forest engagements can be mutually reinforcing pathways to eudaimonic happiness for some individuals.

Self-acceptance was correlated exclusively with *utilitarian forest engagements*. This is further exemplified by the fact that the eudaimonic happiness of Finnish wellness travellers was strongly related to active engagement with forests (Saari et al., 2023). These engagements have the potential to act as drivers of environmental behaviour (Muradian & Pascual, 2018), as these interactions translate into experiences that evoke emotions (Raatikainen et al., 2020). Our results on eudaimonic happiness aspects agree with the findings that while economic considerations remain important, Finnish forest values cover a wide range of ecological, recreational and cultural dimensions that go beyond just commercial timber production (Halla et al., 2021). Therefore, these differentiated paths to eudaimonic happiness highlight the importance of recognising both forest bonds and engagements in designing forest-based interventions and policies, particularly in countries where forests play a significant role in the economy and daily life.

5.2 | Hedonism through utilitarian forest engagements

The most striking finding in this study was the exclusive association of hedonic happiness aspects such as life satisfaction, presence of positive mood and absence of negative mood with *utilitarian forest engagements*. In a recent study for Finnish wellness travellers, hedonic happiness was primarily associated with more passive forest engagements, such as rest, relaxation and escape from everyday life (Saari et al., 2023). However, our study showed that hedonic happiness was strongly associated with active *utilitarian forest engagements*, such as performing and planning forest work, hunting, observing forest growth, participating in forest management and picking berries and mushrooms. These are typical Finnish cultural ways of interacting with forests. An explanation for this might be that active forest involvement, in addition to providing a livelihood, offers physical activity, mental stimulation and a sense of belonging and stewardship. Although weak, our study found some association between hedonic happiness and managed forest environments. This association may be influenced by factors such as ownership and the unique characteristics of managed forests, which can enhance feelings of pride, satisfaction and a sense of control, thereby boosting hedonic happiness. These insights suggest that the Finnish conceptualisation of hedonic happiness is strongly orientated towards active *utilitarian forest engagement* and, to some extent, preferred managed forest environments. Consequently, these forest engagements in Finland may not inherently foster pro-environmental behaviour, as they often emphasise the utilitarian aspects of forests rather than solely focusing on biodiversity conservation.

5.3 | Finnish forest bond

The *bond to natural-like forest* dimension is primarily characterised by variables of the human–forest bond such as biophilic values and CES. The three key biophilic values—naturalistic, moralistic and humanistic—along with the spiritual aspects of CES contributed strongly to this *forest happiness* dimension.

5.3.1 | Naturalistic values

Our results revealed that, in the Finnish context, forest sensory experiences (colour, sound, smell and contact), as well as stress relief, were the predominant naturalistic values. The soothing effects of forests can be attributed to the calming influence of natural sounds, the restorative power of visual stimuli and the sense of

connection with the natural world that can help individuals find meaning and direction in life (Karjalainen et al., 2010; Meyer & Buerger-Arndt, 2014). This is comparable to the Japanese concept of forest bathing (shinrin-yoku), which restores the physical and psychological health of the human body through a 'five senses experience' (vision, smell, hearing, touch and taste) in a forest environment (Li, 2010). Several studies have found that being in the forest and experiencing the forest through the senses reduced depression, tension-anxiety, fatigue, confusion and anger-hostility, thereby enhancing the emotional state of human beings (Horiuchi et al., 2014; Karjalainen et al., 2010; Song et al., 2018; Výbošťok et al., 2024). In contrast to previous findings, which suggested that forests primarily elicit positive emotions and reduce negative emotions to enhance hedonic happiness (Doimo et al., 2020), we found that naturalistic values had a broader impact. Specifically, they influence one's actions on oneself, others and the world, such as reconnecting with nature, fostering a deeper sense of environmental responsibility, influencing pro-environmental behaviours in daily life and encouraging self-reflection on one's role within the natural world.

5.3.2 | Moralistic values

The current study conceptualised two prevailing perceptions of moral values related to forests in Finland: (i) the concern for appropriate forest use and (ii) eco-anxiety regarding forest well-being. Finland has historically been dependent on the utilisation of forests for food, energy, clothing, building materials, pastures and the export of forest products (Kotilainen & Rytteri, 2011; Rantala et al., 2020). This relationship to forests includes a mindset where neglect of the responsibility of appropriate forest management is seen as a failure to contribute to the common good of society, the Finnish forest industry and future generations (Rantala & Primmer, 2003). Many forest professionals who guide forest owners value private forestry and related forest traditions, emphasising their strong moral attachment to appropriate forest use (Karppinen & Korthonen, 2012; Takala et al., 2023). This moral value associated with appropriate forest management was reflected in the second dimension of *Finnish forest happiness* with respect to *utilitarian forest engagements* (PC2) (Appendix SIII).

The second perception of moralistic value on eco-anxiety stems from concerns related to clear-cutting, pollution, land-use changes and biodiversity loss caused by intensive forest management practices, which was reflected in the first dimension, the *bond to natural-like forests* (PC1). This resonates with a study in which Finnish participants reported eco-anxiety in response to human-induced environmental changes, accompanied by a sense of hopelessness about the future (Järekari et al., 2025). This indicates that disturbed landscapes generally affect personal well-being by altering attitudes (Kortmann et al., 2022). The wilderness and conservation of natural forests have been associated with the concept of *Finnishness*, especially at the end of the nineteenth century, as part of the development of national consciousness and societal values (Lassila, 2011; Roux et al., 2022). Even forest owners are willing to participate in conservation efforts, which reflects their moral responsibility towards the remaining natural-like Finnish forest despite having an economic interest (Kosenius, 2024). Therefore, as a society, moralistic values related to forest issues are the key to the perceived happiness of Finns, reflecting the belief that the forest has intrinsic value and should be protected from degradation as an ethical imperative, regardless of its usefulness to humans. However, they also align with the perception of negative contributions within the approach of NCP (Pascual et al., 2017), where individuals recognise that the delivery of desired benefits from natural forests to humans and nature is compromised due to forest degradation, thus contributing to eco-anxiety. Whether considered through the ecosystem services or NCP lens, both frameworks still semantically portray nature as instrumental to human well-being, reflecting a human-centred perspective (Kenter, 2018). In this context, these concerns encompass not only Finnish moralistic values but also an awareness of the diminished capacity of forests to contribute positively to human well-being if they are degraded.

