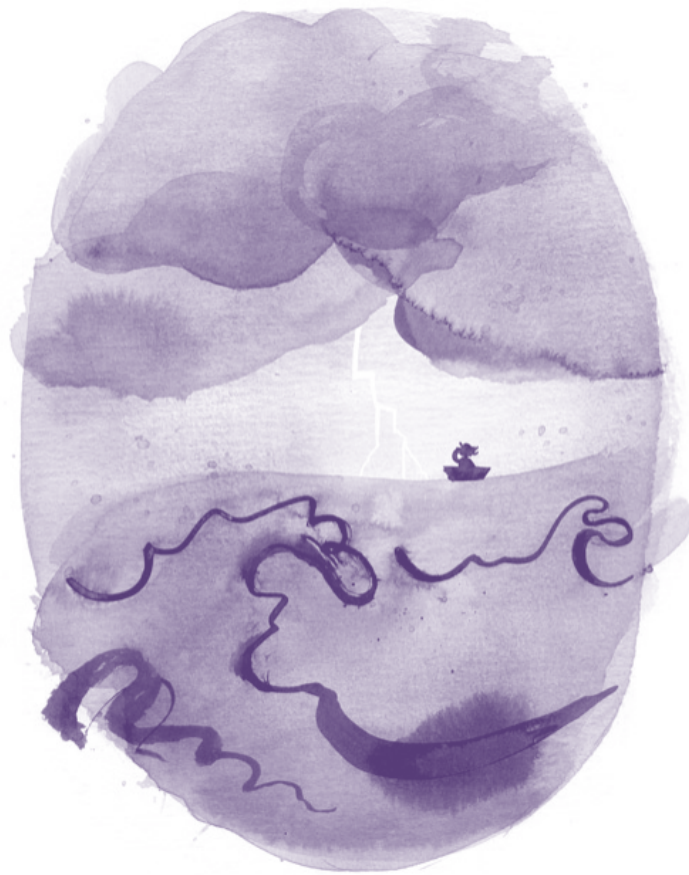


Magical Moments

Theoretical and empirical analysis of adults' competencies to make a spiritual connection with nature



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Colophon

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1. Background

This report focuses on adults who would like to live in closer harmony with nature. It was written in the context of an European Union co-funded project -under the Erasmus+ programme- aiming to strengthen adults' nature connection through the use of a mobile phone app and a training programme.

In order to effectively address this goal, it is necessary to have a clear understanding of what nature connection entails and what its underlying competencies are that contribute to its development. While adults' nature connection is rather unexplored compared to children's connection, this report aims to provide a first framework. A framework is a tool that helps organise ideas in order to provide a foundation for thinking, communicating and acting and in such state it functions to inform the current project's subsequent mobile app and training programme development.

This report presents the development of a theoretical framework for adults to make a connection with nature, along with a questionnaire to monitor progress in making this connection. The overarching goal is to develop a competency model for empowering adults to make meaningful connections with nature, culminating in the development of an app tailored to support and enhance this connection.

Nature across the adult life course

In order to design a mobile phone application intended to improve adults' connection with nature, we need to understand the user. This calls for information about how adults connect with nature, and how this connection progresses as they grow older. We therefore start with a review of relevant literature on how people connect to nature in adult life, examining how it evolves across various stages, including early adulthood (mid-20s to 30s), middle adulthood (40s to mid-60s), and late adulthood (60s and beyond).

Much of the research on nature connectedness has focused on children, given that childhood is generally seen as the formative period during which the bond with nature is formed (Arola et al., 2022). However, individuals' connections with nature undergo significant transitions throughout their lifespan, mirroring the broader transitions in life circumstances from childhood through old age (Elder, Johnson, & Crosnoe, 2003). These transitions, shaped by a complex interplay of biological, social, cultural and self-determined factors, affect emotional, cognitive, spiritual, and behavioural aspects of the relationship with nature (Bell, Phoenix, Lovell, & Wheeler, 2014). Some of the most profound transitions take place in the spiritual

domain, catalysed by influential shifts in perspective, meaning-making, and existential contemplation that come with significant life events (Wink & Dillon, 2002).

Spiritual growth

The idea that spirituality increases throughout the life span dates back at least to Confucius (479 B.C) who is alleged to have said, “*at fifty I understood the Decree of Heaven*” (see Wink & Dillon, 2002). Contemporary discourse on spiritual growth revolves around two prevailing notions. According to the first notion, which can be traced back to Jungian psychology, spiritual growth is the positive result of the maturation journey towards the end of life, arguing that around midlife individuals typically begin to turn inward to explore the more spiritual aspect of the self. Prior to this stage, external constraints associated with launching a career and establishing a family tend to be paramount. An overemphasis on worldly success becomes problematic, however, with the increased awareness of one’s mortality that comes at midlife.

The second notion of spiritual growth conceptualizes the connection between spirituality and getting older more in terms of constraints and adversity than of the growth process (McFadden, 1996). Changes in the process of making meaning to one’s life occur more frequently during periods of societal or personal crisis than during times of stability. Thus, according to this notion, spiritual development may be more influenced by significant life events than by chronological age, although the two are related because being older increases the chance of having experienced these events.

Among the significant life events, parenthood emerges as a paramount catalyst for developing a spiritual bond with nature, encompassing the profound experience of conceiving, nurturing, and guiding the next generations.

Parenthood

The birth of children marks a significant turning point in adult life. Thinking back to their own childhood experiences with nature, adults increasingly recognise the importance of contact with nature for their children (Louv, 2008). This realisation often motivates young families to move out of the city to a house with a garden in suburban or more rural areas (Horňáková & Špačková, 2024). Becoming a parent also inherently prompts individuals to reflect on their own values, purpose, and connection to the natural world around them. Although in this phase of adulthood the demands of combining work with raising children also often leave little time for contemplation and visiting nature in young parents.

Another turning point occurs in middle to late adulthood, when children leave the house, ushering parents into the 'empty nest phase'. During this phase, especially women perceive more freedom in undertaking leisure activities in nature (Janke, Carpenter, Payne, & Stockard, 2010). While specific data on age and gender differences are limited, anecdotal evidence and qualitative research suggest that women in middle to late adulthood often seek involvement in spiritually oriented activities (e.g. Fredrickson & Anderson, 1999). These may include mindfulness programs in nature, forest bathing, pilgrimages, island retreats, or other contemplative practices that offer moments of respite and connection with the natural world.

Once children have settled and started families of their own, becoming a grandparent marks another significant turning point in older middle age. In this phase, the arrival of a grandchild brings a sense of new life, often juxtaposed by the loss of parents or loved ones, deepening the reflection on one's purpose and meaning in life. Grandparents' thoughts more frequently go back to their own childhood and their significant or magical experiences with nature, which are often relived very vividly. This transition is common among both men and women (Häggström, 2019). More generally, having experienced the ambiguity and relativity of human life, middle aged and older adults tend to go beyond the linear and strictly logical modes of apprehending reality, a turn that is conducive to spiritual quest and yearnings to connect with nature in a spiritual way.

In sum, having and raising children and grandchildren plays a crucial role in adults' relationship with nature, serving as a significant factor in fostering a deeper spiritual connection with the natural world. However, it is essential to recognise that not everyone in this stage of life is willing or able to have children; it is only one of the many factors that influence spiritual growth during the adult life course

Nature volunteering

A qualitative study among nature volunteers in Spain looked more specifically at the life experiences with nature that strengthen nature connectedness (Benages-Albert, Vidal, Pol, & Vall-Casas, 2023). Findings suggest that both formative experiences during childhood (such as unrestricted play in nature and engaging in agricultural activities with family) and subsequent reinforcing experiences during adolescence and adulthood (including encounters with nature's challenges and revisiting childhood environments) play pivotal roles in nurturing the spiritual bond with nature. The researchers conclude that such reinforcing nature experiences prompt volunteers to transition from pragmatic motivations for engaging in voluntary

nature-related activities to a more comprehensive understanding of their inherent connection with the natural world.

Conclusion

The exploration of nature connectedness across adulthood unveils a dynamic journey influenced by various life stages and transitions. From the foundational experiences of childhood to the reflective moments of midlife and the nurturing role of parenthood and grandparenthood, individuals continually evolve in their relationship with the natural world. These transitions often catalyse deeper spiritual contemplation, leading from a pragmatic view to a more holistic understanding of one's connection with nature. The spiritual dimension of nature connectedness therefore becomes more predominant in adult life. The following chapters delve deeper into the spiritual dimensions of adults' relationship with nature.



2. Nature and spirituality

Much of our understanding of spiritual experiences with nature stems from research into participants' encounters during arduous journeys through the wilderness (Ashley, 2007). These journeys take place in vast expanses of rugged, spontaneously growing natural landscapes untouched by human intervention. Here, surrounded by immense grandeur and power, individuals may experience a profound sense of insignificance. Renowned natural philosophers such as Thoreau regarded the wilderness as a paradisiacal haven on Earth, retreating to it to live in harmony with nature.

Bootcamp

In the early investigations of wilderness experiences, researchers accompanied participants on a sort of boot camp, where they learned to survive under harsh conditions through practical skills such as fire-making, foraging, shelter construction, and navigation with a compass (Fredrickson & Anderson, 1999; Kaplan, 1984). Participants documented their experiences in journals, and researchers conducted interviews afterwards to gain insights into their experiences. Results indicate a significant enhancement in participants' survival skills and a corresponding boost in self-confidence.

However, experiences were not uniformly positive. Negative effects were also reported, particularly related to a component of such programs known as the *solo*. During a solo, participants spend one or two days entirely alone in a remote wilderness location, tasked with reflecting on what truly matters in their lives with minimal resources. And minimal here means almost nothing: think a piece of plastic for shelter, water, a cup, a knife, and some salt. No tent, sleeping bag, mat, matches, or food.

The underlying premise of the solo, still included in many survival programs, is that in the vast, untamed wilderness, stripped down to the bare essentials, individuals can more readily make a deep connection with the reality of the natural world around them (Naor & Mayseless, 2020). They are alone, yet not alone, experiencing a phenomenon described as *being alone together*. However, in practice, this does not necessarily resonate with everyone. Many participants are solely focused on getting through it, especially if they are not there voluntarily but are compelled to participate, perhaps for academic credit (Kalisch, Bobilya, & Daniel, 2011). Some even endure moments of sheer terror. Thus, a stay in the wilderness is by no means a guarantee of a spiritual nature experience.

The hero's journey

It is a persistent notion: the wilderness as the ultimate destination, where individuals can elevate themselves to higher realms and transcend earthly concerns. Where does this idea originate? It has something to do with the myth of The Hero's Journey, as noticed by Joseph Campbell in 1949. He studied the vast array of narratives gathered from across humanity: fairy tales, legends, folk tales, and the grand stories of the Bible and other religious texts. Campbell discovered that all these stories followed a similar pattern. Across cultures worldwide, there exists an archetype, a universal monomyth, passed down from generation to generation (Palumbo, 2014).

This tale of the hero's journey, in essence, revolves around the life journey or spiritual quest undertaken by individuals (often young men) in search of their own identity. Who am I, and what is my purpose here? To unravel these questions, the hero embarks on a journey. Called to adventure, the hero encounters a mentor or helper who aids in crossing a threshold into the unknown world of the wilderness. Once embarked, retreat is no longer an option, and numerous trials manifest in the form of wild animals, adversaries, and obstacles that must be overcome. At journey's end, having weathered the trials and dangers, and returned to the ordinary world, the hero undergoes a transformation. The child has become an adult. To this day, adventurous wilderness programs are organized worldwide, serving as a form of therapy for young people to embark on this spiritual journey of the hero – including the dreaded solo experience (Gabrielsen & Harper, 2018).

The magic of nature is everywhere

It is quite an undertaking for researchers to spend days with a group venturing into the wilderness to gain insights into spiritual nature experiences. However, there is a simpler approach: by asking people to recall a remarkable or special experience in or with nature. An experience that has left a deep impression and seems to hold significant meaning (Van den Berg & Ter Heijne, 2005; Van Trigt, Van Koppen, & Schanz, 2003; Williams & Harvey, 2001). These studies provide a more diverse and representative picture of spiritual nature experiences.

When people are asked to describe special or impressive experiences in nature, they can occur anywhere. They are not limited to the wilderness or any specific environment, from gardens to parks to forests. Even in urban settings, people can still be spiritually moved by nature. For instance, witnessing a fragile plant pushing through pavement cracks. By compiling numerous such impressive nature experiences, it becomes evident that they can be categorized into a limited number of *magical moments*. This term was coined in 1962 by Rachel Carson in her book

Silent Spring (Carson, 2002). She illustrates how these magical moments are often fleeting and easily overlooked but possess the power to transform our lives and inspire us to protect nature and the environment.

Reviewing all the research, three distinct types of magical moments with nature are discernible. For clarity, we refer to momentary experiences in which individuals establish a spiritual connection with nature. These are experiences in the present moment, unfolding in real-time, with a lasting impact. They do not pertain to the more fleeting experiences of enjoying the beauty or restorative effects of nature. These magical moments leave a profound impression of significant meaning. They can be recounted in detail, and you remember where you were and what you were doing.

Firstly, a magical moment of **enrapture**, or heightened sensory experience. Described in terms of colours appearing more vibrant, sounds becoming richer, and smells more potent.

Secondly, a magical moment of feeling **empathy** with animals, plants, and other living beings. Described in terms of making direct eye contact, feeling an unspoken bond, and experiencing a profound sense of unity with the natural world.

Thirdly, a magical moment of **exaltation**, during which one feels wonder and awe at the grandeur of nature and the realisation of one's own insignificance. Such moments engulf individuals in a humbling reverence as they contemplate the vastness of the natural world and their place within it.

Absorption

Some people are more open to the magic of nature than others. Such individual differences in receptivity to spiritual experiences can be partially explained by a personality trait called *absorption* (Lifshitz, van Elk, & Luhrmann, 2019). Individuals with a high level of absorption possess vivid imagination and fantasy, rendering them more susceptible to intense and immersive experiences. They become easily enraptured and perceive abstract concepts, symbols, and meanings that are not physically perceptible to others as vivid and tangible.

Absorption is to a large extent an inherited trait, but it is also a mental state, a state of mind, that can vary over time (Ballew & Omoto, 2018). At certain moments, you are more open to the magic of nature, while at other times, it completely passes you by. When you are in the right mental state, open, receptive, and absorbing, it can happen that the deeper meaning of nature suddenly unfolds before you. The

thick veil that usually covers things is briefly lifted, allowing you to glimpse above, behind, under, or through them.

Competencies

The receptive mental state that unlocks the door to spiritual nature experiences can be influenced by one's behaviour. It is, for example, likely that individuals are more predisposed to experience a magical moment when they are seated in a meditative posture on a bed of moss compared to when they are strolling with a friend in lively conversation. In essence, there exist mental and more active-oriented competencies within individuals that facilitate their receptivity to the magic of nature.

In the next chapter we will discuss each of the three magical moments in more detail and outline the competencies needed for individuals to become more receptive to these moments.

Conclusion

The chapter delved into the profound spiritual experiences individuals encounter in nature, often during arduous wilderness journeys. These experiences, while sometimes facilitated through survival programs like boot camps or solitary reflection, aren't universally positive. The notion of the wilderness as a transformative destination stems from the concept of the Hero's Journey, a mythic narrative pattern seen across cultures. Moreover, these spiritual connections with nature aren't confined to wilderness settings; they can happen anywhere, even in urban environments. Rachel Carson's notion of "magical moments" captures these transformative encounters, categorized into moments of enrapture, empathy with living beings, and exaltation. These experiences are more accessible to individuals with high levels of absorption, a trait influenced by both genetics and mental state. The chapter hints at exploring competencies that enhance receptivity to these magical moments in the following discussion.

3. Magical moments

This chapter describes three distinct categories of spiritual encounters with nature, identified as magical moments of enrapture, empathy, and exaltation. For each of these magical moments we give some examples in the form of personal experiences¹ and we also identify the competencies conducive to the cultivation of these moments.