5.3.3 | Humanistic values

Our results highlighted the influence of nostalgic memories, history, culture and traditions, thereby emphasising the key role of humanistic values in eudaimonic happiness. These cultural backgrounds, such as traditions, spirituality and philosophies, shape perceptions and establish the relationship with forests (Ritter & Dauksta, 2013). Moreover, nostalgic experiences with nature often form unconsciously and persist in our memories even without regular contact (Vainio et al., 2024). Therefore, these humanistic values also play a crucial role, since forests are integral to cultural and spiritual traditions. In the last decade, cultural aspects have been recognised in sustainable forest management through an emphasis on moral, spiritual and aesthetic aspects (Bengston et al., 2004; Tabbush, 2010). In the USA, this appreciation of cultural values has promoted a shift in forest value orientations from anthropocentric to biocentric views over time (Gray, 2021). Recognition and attitude towards forests are thereby rooted in cultural consciousness to some extent. Therefore, our results agree with the findings that emotional connections through experiences and cultural consciousness have more potential to influence the underlying values of the human forest than knowledge-based activities (Ives et al., 2017; Lumber et al., 2017).

5.3.4 | Cultural ecosystem services

In addition to the three biophilic values, in this study, specific aspects of CES, such as spiritual reflection, determine the human–forest bond in the Finnish context. Hirahara (2021) found that

social factors, such as interaction with people, can even influence the positive emotions one gains from the forest. However, this is not universal, and the demand for such services varies between cultures. In contemporary Finland, peace, beauty and integrity are often associated with forests (Raatikainen et al., 2024). Finnish culture widely accepts silence, personal space and opportunities for solitude as integral to daily life (Mannerström et al., 2023). The majority of our respondents valued similar cultural services from forests to enhance perceived happiness, such as silence and tranquillity, space and freedom and the opportunity to be in peace. These values were ranked similarly among respondents, regardless of background variables, suggesting that they are widely shared within the Finnish context. In contrast, CES, such as opportunities for social interactions or physical activities, received comparatively lower rankings in our dataset, indicating that they are not as easily generalisable (Appendix SIII), even though these were more prominent in other cultural contexts such as Australia or North America (Schipperijn et al., 2013). Here, the NCP approach offers a broader view by incorporating both generalised and context-specific perspectives than CES, which can be viewed only through a cultural lens (Díaz et al., 2018). Thereby certain forest-associated values can be generalised across individuals, whereas others are highly context specific, and the broadly shared forest-associated values among our Finnish respondents could be very differently perceived by people in other cultural contexts. This suggests that the cultural background of the subjects could significantly shape the human–forest relationship by influencing the sociocultural valuation of forest ecosystem services.

5.4 | Natural and managed forest environments: Key to perceived happiness

Our findings underscore that the variables associated with forest characteristics of natural forests, such as natural forests, old-growth forests and the presence of deadwood, are represented in the *bond to natural-like forest* (PC1), while those associated with managed forests, such as young forests, sapling forests and managed forests, are captured in the dimension of *utilitarian forest engagement* (PC2).

The variables referred to as eco-anxiety, which are related to the degradation of natural-like forests, lead to a decline in perceived happiness, particularly eudaimonic happiness. This aligns with the results of the preference study, which indicate that natural landscapes tend to be more visually appealing than intensively managed forests (Silvennoinen, 2017). In another study, uneven-aged forests and those management practices that shape diversity and sensory experiences increased perceived well-being (Výbošťok et al., 2024). Old-growth forests were found to be the most restorative for Finns, followed by mature commercial forests, urban recreation forests and young commercial forests (Simkin et al., 2020). In addition to that, the presence of deadwood was positively valued by the respondents, aligning with previous findings that understanding the ecological role of deadwood increases its perceived value (Martens et al., 2011; Simkin et al., 2021). Thus, our results indicate that Finns connect characteristics resembling natural-like forests with deeper aspects of happiness, such as eudaimonia.

Earlier studies have reported that managed urban forests are preferred by residents (Tyrväinen et al., 2003) and enhancing the affective well-being (Martens et al., 2011) compared to wild urban forests or dense forests with abundant undergrowth. Furthermore, forest management has been found to enhance landscape appreciation by improving visual qualities, such as brightness, but has a limited impact on the psychological restorative effects of forests (Takayama et al., 2017). Finns preferred beauty, biodiversity and naturalness, which differed between differently managed forests and had varying levels of perceived restorativeness (Simkin et al., 2021). Moreover, individuals tend to prefer landscapes experienced during childhood (Adevi & Grahn, 2011). Therefore, the observed correlation between general perceived happiness with managed forests for Finns in our study could be explained by their earlier exposure to managed forests, perhaps making them feel more familiar and comfortable compared to wild natural forests, influencing their mood and emotional responses (Martens et al., 2011). In our study, Finns associated the characteristics of managed forests with overall perceived happiness, including both eudaimonic and hedonic happiness.

Therefore, the choice between natural and managed forests in terms of happiness is individualistic, and these preferential dispositions are not homogeneous within the Finnish population. This aligns with the NCP approach, which acknowledges that certain aspects can be both positively and negatively valued by the same people depending on cultural, socioeconomic, temporal and spatial contexts, emphasising a pluralistic understanding of the diverse values underpinning the human–nature relationship (Díaz et al., 2018). Women, young, urban people, and those who do not own forests or have work related to forests tended to experience thinning less positively and saw clear-cuttings as more harmful than the others (Silvennoinen et al., 2002). They are shaped not only by forest characteristics but also by background characteristics, one's past exposure, engagement and nature connectedness (Martens et al., 2011; Simkin et al., 2021; Tyrväinen et al., 2003). An extension of this idea is found in our results where individuals with a countryside background exhibit a stronger *utilitarian forest engagement* dimension, whereas those from city and suburban contexts do not. In addition to that, forest cover, forest ownership, proximity and free access to Finnish forests are relevant when discussing the rich cultural and historical significance that forests hold in this region. The duality of forest preferences displayed in our results explains the continuous struggle between the preservation of natural forests and the use of forest resources in this society. Thus, our results suggest that the Finnish population spans a spectrum of perspectives, from anthropocentric views associated with managed forests to more ecocentric views linked to natural forests when it comes to perceived happiness.

5.5 | Importance of childhood experiences for Finnish forest happiness

The third dimension of *Finnish forest happiness*, forest exposure, was found to be strongly related to childhood experiences. Individuals with a childhood in the countryside tend to associate forests with everyday functional spaces and derive happiness from active *utilitarian forest engagements*, whereas *bonds to natural-like forests* are more pronounced among those with a suburban childhood. On the contrary, individuals with a childhood in the city are more associated with the dimension of *forest exposure* rather than bonds or utilitarian engagements. This agrees well with an earlier finding that the human–forest relationship is often established during childhood (Taye et al., 2019). Consequently, adults who had more contact with natural spaces during childhood tend to have better mental health outcomes compared to those with less childhood exposure (Preuß et al., 2019).

Several studies found a correlation between rural upbringing and positive forest experiences (urban with negative) with a pro-environmental attitude and appreciation (Bakir-Demir et al., 2019; Collado & Evans, 2019; Duron-Ramos et al., 2020). Consistent with these findings, respondents in our study who spent their childhood in the countryside reported stronger *utilitarian forest engagements*. Participants with rural childhood residences reported less apprehension towards natural environments compared to participants with urban childhood residences (Hinds & Sparks, 2011). However, those who spent their childhoods in the countryside or cities in Finland showed weaker associations with the *bond to natural-like forests*. These findings highlight not only the role of childhood environment but also the influence of cultural context and the availability of different forest environments. This pattern is further shaped by Finland's long-standing forest kindergarten system established over 30 years (since 1991), which promotes cultural awareness by integrating regular forest visits into childhood education (Anttonen, 2019; Kukkonen, 2019) even during the winter months. As a result, childhoods spent in cities and suburban areas are positively associated with *forest exposure*, underscoring the role of culturally mediated exposure to nature even in more urbanised contexts. Together, these findings highlight the importance of early ecological experiences in shaping children's attitudes towards nature and the environment, thereby emphasising the need to reconnect children, especially those in urban areas, with nature to promote their environmental awareness and conservation efforts as well as their adulthood well-being.

5.6 | Gender landscape of Finnish forest happiness

Our study explored demographic differences in *Finnish forest happiness* and found that the happiness of male forest owners, hunters and males in general was correlated with *utilitarian forest engagements* and a managed forest environment. Women own 41% of private forests in Finland, but their happiness is more strongly associated with the *bond to natural-like forests*. This is supported by a finding among landowners that women are more nature-oriented in their forest management, while men prioritise economic uses (Pynnönen et al., 2018). Among Finnish forest owners, females have a more diverse objective structure and value aesthetics, conservation and heritage more than economic and income-related objectives (Kuhlman et al., 2022). This aligns with a study in Georgia, which found that male landowners had stronger attachments to their forests, while female landowners were more influenced by specific dimensions of place attachment (Mook et al., 2022). Our findings regarding the correlation of *forest happiness* among female respondents with the *bond to natural-like forests* align substantively with the narrative of previously documented Finnish women, indicating that forests that provide well-being should be silent, peaceful and feature old trees (Laurén, 2009). Although direct research on the correlation between hunting and happiness is limited, hunting is recognised as a significant factor in forest management decisions (UNECE and FAO, 2020). In addition to gender perspectives, the happiness of forest owners in general was associated with activities in their forests, as these activities foster a strong sense of belonging.

5.7 | Limitations and policy implications

In our study, more than 95% of the respondents identified a specific Finnish forest that contributed to their happiness, more than half reported that they or their family owned a forest, and the survey also showed an overrepresentation of hunters, suggesting a possible bias towards people with a strong relationship with forests. Furthermore, the underrepresentation of younger participants (20–30 years) and international residents compared to the general Finnish population suggests either a lack of interest in participating in lengthy surveys or a weaker connection to Finnish forests. For international residents, possible reasons could also include differences in sociocultural values or unfamiliarity with the local landscape. Exploring how these factors influence their relationship with Finnish forests would be an interesting aspect for future research.

Understanding the relationship between *forest happiness* with forest values, forest engagement, forest preferences, cultural context and demographics can have significant impacts on decision-making and land-use planning in any country. Although well-being and preference studies should be treated as distinct, they may complement each other when well-being is evaluated using subjective measures, as demonstrated in our study. Our results show that the Finnish population exists on a spectrum between anthropocentric and ecocentric views. The happiness related to managed forests identified in our results is currently more secure, as this dimension of happiness is typically associated with the utilitarian engagement and control over the forest. This dimension showed only a very weak association with variables linked to a decline in *forest happiness* (see Appendix SIII). However, we found that the degradation of natural-like forests due to intensive management, clear-cutting, land-use changes, pollution and inaccessibility triggered eco-anxiety and led to a decline in *Finnish*

forest happiness along the first dimension. This result highlights that the shift from natural-like forests to a more management-oriented approach is not preferred by certain individuals and negatively influences their perception of *forest happiness*, emphasising the importance of protecting these natural-like forests. This indicates the importance of the availability of natural-like forests near human settlements as well. In that scenario, forest policies should be designed to balance both human needs and benefits while also ensuring the preservation of forests as ecological systems. This would harmonise policies with a pluralistic understanding of the diverse values held by the population.

Furthermore, the results highlight that forest exposure during childhood is not the only crucial factor in shaping the human–forest bond. Therefore, urban planners and policymakers should go beyond merely ensuring that children living in urban areas have access to and exposure to forests. They should also provide opportunities that foster meaningful interactions and values, enabling children in urban areas to build lasting relationships with forests.

Forest-based interventions or therapies should be tailored to align with existing relationships between people and forests, their preferred forms of engagement and forest characteristics, ensuring effective support for their well-being. A generic green/nature prescription on green space exposure will be less effective than one customised to individual preferences and needs. Furthermore, establishing indicators and systems to monitor the impact of forest-related policies on public happiness and well-being would enable evidence-based adjustments for more sustainable forest management and improved human-forest experiences.

AUTHOR CONTRIBUTIONS

Syamili Manoj Santhi, Tuomo Takala, Aino Korrensalo, Nataša Lovric, Jukka Tikkanen and Eeva-Stiina Tuittila conceived the ideas and designed the methodology; Syamili Manoj Santhi collected the data; Syamili Manoj Santhi, Tuomo Takala and Aino Korrensalo analysed the data; Syamili Manoj Santhi, Tuomo Takala, Aino Korrensalo, Nataša Lovric, Jukka Tikkanen and Eeva-Stiina Tuittila led the writing of the manuscript. All authors contributed critically to the drafts and gave final approval for publication.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this document.