Enrapture



The experience of enrapture resembles lucid dreams, where sensory perception intensifies, akin to life unfolding in slow motion. During magical moments of enrapture, sensory faculties heighten, fostering an intensified sense of presence and openness to alternate realities. Enrapture transcends mere sensory perception, inviting individuals to immerse themselves fully in the present moment, where the boundaries between self and surroundings blur. These experiences may manifest in early infancy and are often forgotten due to childhood amnesia (Usher & Neisser, 1993). An example of such an early experience:

My love for nature actually began in the crib. Yes, yes... it's a very early memory, almost unbelievable. Picture a small backyard facing north, with a shed and a lilac tree. When the sun shone there, my crib was placed, and the (in my eyes) very large tree, with purple-scented flowers and the buzz of bees, made me calm and happy. I will never forget that imprint.

Synesthesia

A personality trait that contributes to magical moments of stillness is *synesthesia*. In individuals with synesthesia, certain senses are interconnected: a perception in

¹ Quotes included in this report are sourced from publicly available websites and scientific articles.

one sense triggers an additional perception in another sense simultaneously. They may see scents or smell colours. While walking in nature, for example, the air may smell like blueberries, or colours may appear when they hear a bird sing. Such experiences are perceived as magical moments of enrapture that come across quite intensely:

I once walked through a forest and heard a bird singing. The sound was a high trill and it was so beautiful that I stopped to listen. As I listened, I saw a burst of bright orange in my mind's eye, followed by a swirling pattern of pink and yellow. It was as if the colours were dancing to the rhythm of the bird's song. I've had many of these experiences in nature, where the sounds of the environment around me evoke a kaleidoscope of colours in my mind. It's a magical experience for which I am grateful every time.

According to a popular theory, we all had synesthesia as babies. Most people grow out of it as connections between different sensory brain regions disappear over time. This is somewhat unfortunate because synesthetic experiences are generally perceived as enriching. Researchers are trying to determine if these experiences can be relearned through training (Bor, Rothen, Schwartzman, Clayton, & Seth, 2014). Participants in such training, for example, engage in various tasks for nine weeks, five days a week, each day for half an hour, associating certain letters with certain colours. This includes reading a text where each letter is printed in a different colour. Afterwards, two-thirds of the participants indeed perceive the learned colours hovering above black-printed letters. These effects are minor, not comparable to the intense experiences of individuals with synesthesia. But it suggests that it is possible to train synesthetic experiences.

Direct contact

When the weather outside is poor, most people choose to stay indoors if possible. While understandable, it also represents a missed opportunity of having a magical moment of enrapture:

... do you know what, I really like to go outside when the weather's really rubbish as well; sometimes it's just crazy, in the winter going up where it's really snowy or when the weather's really awful and the wind's howling across and you're just basically having to hold on to rocks and not get blown off the top of the hill, it's brilliant, you just laugh and it's great. I just love it up there.

The above quote is from an English study on sensory experiences of participants in walking groups in Wales, UK (Allen-Collinson & Leledaki, 2015). Based on

observations and conversations with the participants, the researchers conclude that direct contact with the elements, particularly rain and wind, evokes intense experiences, described as an increased awareness of having a body.

Another missed opportunity is the habit of automatically putting on shoes when going outside. However, this is not always necessary, especially when walking on sand or grass. The results of a controlled experiment in England show that walking barefoot instead of with shoes on the beach or through grass leads to increased sensory perception, which in turn fosters a stronger sense of connection with nature (Rickard & White, 2021).

Empathy



Magical moments of empathy underscore the sense of human interconnectedness with all living beings, emphasizing the idea of 'we are nature'. This encompasses recognizing every living entity's right to exist, whether it's a wasp buzzing nearby, the comforting presence of a purring cat, or the fulfilment of tending to one's own garden. During such moments, individuals feel intimately connected to all life forms, realising their equality with other beings. This evokes feelings of joy, gratitude, and a sense of belonging to the vast circle of life:

I'm already in my old age, but I still work in my little garden every day. Just a bit of weeding, repotting plants. One day, it was still early, suddenly, almost out of nowhere, I had a realisation. I felt like I belonged. To everything that lives. That I myself am also a part of nature. You know, I've been living on my own for years and I'm doing just fine. But when I was there, in my garden, I thought – this man is not alone at all. That really hit me.

Biophilia

According to the biophilia hypothesis proposed by Edward Wilson, as a human species, we have an innate need to connect with other living beings (Kellert & Wilson, 1993). Nature is our original habitat, and our entire biology is geared towards living and surviving in and with nature. Whenever we engage with the natural world it feels like coming home. Embracing the rhythms and cycles of nature further enriches this sense of belonging. Aligning our lives with the ebb and flow of the seasons, the rising and setting of the sun, and the natural patterns of growth and decay deepens our connection to the world around us. Our need for connection is satisfied, which brings us joy and happiness.

The experience I had as a child of perfect harmony is an unforgettable childhood memory. It was in an orchard close to home. I stood by an apple tree, and the apple I had picked (or been handed) had a taste that transported me to another level of consciousness. I felt and 'saw' that everything was in harmony... nature, people... everything was intricately interconnected and of heavenly beauty.

The biophilia hypothesis extends beyond a mere theory. In practice, it serves as an inspiring foundation for designers and architects to make the urban, built environment resemble more closely the natural world. According to this biophilic design approach, cities and buildings can be imbued with a more natural appearance in various ways (Kellert, Heerwagen, & Mador, 2011). Firstly, by incorporating a significant amount of vegetation within and around them. Singapore, one of the most densely populated cities in the world, boasts an astonishing amount of greenery throughout its urban landscape. This is achieved not so much horizontally in the form of parks and gardens, as seen in many other cities, but vertically. However, the principle of biophilia can also be applied in other ways, such as through the use of natural, rounded shapes and materials like wood or bamboo, or through biomimicry, which involves mimicking nature's strategies to solve problems, such as developing solar cells inspired by plant's ability to photosynthesise sunlight into energy.

Eye to eye

In principle, one can have connecting experiences with all living beings, whether it be an animal, tree, plant, or meadow. Additionally, connections can extend to non-living materials, such as a stone, when one realises the extensive transformation it has undergone from fossile materials to becoming inert. However, most people find it easiest to connect with animals such as dogs or cats. Strong connections often

arise through direct eye contact, serving as a significant trigger for connecting experiences with animals (Van den Berg & Ter Heijne, 2005). This phenomenon applies not only to pets but also to encounters with wild animals. It may occur unexpectedly during a nature walk to find oneself face to face with a wild animal, such as a deer, hare, or wild boar, or even a bird:

At one point, I was in the dunes, and there I had an experience I had never had before. I had an encounter with a blackbird: I really had the impression that the blackbird and I saw each other for a moment. Different from just looking at a bird and wondering what kind of bird it is [...]. It felt like a connection, although that's not the right word to describe it; [...] it was an experience in the moment of crossing worlds. A moment of seeing each other that freezes us both in time. A moment of being aware of the other in such a penetrating way that you are forced to reinterpret what is happening, what a bird actually is.

Exaltation



During moments of exaltation, also known as awe, individuals experience a profound sense of humility, realising their insignificance within the vastness of the universe. Their thoughts ascend to contemplate a grander plan that may lie beyond their immediate comprehension. They also perceive themselves as part of something greater than themselves, often accompanied by a thrilling edge as they venture into unknown territory. This mixture of positive and negative emotions may initially tilt towards negativity, but ultimately, the positive prevails. A distinctive feature of these experiences is their potential to evoke physical reactions: goosebumps, shivers down the spine, hair standing on end, or a queasy sensation in the stomach.

For me, wilderness is a higher power... being in the wilderness reminds me that there's so much more going on than just my own little stupid problems... it makes you feel small but... in a very reassuring way, it makes your problems smaller... it puts [life] into perspective.