DATA AVAILABILITY STATEMENT

The survey data are openly available in the Zenodo service at 10.5281/zenodo.17157949. Due to ethical and confidentiality reasons, the data supporting the background information of respondents in this study cannot be made publicly available. We have however included the background information about gender, childhood residence and forest ownership of the respondents.

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REFERENCES

Adevi, A. A., & Grahn, P. (2011). Preferences for landscapes: A matter of cultural determinants or innate reflexes that point to our evolutionary background? *Landscape Research*, *37*(1), 27–49. https://doi.org/10.1080/01426397.2011.576884

Anttonen, A. (2019). *Metsämörritoiminnan hyödyntäminen varhaiskasvatussuunnitelman oppimisen alueilla* (37 p.) [Bachelor's thesis]. Diaconia University of Applied Sciences.

Arifwidodo, S. D., & Chandrasiri, O. (2024). Urban green space visitation and mental health wellbeing during COVID-19 in Bangkok, Thailand. *Frontiers in Public Health*, *11*, 1292154. https://doi.org/10.3389/fpubh.2023.1292154

Bakir-Demir, T., Berument, S. K., & Sahin-Acar, B. (2019). The relationship between greenery and self-regulation of children: The mediation role of nature connectedness. *Journal of Environmental Psychology*, *65*, 101327. https://doi.org/10.1016/j.jenvp.2019.101327

Bengston, D. N., Webb, T. J., & Fan, D. P. (2004). Shifting forest value orientations in the United States, 1980-2001: A computer content analysis. *Environmental Values*, *13*(3), 373–392. https://doi.org/10.3197/09632710432331273

Björklund, H., Hiltunen, K., Purhonen, J., Rainio, M., Sääskilahti, N., & Vallius, A. (2023). *Luontosuhteiden luonto: Taiteentutkimuksen ja ekologian näkökulmia*. Nykykulttuurin Tutkimuskeskuksen Julkaisuja. http://urn.fi/URN:ISBN:978-951-39-9459-4

Boeije, H., & Willis, G. (2013). The cognitive interviewing reporting framework (CIRF). *Methodology*, *9*(3), 87–95. https://doi.org/10.1027/1614-2241/a000075

Bruley, E., Locatelli, B., & Lavorel, S. (2021). Nature's contributions to people: Coproducing quality of life from multifunctional landscapes. *Ecology and Society*, *26*, 12. https://doi.org/10.5751/ES-12031-260112

Chavent, M., Kuentz, V., Labenne, A., & Saracco, J. (2022). Multivariate analysis of mixed data. The R package PCAmixdata. *Electronic Journal of Applied Statistical Analysis*, *15*(3), 606–645. https://doi.org/10.1285/i20705948v15n3p606

Cheng, X., Van Damme, S., Li, L., & Uyttenhove, P. (2019). Evaluation of cultural ecosystem services: A review of methods. *Ecosystem Services*, *37*, 100925. https://doi.org/10.1016/j.ecoser.2019.100925

Collado, S., & Evans, G. (2019). Outcome expectancy: A key factor to understanding childhood exposure to nature and children's pro-environmental behavior. *Journal of Environmental Psychology*, *61*, 30–36. https://doi.org/10.1016/j.jenvp.2018.12.001

Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R. T., Molnár, Z., Hill, R., Chan, K. M., Baste, I. A., Brauman, K. A., & Polasky, S. (2018). Assessing nature's contributions to people. *Science*, *359*(6373), 270–272. https://doi.org/10.1126/science.aap8826

Dillman, D. A., & Bowker, D. K. (2000). The web questionnaire challenge to survey methodologists. In B. Batinic, U.-D. Reips, M. Bosnjak,

& A. Werner (Eds.), *Online social sciences* (pp. 53–71). Hogrefe & Huber Publishers.

Doimo, I., Masiero, M., & Gatto, P. (2020). Forest and wellbeing: Bridging medical and Forest research for effective Forest-based initiatives. *Forests*, *11*, 791. https://doi.org/10.3390/f11080791

Duron-Ramos, M. F., Collado, S., García-Vázquez, F. I., & Bello-Echeverria, M. (2020). The role of urban/rural environments on Mexican children's connection to nature and pro-environmental behavior. *Frontiers in Psychology*, *11*, 514. https://doi.org/10.3389/fpsyg.2020.00514

Edwards, G. A., Reid, L., & Hunter, C. (2016). Environmental justice, capabilities, and the theorization of well-being. *Progress in Human Geography*, *40*(6), 754–769. https://doi.org/10.1177/0309132515620850

Ericsson, K. A., & Simon, H. A. (1980). Verbal reports as data. *Psychological Review*, *87*(3), 215–251. https://doi.org/10.1037/0033-295X.87.3.215

Fagerholm, N., Eilola, S., & Arki, V. (2021). Outdoor recreation and nature's contribution to well-being in a pandemic situation-case Turku, Finland. *Urban Forestry & Urban Greening*, *64*, 127257. https://doi.org/10.1016/j.ufug.2021.127257

Finnish Wildlife Agency. (2025). *Hunting*. Retrieved March 10, 2025, from https://riista.fi/en/hunting/

Flint, C. G., Kunze, I., Muhar, A., Yoshida, Y., & Penker, M. (2013). Exploring empirical typologies of human–nature relationships and linkages to the ecosystem services concept. *Landscape and Urban Planning*, *120*, 208–217. https://doi.org/10.1016/j.landurbplan.2013.09.002

Gray, J. (2021). A review of ecocentric ethical orientation within the national forestry policy of Mediterranean rim countries. *Euro-Mediterranean Journal for Environmental Integration*, *6*(2), 46. https://doi.org/10.1007/s41207-020-00219-2

Guan, H., Wei, H., He, X., Ren, Z., & An, B. (2017). The tree-species-specific effect of forest bathing on perceived anxiety alleviation of young-adults in urban forests. *Annals of Forest Research*, *60*(2), 327–341. https://doi.org/10.15287/afr.2017.897

Gundersen, V. S., & Frivold, L. H. (2008). Public preferences for forest structures: A review of quantitative surveys from Finland, Norway and Sweden. *Urban Forestry & Urban Greening*, *7*(4), 241–258. https://doi.org/10.1016/j.ufug.2008.05.001

Halla, T., Holz, J., Karhunkorva, R., & Laine, J. (2023). The concept of the human-forest relationship (HFR)–definition and potentials for forest policy research. *Forest Policy and Economics*, *153*, 102995. https://doi.org/10.1016/j.forpol.2023.102995

Halla, T., Karhunkorva, R., Laine, J. M., & Leena, P. (2021). Human-forest relationship in Finland. In E. Johann, J. Kuismin, & J. Woitsch (Eds.), *European forests – Our cultural heritage: Proceedings of the international conference European forests – Our cultural heritage (IUFRO)* (pp. 169–188). Institute of Ethnology CAS. http://shop.eu.avcr.cz/en/domu/193-european-forests-our-cultural-heritage.html

Hinds, J., & Sparks, P. (2011). The affective quality of human-natural environment relationships. *Evolutionary Psychology*, *9*(3), 451–469. https://doi.org/10.1177/147470491100900314o

Hirahara, S. (2021). Evaluation of a structure providing cultural ecosystem services in forest recreation: Quantitative text analysis of essays by participants. *Forests*, *12*(11), 1546. https://doi.org/10.3390/f12111546

Hirons, M., Comberti, C., & Dunford, R. (2016). Valuing cultural ecosystem services. *Annual Review of Environment and Resources*, *41*(1), 545–574. https://doi.org/10.1146/annurev-environ-110615-085831

Horiuchi, M., Endo, J., Takayama, N., Murase, K., Nishiyama, N., Saito, H., & Fujiwara, A. (2014). Impact of viewing vs. not viewing a real forest on physiological and psychological responses in the same setting. *International Journal of Environmental Research and Public Health*, *11*(10), 10883–10901. https://doi.org/10.3390/ijerph111010883

IPBES. (2022). Summary for policymakers of the methodological assessment of the diverse values and valuation of nature of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. In U. Pascual, P. Balvanera, M. Christie, B. Baptiste, D. Gonzalez-Jimenez, C. Anderson, S. Athayde, D. Barton, R. Chaplin-Kramer, S. Jacobs, E. Kelemen, R. Kumar, E. Lazos, A. Martin, T. Mwampamba, B. Nakangu, P. O'Farrell, C. Raymond, S. Subramanian, & A. Vatn (Eds.), (pp. 1–37). IPBES Secretariat. https://doi.org/10.5281/zenodo.6522392

Isaac, R., Cumming, G. S., Felipe-Lucia, M. R., & Martín-López, B. (2025). The forest beyond the trees: A network perspective on governing co-production of nature's contributions to people. *Ambio*, *54*, 1–17. https://doi.org/10.1007/s13280-025-02187-9

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

Järekari, J., Fagerholm, N., Eilola, S., & Arki, V. (2025). Nature facilitates eudaimonic well-being through promoting connection with self and others. *People and Nature*, *7*, 2194–2211. https://doi.org/10.1002/pan3.70104

Joshanloo, M., Jovanović, V., & Taylor, T. (2019). A multidimensional understanding of prosperity and well-being at country level: Data-driven explorations. *PLoS One*, *14*(10), e0223221. https://doi.org/10.1371/journal.pone.0223221

Jung, W. H., Woo, J. M., & Ryu, J. S. (2015). Effect of a forest therapy program and the forest environment on female workers' stress. *Urban Forestry & Urban Greening*, *14*(2), 274–281. https://doi.org/10.1016/j.ufug.2015.02.004

Karjalainen, E., Sarjala, T., & Raitio, H. (2010). Promoting human health through forests: Overview and major challenges. *Environmental Health and Preventive Medicine*, *15*, 1–8. https://doi.org/10.1007/s12199-008-0069-2

Karppinen, H., & Korthonen, M. (2012). Do forest owners share the public's values? An application of Schwartz's value theory. *Silva Fennica*, *2012*(1), 222. https://doi.org/10.22004/ag.econ.199449

Kellert, S. R. (1993). The biological basis for human values of nature. In S. R. Kellert & E. O. Wilson (Eds.), *The biophilia hypothesis* (pp. 42–69). Island Press.

Kenter, J. O. (2018). IPBES: Don't throw out the baby whilst keeping the bathwater; put people's values central, not nature's contributions. *Ecosystem Services*, *33*, 40–43. https://doi.org/10.1016/j.ecoser.2018.08.002

Korpela, K., Borodulin, K., Neuvonen, M., Paronen, O., & Tyrväinen, L. (2014). Analyzing the mediators between nature-based outdoor recreation and emotional well-being. *Journal of Environmental Psychology*, *37*, 1–7. https://doi.org/10.1016/j.jenvp.2013.11.003

Kortmann, M., Angelstam, P., Mayer, M., Leibl, F., Reichert, J., Thorn, C., & Thorn, S. (2022). Disturbance severity and human–nature relationships: A new approach to analyze people's well-being along a bark beetle infestation gradient. *Forests*, *13*(11), 1954. https://doi.org/10.3390/f13111954

Kosenius, A. K. (2024). Forest owner attitudes and preferences for voluntary temporary forest conservation. *Small-Scale Forestry*, *23*(3), 493–513. https://doi.org/10.1007/s11842-024-09573-3

Koskela, T., & Karppinen, H. (2021). Forest owners' willingness to implement measures to safeguard biodiversity: Values, attitudes, ecological worldview and forest ownership objectives. *Small-Scale Forestry*, *20*(1), 11–37. https://doi.org/10.1007/s11842-020-09454-5

Kotilainen, J., & Rytteri, T. (2011). Transformation of forest policy regimes in Finland since the 19th century. *Journal of Historical Geography*, *37*(4), 429–439. https://doi.org/10.1016/j.jhg.2011.04.003

Krekel, C., Kolbe, J., & Wüstemann, H. (2016). The greener, the happier? The effect of urban land use on residential well-being. *Ecological Economics*, *121*, 117–127. https://doi.org/10.1016/j.ecolecon.2015.11.005

Kubovy, M. (1999). On the pleasures of the mind. In *Well-being: The foundations of hedonic psychology* (pp. 134–154). Russell Sage Foundation.