The sublime

The philosopher Edmund Burke described moments of awe and wonder as sublime experiences in nature, surpassing mere beauty (Burke, 1757). These experiences, tinged with negative emotions, evoke a chilling delightful horror when confronted with vastness and infinity, leading one to realise their insignificance in the world. Burke lived in the 18th century, a time when it was fashionable among the elite to immerse oneself in the grandeur of nature. Gardens at castles and estates were even specially designed to evoke this delightful horror. For instance, the garden at Wörlitz Estate in Germany features a faux volcano – modelled after Mount Vesuvius in Italy – that once spewed real fire on command.

Haunted houses at fairs have long capitalized on this combination of fear and awe, as have horror films and the fright nights organized in theme parks for Halloween. The essence of all these organized horror experiences is their artificiality, allowing individuals to relativise and control their fear. In a similar manner, our fears of nature are often exaggerated, due to the fact that our survival instincts make us highly attuned to potential dangers in nature (Öhman & Mineka, 2003). However, even a realistically dangerous moment with nature can inspire feelings of exaltation. Albeit it often does only after the experience:

As a kid, I was hanging out with a friend and we got a bright idea to play with fire, as boys do. It was fun, at first. Late summer, dry forest floor, whispers of smoke. Stamping it out, fetching something to smother it with, trying to stop the spread. One moment we are in control, the next we realise we're not. Filled with dread. The fire brigade puts out the fire. Extinguishing the shame takes much longer. A lesson well learned. To this day fire scares me, irrespective of the precautions. My gut reminds me that it is just a gust of wind or an errant ember away from breaking out. And when it does, it has a life of its own. This experience inspired both fear and awe, made me realise the forces of nature.

Trees

The tree, with its roots deep in the ground and its crown reaching high into the sky, has long captivated the human imagination as something beyond comprehension. Throughout the ages, trees have been imbued with special spiritual symbolism and healing powers (Hageneder, 2020). As towering living beings, steadfast, grounded, and vertical, trees serve as a connection (Axis Mundi) between the underworld, the earthly realm, and the divine. In Norse mythology, Yggdrasil, the world tree, symbolises this connection.

Trees play a significant role in the religions, myths, folklore, and customs of nearly all peoples on Earth. Consider the tree of knowledge of good and evil in the Bible or the Bodhi tree in India under which Buddha attained enlightenment. For our ancestors, trees symbolised the foundation of their existence on Earth. They felt a kinship with trees, recognizing them as sentient beings, akin to humans and animals. Different tree species (oak, birch, elder, alder, lime, etc.) were believed to possess unique powers and attributes. Individual trees often had names, and people would implore the spirit of the tree for forgiveness when it was necessary to bring it down.

The Christian church viewed tree worship as idolatry, and with the onset of Christianisation in Europe, pagan practices were swiftly eradicated. Sacred trees were felled, and small churches or chapels were often erected in their place. The Christmas tree, along with a few others like the twisted willow, tulip tree, and forsythia used for Easter branches, were among the few trees incorporated into Christian tradition. Nonetheless, ancient customs surrounding tree worship endured. Throughout Europe rag trees, also called cloutie trees, can still be found, where people hang scraps of fabric, such as ribbons, neckties, handkerchiefs, and other fabrics – and even face masks during the pandemic – to ask the tree for healing for themselves or a loved one (Le Borgne, 2002)

The instant overwhelming effect of looking up at trees is measurable after just one minute, as demonstrated by American research where students were asked to gaze upwards for one minute at towering Eucalyptus trees (Piff, Dietze, Feinberg, Stancato, & Keltner, 2015). Compared to students looking up at tall buildings, those who looked at trees reported greater feelings of awe. This study highlights that exaltation is not merely about the size or height of something – it is truly the natural environment that matters. It also suggests that feelings of awe can be induced by immersive behaviours such as looking up and contemplating a tall tree.

Conclusion

In conclusion, this chapter discussed three distinct categories of spiritual encounters with nature: enrapture, empathy, and exaltation. Each category is elucidated through personal experiences and an exploration of the competencies conducive to their cultivation. Enrapture encompasses sensory-intense moments of presence and openness. Empathy underscores our interconnectedness with all living beings, leading to feelings of joy, gratitude, and belonging. Exaltation, characterised by a profound sense of humility and insignificance, evokes awe and wonder as individuals contemplate their place within the vastness of the universe. Through these spiritual encounters, we deepen our relationship with nature, finding solace, inspiration, and a sense of belonging in its timeless

4. NQ-Spirit: A competency model for adults

Nowadays, people face many barriers that hinder the establishment of a connection with nature, such as innate or culturally transmitted fears, societal norms that stigmatise expressions of affinity with nature as eccentric, and the appeal of the internet and social media. It is vital to overcome these obstacles and build competencies to connect to nature, as it brings numerous benefits to our physical, mental, and emotional well-being. Clear benchmarks for competencies to connect to nature not only guide people in their learning journey but also enable educators to design more effective curricula tailored to strengthening the competencies in different domains.

This chapter first introduces the concept of Nature Intelligence as a novel competency-based approach to foster nature connectedness, initially designed for young people. We then present an adapted version of the model for adults (25+), focusing on strengthening the spiritual connection with nature.

Nature Intelligence

The concept of Nature Intelligence (or NQ) encompasses a multidimensional set of competencies to foster connections with nature in cognitive, emotional, spiritual and action domains (Van den Berg & Albers, 2022). See Figure 4.1 for a graphical illustration of the NQ-model and the competencies in the four domains.

The concept was initially developed within a European Union funded Erasmus+ project aimed at empowering youth workers to facilitate connections between individuals aged 16-30 and the natural world. This is a not-so-easy-to-reach group for nature education, with relatively low levels of connectedness to nature (Richardson, Passmore, Lumber, Thomas, & Hunt, 2021). At the same time, this age group, also known as Gen Z, stands out by their high interest in sustainability and planetary stewardship (Tyson, Kennedy, & Funk, 2021). By tapping into this motivation, the NQ-youth model views connectedness to nature as a pathway to contribute significantly to a healthier planet, fostering a harmonious relationship between humanity and the environment.

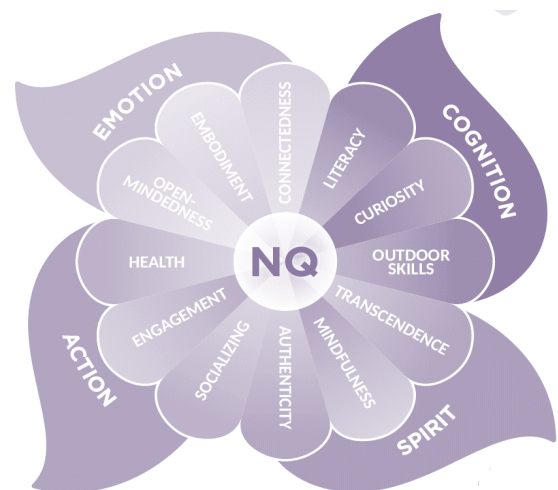


Figure 4.1. The NQ model for young people

Spiritual Nature Intelligence

As discussed in chapter 1, some of the most profound transitions in the relationship with nature in adulthood take place in the spiritual domain, catalysed by factors such as parenthood, maturation, and significant life events that make individuals more open to meaning-making and existential contemplation that come with significant life events. This urges a focus on the spiritual dimension in the adult model of Nature Intelligence.

Many of the factors that trigger spiritual nature experiences are beyond one's control. However, as active self-agents, adults can strengthen competencies which open pathways for deeper meaning-making as experienced during magical moments of enrapture, empathy and exaltation. Following this line of thought, Spiritual Nature Intelligence (NQ-spirit) in adults can be described as:

“The capability of individuals to make a spiritual connection with nature by using competencies that foster magical moments of enrapture, empathy and exaltation”

Person descriptions

To gain more insight in the lived experiences of individuals possessing competencies relevant for spiritual nature intelligence, partners in the ongoing Erasmus+ project, comprising adults aged 30-60, were invited to verbally recount a personal spiritual encounter with nature during a project meeting in Amsterdam in October 2023. Additionally, they provided written descriptions of adults they know who exhibit high Nature Intelligence in the spiritual domain. Most project partners can be, in their own unique way, considered experts in the promotion or education of nature connection. These verbal and written descriptions were analysed using a thematic analysis approach in order to develop a unique competency model for spiritual nature intelligence. Table 4.1 gives an overview of a preliminary NQ model with nine different competencies needed to make a spiritual connection with nature, divided into the three categories of enrapture, empathy and exaltation.