Kuhlman, J., Berghäll, S., Hurttala, H., & Vainio, A. (2022). Understanding the diversity of objectives among women forest owners in Finland. *Canadian Journal of Forest Research*, *52*(10), 1367–1382. https://doi.org/10.1139/cjfr-2022-0028

Kukkonen, R. (2019). *Tervetuloa metsäryhmään: Päiväkodin metsäryhmän arki lasten kertomana* (60 p.) [Bachelor's thesis]. Laurea University of Applied Sciences.

Laakkonen, A., Rusanen, K., Hujala, T., Gabrielsson, M., & Pykäläinen, J. (2023). Implications of the sustainability transition on the industry value creation logic–case of Finnish pulp and paper industry. *Silva Fennica*, *57*(3), 23024. https://doi.org/10.14214/sf.23024

Lassila, P. (2011). *Metsän autuus: luonto suomalaisessa kirjallisuudessa 1700–1950*. Suomalaisen Kirjallisuuden Seura.

Laurén, K. (2009). Metsä arkisen hyvinvoinnin lähteenä naisten kertomuksissa. *Alue Ja Ympäristö*, *38*(2), 13–24. https://aluejaymparisto.journal.fi/article/view/64386

Lee, J., Tsunetsugu, Y., Takayama, N., Park, B. J., Li, Q., Song, C., Komatsu, M., Ikei, H., Tyrväinen, L., Kagawa, T., & Miyazaki, Y. (2014). Influence of forest therapy on cardiovascular relaxation in young adults. *Evidence-based Complementary and Alternative Medicine*, *2014*(1), 834360. https://doi.org/10.1155/2014/834360

Leppänen, J., & Torvelainen, J. (2015). *Tilasto: metsämaan omistus 2013*. Luonnonvarakeskus.

Li, Q. (2010). Effect of forest bathing trips on human immune function. *Environmental Health and Preventive Medicine*, *15*, 9–17. https://doi.org/10.1007/s12199-008-0068-3

Lidestav, G., Bergstén, S., Keskitalo, E. C. H., & Linck, L. (2020). Forest social values: The case of Dalasjö, Sweden. *Scandinavian Journal of Forest Research*, *35*(3–4), 177–185. https://doi.org/10.1080/02827581.2020.1754454

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

Mannerström, R., Hietajärvi, L., Kuusisto, A., Salmela-Aro, K., & Kallioniemi, A. (2023). Value profiles among Finnish adolescents and their associations with subjective and social well-being. *Child Indicators Research*, *16*(2), 509–531. https://doi.org/10.1007/s12187-022-09992-8

Manoj Santhi, S., & Tuittila, E.-S. (2025). Questionnaire survey response (close-ended responses) on human-forest relationship and perceived happiness in Finland [data set]. *Zenodo*. https://doi.org/10.5281/zenodo.17157949

Marselle, M. R., Hartig, T., Cox, D. T. C., de Bell, S., Knapp, S., Lindley, S., Triguero-Mas, M., Böhning-Gaese, K., Braubach, M., Cook, P. A., de Vries, S., Heintz-Buschart, A., Hofmann, M., Irvine, K. N., Kabisch, N., Kolek, F., Kraemer, R., Markevych, I., Martens, D., … Bonn, A. (2021). Pathways linking biodiversity to human health: A conceptual framework. *Environment International*, *150*, 106420. https://doi.org/10.1016/j.envint.2021.106420

Martens, D., Gutscher, H., & Bauer, N. (2011). Walking in "wild" and "tended" urban forests: The impact on psychological well-being. *Journal of Environmental Psychology*, *31*(1), 36–44. https://doi.org/10.1016/j.jenvp.2010.11.001

MEA (Millennium Ecosystem Assessment). (2005). *Ecosystems and human well-being: Synthesis*. Island Press. https://www.millenniumassessment.org/documents/document.356.aspx.pdf

Meyer, K., & Buerger-Arndt, R. (2014). How forests foster human health–present state of research-based knowledge (in the field of forests and human health). *International Forestry Review*, *16*(4), 421–446. https://doi.org/10.1505/146554814813484103

Ministry of Agriculture and Forestry. (2024). *Forest resources in Finland*. Retrieved April 13, 2024, from https://mmm.fi/en/forests/forestry/forest-resources

Mook, A., Goyke, N., & Dwivedi, P. (2022). Conservation intentions and place attachment among male and female forest landowners. *Rural Sociology*, *87*(3), 817–846. https://doi.org/10.1111/ruso.12434

Muradian, R., & Pascual, U. (2018). A typology of elementary forms of human-nature relations: A contribution to the valuation debate. *Current Opinion in Environmental Sustainability*, *35*, 8–14. https://doi.org/10.1016/j.cosust.2018.10.014

Muttilainen, H., Hallikainen, V., Miina, J., Vornanen, J., & Vanhanen, H. (2023). Forest owners' perspectives concerning non-timber forest products, Everyman's rights, and organic certification of forests in eastern Finland. *Small-Scale Forestry*, *22*(1), 69–101. https://doi.org/10.1007/s11842-022-09528-6

Natural Resources Institute Finland. (2019). *Ownership of forest land 2016*. Retrieved April 13, 2024, from https://www.luke.fi/en/statistics/ownership-of-forest-land/ownership-of-forest-land-2016

Natural Resources Institute Finland. (2022). *Forest protection*. Retrieved April 13, 2024, from https://www.luke.fi/en/statistics/forest-protection/forest-protection-112022

Natural Resources Institute Finland. (2023). *Forest resources by region*. Retrieved April 13, 2024, from https://www.luke.fi/en/statistics/forest-resources/forest-resources-by-region-6

Neuvonen, M., Lankia, T., Kangas, K., Koivula, J., Nieminen, M., Sepponen, A. M., Store, R., & Tyrväinen, L. (2022). *Luonnon virkistyskäyttö 2020*. Natural Resources Institute Finland (Luke). http://urn.fi/URN:ISBN:978-952-380-429-6

Nisbet, E. K., Zelenski, J. M., & Murphy, S. A. (2011). Happiness is in our nature: Exploring nature relatedness as a contributor to subjective well-being. *Journal of Happiness Studies*, *12*, 303–322. https://doi.org/10.1007/s10902-010-9197-7

Oksanen, J. (2015). *Vegan: An introduction to ordination*. http://ftp5.gwdg.de/pub/misc/cran/web/packages/vegan/vignettes/intro-vegan.pdf