Table 4.1. Preliminary NQ-Spirit model with examples of descriptions of adult experiences reflecting the competencies to make a spiritual connection with nature.

Enrapture	
Presence	<i>"Whenever she feels sad or anxious, she seeks out a nearby park or forest and takes for a long walk among the trees and streams. She finds the sound of flowing water and the rustle of leaves immensely soothing and calming. This leads naturally to competencies such as simply being there and "in the moment", as the best way to experience the relaxing effects of the outdoors."</i>
Openness	<i>"She has the ability to observe, to contemplate, smell, hear, feel."</i>
Touch	<i>"She carefully picked up the dead bird, and stroke its beautiful feathers She felt the softness of its feathers, that she would normally never be able to feel."</i>
Empathy	
Meet	<i>"One day when my father pointing his gun toward an antelope, he met his eyes. He felt a deep connection to this animal."</i>
Compassion	<i>"The animal was looking right at him with fear and hope at the same time. This made him decide to become vegetarian."</i>
Rhythms	<i>"He talked about the changing seasons, from colorful autumn leaves to refreshing spring rains. He showed his grandsons how the world around them was constantly evolving. He also showed them how the natural world was an ever-changing canvas always evolving, full of new wonders to behold."</i>
Exaltation	
Confront	<i>"I walked with my partner and dog under a glacier in a place where it was officially forbidden to go. It was scary and dangerous but also very impressive, it made a lasting expression that I want to share with other people to inspire them to save the environment."</i>
Reflect	<i>"When I was a school boy I often stayed at my grandparents' house in the country, looking at the fire flies dancing in the air after dark. On night I looked up at the sky and realised the immensity of the universe and the parallels between the micro-world of the flies and the macro-world of the universe."</i>
Relativise	<i>"Last year, when I made a boat trip, I suddenly realised the greatness of nature and I suddenly understood why people talk about it in such an emotional way. I felt small in the face of the grander scheme of thing, and I can still vividly feel what I felt back then."</i>

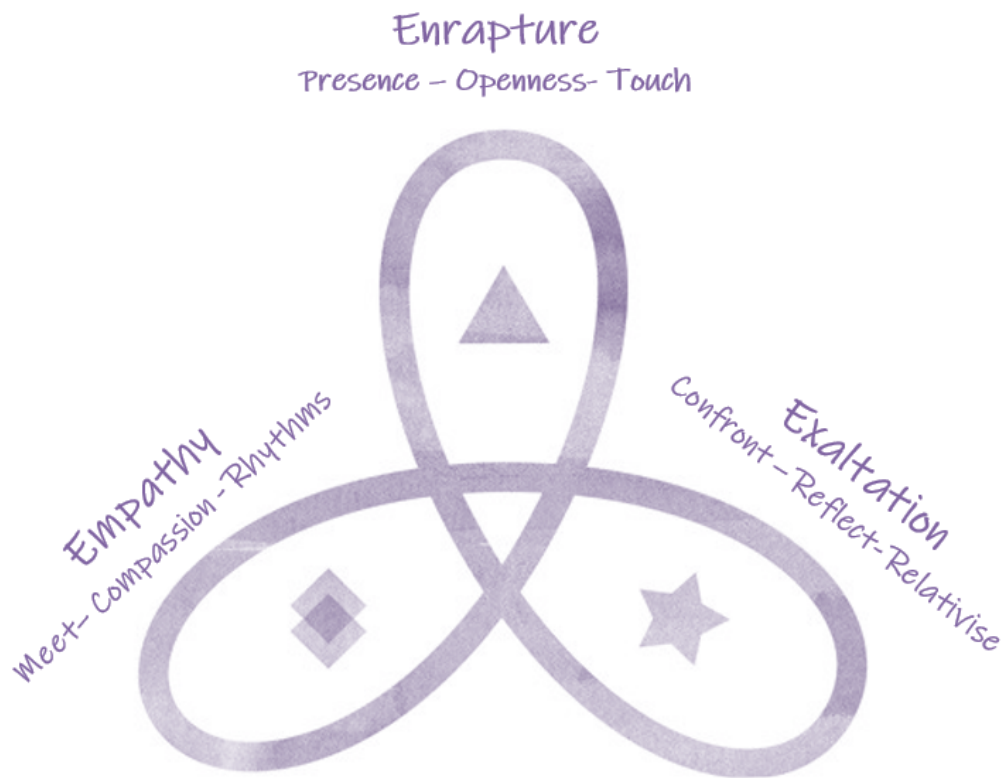
The NQ-spirit competency model

Following the analyses of the literature and the preliminary model as derived from person descriptions provided by the project partners, Table 4.2 gives an overview of the model in more general terms. Each of these competencies can be addressed to foster an adults' spiritual nature connection. A visual representation of the model is given in Figure 4.2.

Table 4.2: Description of the competencies in the three dimensions of the NQ-spirit model for adults.

Enrapture	
Presence	Being in the here and now, not dwelling on the past or the future, but fully embracing the present moment.
Openness	Consciously, openly, and clearly experiencing the sensory stimuli from one's surroundings. This can occur in a spontaneous and relaxed manner, without being forced or excessively slow. Simple everyday activities, such as taking a moment to smell a flower, can be equally effective.
Touch	Direct, physical contact with nature. Think of hands in the soil, bare feet in the mud, or raindrops on your skin.
Empathy	
Meet	Connecting with plants, animals, and other living beings. Think of listening to the sap flows of a tree, talking to plants, or making eye contact with an animal.
Compassion	Understanding what it is like to be another life form and recognizing their right to exist. This extends to all living beings, including pets or wild animals, insects, spiders, trees, and plants.
Rhythms	Aligning one's own biorhythm with the rhythms of nature. This includes the seasons, as well as the lunar cycle and the daily cycle of sunrise and sunset
Exaltation	
Confront	Challenging oneself to confront one's fears of nature, thereby becoming overwhelmed by the power of its forces and grandeur.
Reflect	Thinking about the relationship between humans and nature and the wonder of the natural world in a conscious manner, both in the present moment and through reflections on past experiences.
Relativise	The realisation of one's own insignificance in the larger scheme of life on earth and beyond.

Figure 4.2. A visual representation of the NQ-Spirit Model.



Conclusion

In this chapter, we first introduced the concept of Nature Intelligence (NQ) as a competency-based approach to fostering nature connectedness, initially designed for young people and subsequently adapted for adults. Nature Intelligence encompasses a multidimensional set of competencies across cognitive, emotional, spiritual, and action domains, providing a framework for nurturing connections with nature. Within the adult competency model, presented in this chapter, emphasis is placed on strengthening the spiritual dimension, recognizing that profound transitions in the relationship with nature often occur in adulthood. Through the analysis of personal experiences, we outlined the competencies of Spiritual Nature Intelligence (NQ-spirit), which enable individuals to make spiritual connections with nature. These competencies span three categories—enrapture, empathy, and exaltation—each reflecting a unique aspect of the spiritual nature connection. By cultivating these competencies, adults can deepen their relationship with nature, fostering a sense of presence, empathy, and awe that transcends the barriers of modern life.

5. Daily nature spirituality

In this chapter we introduce a self-test designed to support individuals and nature educators in strengthening competencies for spiritually connecting with nature, drawing upon the three distinct types of magical moments delineated in preceding chapters. We also present the results of a large-scale survey among 537 adult respondents who filled in the questionnaire.

The NQ-spirit test

Collaboratively, our project team devised an NQ-spirit assessment tool, encompassing nine statements about nature-related activities that individuals may engage in to varying degrees. These activities were derived from the descriptions of the competencies in the model, with inspiration from activities included in other models of strengthening connection with nature, such as the five paths model of connection to nature (Rhodes & Lumber, 2022), and the Earthfulness Challenge competencies outlined in the NQ-spirit model (van Heel, van den Born, & Aarts, 2024). Table 5.1 gives an overview of the test.

Table 5.1: The NQ-spirit test for adults. With response options 0 = never, 1 = once in a while, 2 = on some days, 3 = on many days, 4 = every day and 5 = many times a day.

How often do you engage in these activities?		
Dimension	Competency	Statement
Enrapture	Presence	Being completely absorbed in the here and now while I am in nature
	Openness	Focus my attention on sounds and impressions from nature, such as the singing of birds or the rustling of trees
	Touch	Get in touch with nature with my bare hands and other parts of my body
Empathy	Meet	Make direct contact with an animal, plant or other living being, for example by talking to it or looking at it attentively
	Compassion	Imagine what it would be like to be a certain animal or plant
	Rhythms	Follow the rhythms of nature, for example by eating seasonal vegetables or taking notice of the phases of the moon
Exaltation	Confront	Do something in or with nature that I find somewhat scary or uncomfortable
	Reflect	Reflect on my relationship with nature
	Relativise	Look up at the sky and the stars and feel part of a larger whole

Survey

To gain more insight into the reliability and validity of the NQ-spirit test, we conducted a large-scale online survey using Google Forms.

Respondents

Respondents were recruited via posts with an embedded link to the test on social media and a local neighbourhood platform in the Netherlands. Partners in the project also filled in the survey and sent it around to their connections. The survey had no age restrictions, but here we only discuss the results of respondents 25+, as the target group of our project. The final sample consisted of 537 respondents (153 male and 354 female) with a mean age of 51.4 years (range 26-83 years). The majority of respondents (97%) have the Dutch nationality, the remaining 3% are from Italy and Spain.

The survey

The survey (in both Dutch and English) included the 9 items of the NQ-spirit test along with two additional validated questionnaires to check for convergent and predictive validity of the test:

- The brief 6-item version of the Nature Relatedness scale (NR-6) (Nisbet & Zelenski, 2013).
- The 4-item Subjective Happiness Scale (Lyubomirsky & Lepper, 1999).

In addition, there were questions about respondents' demographic background (age, gender) and how they found the link to the survey. There was also an open-ended question asking respondents to write down any comments or suggestions about how they experienced doing the test.

Reliability and dimensionality of the test

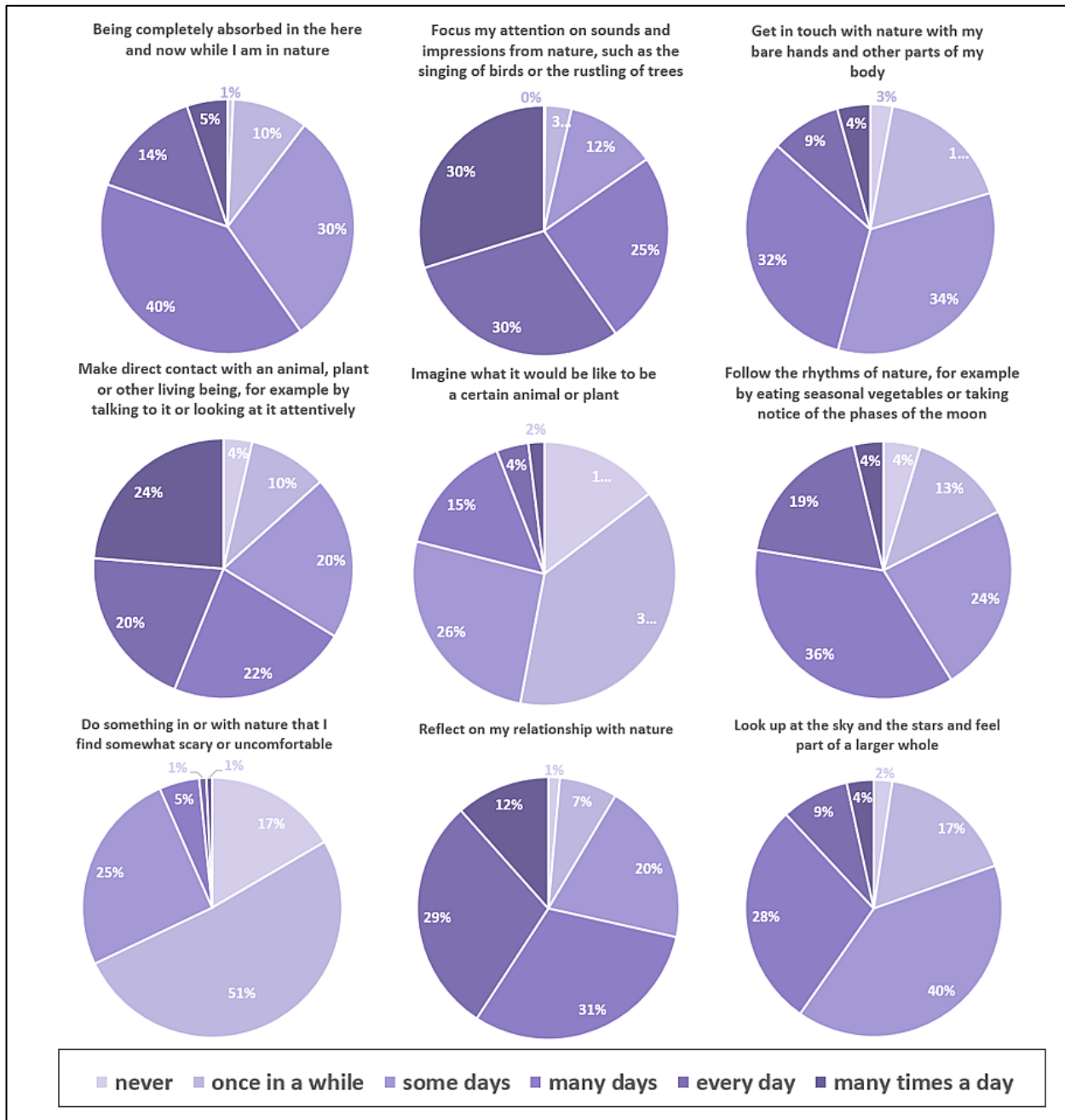
The test shows good reliability, Cronbach's alpha = .85. Reliabilities of the subscales enrapture (.77) and empathy (.67) are also acceptable, with a somewhat lower but still acceptable reliability for the subscale exaltation (.62).

An exploratory factor analysis showed that all items loaded on one factor, with a total explained variance of 46%. While most items displayed robust factor loadings (> .62), the item '*Do something in or with nature that I find somewhat scary or uncomfortable*' deviated slightly with a loading of only .43. Thus the three different dimensions of the test could not be empirically established. It is important to acknowledge, however, that the limited number of items likely constrained the identification of multiple dimensions.

Responses per item

Figure 5.1 gives an overview of the distribution of responses for each of the nine activities in the NQ-spirit test. In general, the darker the purple colours in a pie, the more frequently respondents engage in an activity.

Figure 5.1. Distribution of responses for each item in the NQ-spirit test.



As can be derived from Figure 5.1, respondents most frequently engage in focussing their attention on sounds and impressions from nature, such as the singing of birds or the rustling of trees, 85% of respondents do this on many days, every day or many times a day. Making direct contact with an animal, plant or other living being, is also a popular activity, 66% do this on many days, every day or many times a

day. Respondents least frequently engage in doing something in or with nature that I find somewhat scary or uncomfortable, 93% do this never, or only once in a while or on some days. Imagining what it would be like to be a certain animal or plant is also not something they do very frequently, 79% do this never, or only once in a while or on some days.

Mean scores per dimension

Figure 5.2 gives the mean scores per dimension. On average, respondents engage most frequently in activities related to enrapture, followed by activities related to empathy and activities related to exaltation. This pattern suggests a gradual increase in the level of difficulty or perhaps a hierarchy in the perceived accessibility or appeal of these dimensions of spiritual nature intelligence among respondents.