Oswald, A. J., Proto, E., & Sgroi, D. (2015). Happiness and productivity. *Journal of Labor Economics*, *33*(4), 789–822. https://doi.org/10.1086/681096

Pascual, U., Balvanera, P., Díaz, S., Pataki, G., Roth, E., Stenseke, M., Watson, R. T., Dessane, E. B., Islar, M., Kelemen, E., & Maris, V. (2017). Valuing nature's contributions to people: The IPBES approach. *Current Opinion in Environmental Sustainability*, *26*, 7–16. https://doi.org/10.1016/j.cosust.2016.12.006

Potschin, M., & Haines-Young, R. (2013). Landscapes, sustainability and the place-based analysis of ecosystem services. *Landscape Ecology*, *28*, 1053–1065. https://doi.org/10.1007/s10980-012-9756-x

Preuß, M., Nieuwenhuijsen, M., Marquez, S., Cirach, M., Dadvand, P., Triguero-Mas, M., Gidlow, C., Grazuleviciene, R., Kruize, H., & Zijlema, W. (2019). Low childhood nature exposure is associated with worse mental health in adulthood. *International Journal of Environmental Research and Public Health*, *16*(10), 1809. https://doi.org/10.3390/ijerph16101809

Pynnönen, K., Rantanen, T., Kokko, K., Tiikkainen, P., Kallinen, M., & Törmäkangas, T. (2018). Associations between the dimensions of perceived togetherness, loneliness, and depressive symptoms among older Finnish people. *Aging & Mental Health*, *22*(10), 1329–1337. https://doi.org/10.1080/13607863.2017.1348479

Raatikainen, K. J., Juhola, K., Huhmarniemi, M., & Peña-Lagos, H. (2020). "Face the cow": Reconnecting to nature and increasing capacities for pro-environmental agency. *Ecosystems and People*, *16*(1), 273–289. https://doi.org/10.1080/26395916.2020.1817151

Raatikainen, K. J., Tupala, A. K., Niemelä, R., & Laulumaa, A. M. (2024). The intricate diversity of human–nature relations: Evidence from

Finland. *Ambio*, *53*, 181–200. https://doi.org/10.1007/s13280-023-01933-1

Rantala, S., Swallow, B., Paloniemi, R., & Raitanen, E. (2020). Governance of forests and governance of forest information: Interlinkages in the age of open and digital data. *Forest Policy and Economics*, *113*, 102123. https://doi.org/10.1016/j.forpol.2020.102123

Rantala, T., & Primmer, E. (2003). Value positions based on forest policy stakeholders' rhetoric in Finland. *Environmental Science & Policy*, *6*(3), 205–216. https://doi.org/10.1016/S1462-9011(03)00040-6

Ritter, E., & Dauksta, D. (2013). Human–forest relationships: Ancient values in modern perspectives. *Environment, Development and Sustainability*, *15*, 645–662. https://doi.org/10.1007/s10668-012-9398-9

Romanazzi, G. R., Koto, R., De Boni, A., Palmisano, G. O., Cioffi, M., & Roma, R. (2023). Cultural ecosystem services: A review of methods and tools for economic evaluation. *Environmental and Sustainability Indicators*, *20*, 100304. https://doi.org/10.1016/j.indic.2023.100304

Roux, J. L., Konczal, A. A., Bernasconi, A., Bhagwat, S. A., De Vreese, R., Doimo, I., Govigli, V. M., Kašpar, J., Kohsaka, R., Pettenella, D., Plieninger, T., Shakeri, Z., Shibata, S., Stara, K., Takahashi, T., Torralba, M., Tyrväinen, L., Weiss, G., & Winkel, G. (2022). Exploring evolving spiritual values of forests in Europe and Asia: A transition hypothesis toward re-spiritualizing forests. *Ecology and Society*, *27*(4), 1–20. https://doi.org/10.5751/ES-13509-270420

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, *52*(1), 141–166. https://doi.org/10.1146/annurev.psych.52.1.141

Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, *69*(4), 719–727. https://doi.org/10.1037/0022-3514.69.4.719

Saari, S., Grénman, M., & Varhelahti, M. (2023). The relationships between happiness, wellness tourist motivation, and tourism destination among Finnish wellness travellers: Insights from the world's "happiest nation". *International Journal of Spa and Wellness*, *6*(3), 305–328. https://doi.org/10.1080/24721735.2023.2263310

Schipperijn, J., Bentsen, P., Troelsen, J., Toftager, M., & Stigsdotter, U. K. (2013). Associations between physical activity and characteristics of urban green space. *Urban Forestry & Urban Greening*, *12*(1), 109–116. https://doi.org/10.1016/j.ufug.2012.12.002

Shin, Y. K., Kim, D. J., Jung-Choi, K., Son, Y. J., Koo, J. W., Min, J. A., & Chae, J. H. (2013). Differences of psychological effects between meditative and athletic walking in a forest and gymnasium. *Scandinavian Journal of Forest Research*, *28*(1), 64–72. https://doi.org/10.1080/02827581.2012.706634

Silvennoinen, H. (2017). *Metsämaiseman kauneus ja metsänhoidon vaikutus koettuun maisemaan metsikkötasolla* [Academic dissertation]. Dissertationes Forestales, Finnish Society of Forest Science. https://dissertationesforestales.fi/article/7732

Silvennoinen, H., Alho, J., Kolehmainen, O., & Pukkala, T. (2001). Prediction models of landscape preferences at the forest stand level. *Landscape and Urban Planning*, *56*(1–2), 11–20. https://doi.org/10.1016/S0169-2046(01)00163-3

Silvennoinen, H., Pukkala, T., & Tahvanainen, L. (2002). Effect of cuttings on the scenic beauty of a tree stand. *Scandinavian Journal of Forest Research*, *17*(3), 263–273. https://doi.org/10.1080/02827580275374936

Simkin, J., Ojala, A., & Tyrväinen, L. (2020). Restorative effects of mature and young commercial forests, pristine old-growth forest and urban recreation forest-a field experiment. *Urban Forestry & Urban Greening*, *48*, 126567. https://doi.org/10.1016/j.ufug.2019.126567

Simkin, J., Ojala, A., & Tyrväinen, L. (2021). The perceived restorativeness of differently managed forests and its association with forest qualities and individual variables: A field experiment. *International Journal of Environmental Research and Public Health*, *18*(2), 422. https://doi.org/10.3390/ijerph18020422

Song, C., Ikei, H., Park, B. J., Lee, J., Kagawa, T., & Miyazaki, Y. (2018). Psychological benefits of walking through forest areas. *International Journal of Environmental Research and Public Health*, *15*(12), 2804. https://doi.org/10.3390/ijerph15122804

Syamili, M. S., Takala, T., Korrensalo, A., & Tuittila, E. S. (2023). Happiness in urban green spaces: A systematic literature review. *Urban Forestry & Urban Greening*, *86*, 128042. https://doi.org/10.1016/j.ufug.2023.128042

Tabbush, P. (2010). *Cultural values of trees, woods and forests*. The Research Agency of the Forestry Commission.