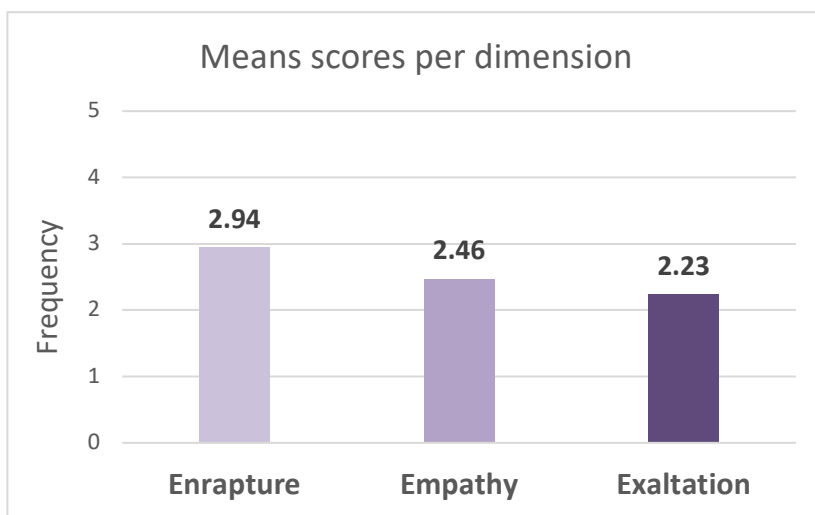


Figure 5.2. Mean scores for the frequency of engaging in activities related to the dimensions of enrapture, empathy and exaltation. With response options 0 = never, 1 = once in a while, 2 = on some days, 3 = on many days, 4 = every day and 5 = many times a day.

Gender differences

As can be seen in Figure 5.3, women consistently have higher scores than men on the NQ-spirit test and its subscales. These gender disparities are statistically significant, as evidenced by all p -values of ANOVA tests being smaller than .001. These results align with the unequal representation of men and women in the sample, where women are approximately three times more prevalent. This suggests that the invitation to participate in a survey on nature and spirituality was more appealing to women than to men.

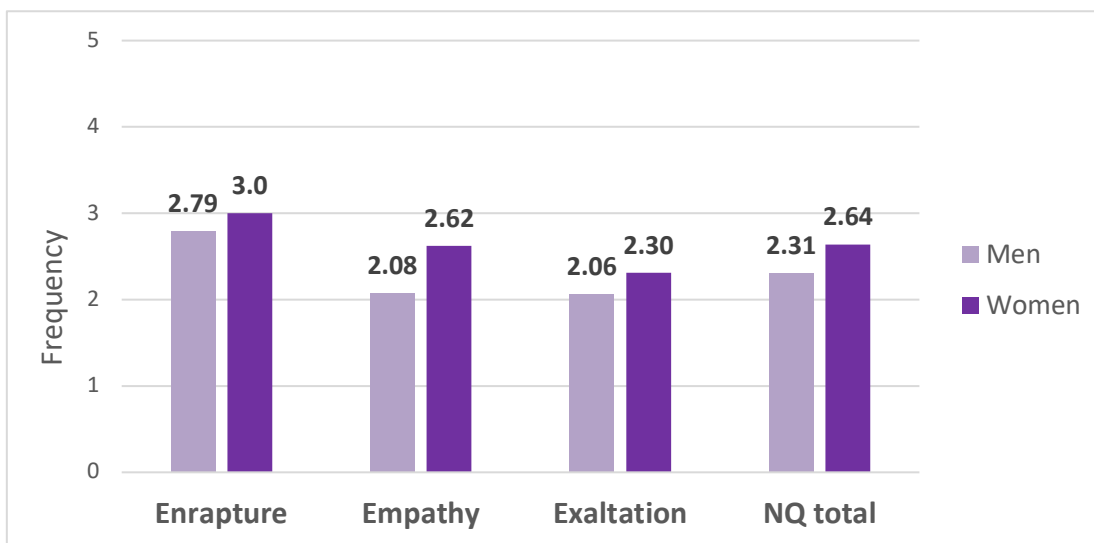


Figure 5.3. Mean scores of men and women for the frequency of engaging in nature activities of the NQ-spirit test. With response options 0 = never, 1 = once in a while, 2 = on some days, 3 = on many days, 4 = every day and 5 = many times a day.

Age differences

The age of the 537 respondents in our sample varied between 26 and 83, a range that includes early adulthood (mid-20s to 30s, $N = 86$), middle adulthood (40s to 60s, $N = 355$), and late adulthood (60s and beyond, $N = 96$). A correlational analysis shows that age (in years) is significantly correlated with the total score on the NQ-spirit scale, $r = .09$, $p = .035$, indicating more frequent engagement in spiritual nature activities as people grow older. This relationship is primarily due to an increase in the frequency of activities in the domain of enrapture, $r = .15$, $p < .001$.

Figure 5.4 gives an overview of the mean scores for the three age groups on the NQ-spirit test and its subscales.

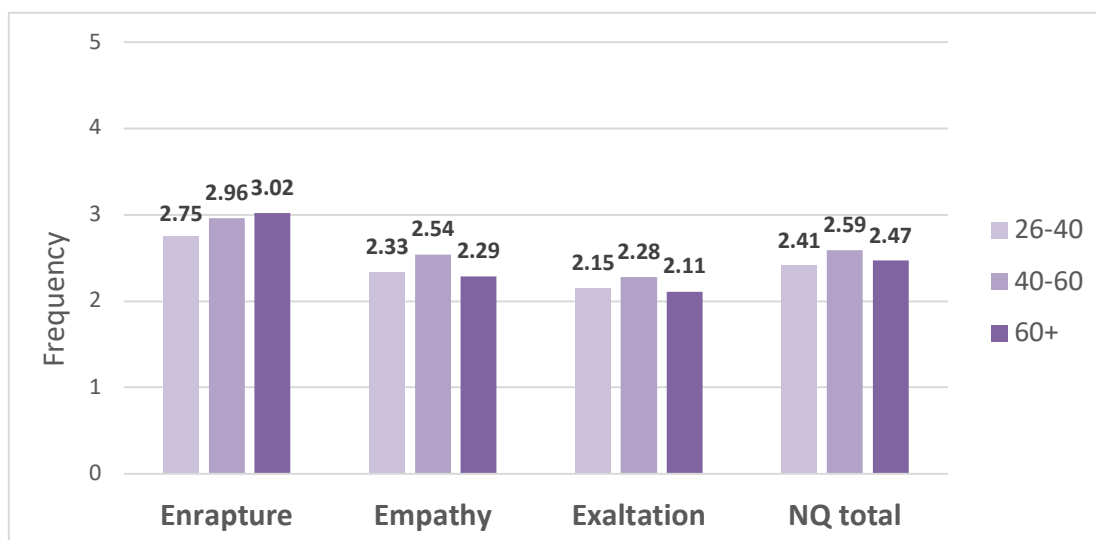


Figure 5.4. Mean scores of different age groups for the frequency of engaging in nature activities of the NQ-spirit test. With response options 0 = never, 1 = once in a while, 2 = on some days, 3 = on many days, 4 = every day and 5 = many times a day.

Upon examining Figure 5.4, it becomes evident that the relationship between nature spirituality and age is curvilinear rather than linear, especially in the domains of empathy and exaltation, with the peak interest in engaging in spiritual nature activities occurring during middle age. Plausible explanations for this pattern could be the busy schedules of young adults and the increasing cognitive and physical limitations experienced by individuals in older age, which may diminish the ability of these age groups to actively participate in these activities.

Nature relatedness

Are respondents who score higher on the NQ-spirit test more connected to nature, as measured by the internationally validated NR-6 test of Nature Relatedness (Nisbet & Zelenski, 2013)? While the two tests share some commonalities, they also have notable differences, not only in items but also in response options. Most importantly, the NQ-spirit test focuses on quantifying the frequency of engaging in activities that enhance the bond with nature, whereas the NR-6 test evaluates the extent to which individuals agree with statements about their more stable connection to nature. Therefore, a moderate (not too low, not too high) relationship between the two scales can be interpreted as an indication of convergent validity, suggesting that both tests are tapping into related but distinct aspects of individuals' relationship with nature.