Takahashi, T., Uchida, Y., Ishibashi, H., & Okuda, N. (2021). Subjective well-being as a potential policy indicator in the context of urbanization and forest restoration. *Sustainability*, *13*, 3211. https://doi.org/10.3390/su13063211

Takala, T., Tanskanen, M., Brockhaus, M., Kanniainen, T., Tikkanen, J., Lehtinen, A., Hujala, T., & Toppinen, A. (2023). Is a sustainability transition possible within the decision-support services provided to Finnish forest owners? *Forest Policy and Economics*, *150*, 102940. https://doi.org/10.1016/j.forpol.2023.102940

Takayama, N., Fujiwara, A., Saito, H., & Horiuchi, M. (2017). Management effectiveness of a secondary coniferous forest for landscape appreciation and psychological restoration. *International Journal of Environmental Research and Public Health*, *14*(7), 800. https://doi.org/10.3390/ijerph14070800

Taye, F. A., Abildtrup, J., Mayer, M., Ščasný, M., Strange, N., & Lundhede, T. (2019). Childhood experience in forest recreation practices: Evidence from nine European countries. *Urban Forestry & Urban Greening*, *46*, 126471. https://doi.org/10.1016/j.ufug.2019.126471

Tyrväinen, L., Mäkinen, K., & Schipperijn, J. (2007). Tools for mapping social values of urban woodlands and other green areas. *Landscape and Urban Planning*, *79*(1), 5–19. https://doi.org/10.1016/j.landurbplan.2006.03.003

Tyrväinen, L., Ojala, A., Korpela, K., Lanki, T., Tsunetsugu, Y., & Kagawa, T. (2014). The influence of urban green environments on stress relief measures: A field experiment. *Journal of Environmental Psychology*, *38*, 1–9. https://doi.org/10.1016/j.jenvp.2013.12.005

Tyrväinen, L., Silvennoinen, H., & Hallikainen, V. (2017). Effect of the season and forest management on the visual quality of the nature-based tourism environment: A case from Finnish Lapland. *Scandinavian Journal of Forest Research*, *32*(4), 349–359. https://doi.org/10.1080/02827581.2016.1241892

Tyrväinen, L., Silvennoinen, H., & Kolehmainen, O. (2003). Ecological and aesthetic values in urban forest management. *Urban Forestry & Urban Greening*, *1*(3), 135–149. https://doi.org/10.1078/1618-8667-00014

UN (United Nations). (2024). *World population prospects: The 2024 revision*. Department of Economic and Social Affairs, Population Division. Retrieved March 15, 2025, from https://population.un.org/wpp/

UNECE and FAO. (2020). *Who owns our forests? Forest ownership in the ECE region*. United Nations Publications: Economic Commission for Europe. https://unece.org/DAM/timber/publications/2008976E_lastWeb.pdf

Vainio, K., Korrensalo, A., Takala, T., Räsänen, A., Lummaa, K., & Tuittila, E. (2024). Do you have a tree friend?—Human–tree relationships in Finland. *People and Nature*, *6*, 10593. https://doi.org/10.1002/pan3.10593

Výbošťok, J., Pichlerová, M., Lamatungga, K. E., Tamatam, D., Önkal, D., Halaj, D., & Pichler, V. (2024). Preferences for woodland activities and forest features as predictors of well-being after forest visits: Evidence from a nationally representative survey in Slovakia. *Ambio*, *53*(5), 795–807. https://doi.org/10.1007/s13280-024-01982-0

Waterman, A. S., Schwartz, S. J., Zamboanga, B. L., Ravert, R. D., Williams, M. K., Bede Agocha, V., Yeong Kim, S., & Brent Donnellan, M. (2010). The questionnaire for eudaimonic well-being: Psychometric properties, demographic comparisons, and evidence of validity. *The Journal of Positive Psychology*, *5*(1), 41–61. https://doi.org/10.1080/17439760903435208

Wen, Y., Yan, Q., Pan, Y., Gu, X., & Liu, Y. (2019). Medical empirical research on forest bathing (Shinrin-yoku): A systematic review. *Environmental Health and Preventive Medicine*, *24*(1), 1–21. https://doi.org/10.1186/s12199-019-0822-8

White, M. P., Alcock, I., Wheeler, B. W., & Depledge, M. H. (2013). Would you be happier living in a greener urban area? A fixed-effects analysis of panel data. *Psychological Science*, *24*(6), 920–928. https://doi.org/10.1177/0956797612464659

Wickham, H. (2016). Programming with ggplot2. In *ggplot2*. *Use R!* Springer. https://doi.org/10.1007/978-3-319-24277-4_12

Willis, G. B. (2004). Introduction to cognitive interviewing. In *Cognitive interviewing: A tool for improving questionnaire design*. Sage Publications.

Wu, Q., Cao, Y., Mao, G., Wang, S., Fang, Y., Tong, Q., Huang, Q., Wang, B., Yan, J., & Wang, G. (2017). Effects of forest bathing on plasma endothelin-1 in elderly patients with chronic heart failure: Implications for adjunctive therapy. *Geriatrics & Gerontology International*, *17*(12), 2627–2629. https://doi.org/10.1111/ggi.13114

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Appendix SI. Finnish forest happiness survey questionnaire.

Appendix SII. Profile of respondents.

Appendix SIII. Squared loadings of variables in the PCAMix analysis.

Appendix SIV. Association of background variables with the ordination: Results of the 'envfit' function.

Appendix SV. Correlation between principal component 1 (bond to natural-like forests) and principal component 3 (forest exposure) with background variables.

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