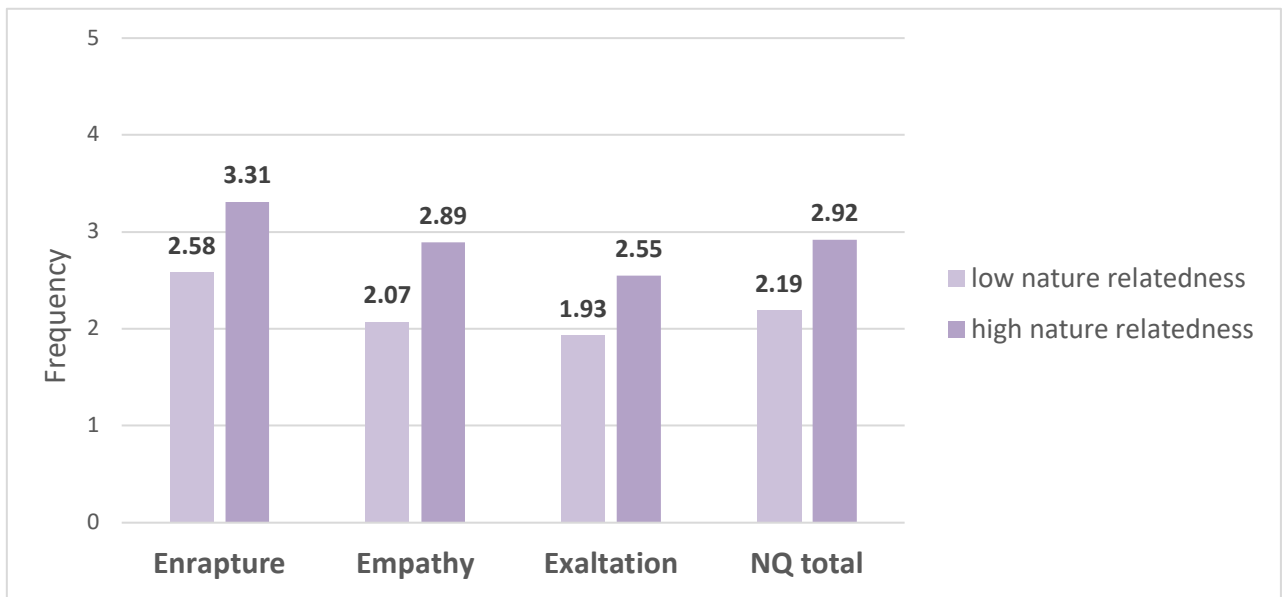


Figure 5.5. Mean frequencies of engaging in daily spiritual nature activities of respondents with low and high levels of nature relatedness. With response options 0 = never, 1 = once in a while, 2 = on some days, 3 = on many days, 4 = every day and 5 = many times a day.

Correlation analysis shows that the scores on NR-6 test are indeed significantly moderately correlated with with the total scores on the NQ-spirit scale, $r = .54$, as well as with all subscales, $r > .44$, all p -values $< .001$. This indicates a good convergent validity of the scale. As shown in Figure 5.5, respondents with high scores on the NR-6 have significantly higher scores on the NQ-spirit test than respondents with low scores (as determined by a median split). This finding suggests that engaging in the activities delineated by the NQ-spirit scale may support people in becoming more connected to nature. However, the causal direction of this relationship cannot be established, it is also possible that being more connected to nature inspires people to engage more frequently in spiritual nature activities.

Happiness

Are respondents with high scores on the NQ-spirit test happier, as measured by the subjective happiness scale (Lyubomirsky & Lepper, 1999)? Figure 5.6 illustrates the NQ-spirit scores of respondents with low, medium and high scores on the subjective happiness scale.

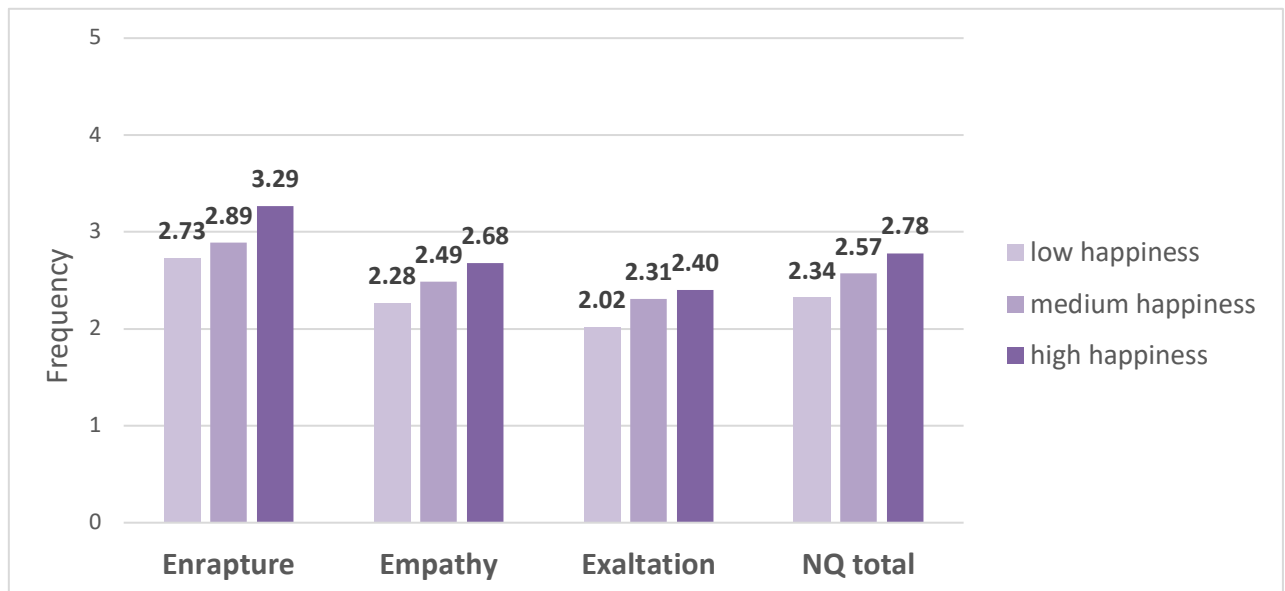


Figure 5.6. Mean frequencies of engaging in daily spiritual nature activities of respondents with low, medium and high levels of subjective happiness. With response options 0 = never, 1 = once in a while, 2 = on some days, 3 = on many days, 4 = every day and 5 = many times a day.

Correlation analysis shows that the scores on the subjective happiness scale are significantly correlated with with the total scores on the NQ-spirit scale, $r = .18$, as well as with all subscales, $r > .11$, all p -values $< .01$. This confirm the predictive validity of the scale for subjective happiness. As shown in Figure 5.6, respondents with high scores on the subjective happiness scale have significantly higher scores on the NQ-spirit test than respondents with medium or low scores. This finding suggests that engaging in the activities delineated by the NQ-spirit scale may support people in becoming happier in life. Again, however, the causal direction of this relationship cannot be established, it is also possible that having a more positive outlook on life inspires people to engage more frequently in spiritual nature activities.

Reactions to the survey

At the end of the survey, respondents were given the opportunity to add any comments or thoughts via an open answered question. 128 respondents took the effort to add a few lines (not counting in the respondents who said things like 'no comment'). We analysed the responses using a thematic approach, resulting in the identification of the comments into four primary themes: success, expressions of gratitude, sharing of spiritual experiences, and other miscellaneous topics. We give some examples of comments for each of these themes (all translated from Dutch).

Success

18% of the respondents wished us success with our research. Some examples:

"Wishing you success with your research!"

"Much success and I am grateful that you are taking this up"

"Wishing you success, I am so curious to see the end result"

Thank you

28% of respondents thanked us in some or other way for doing this type of research. Some examples:

"Such a nice survey, it made me happy!"

"What an interesting research topic. I am curious about the results"

"I just thank you it was a beautiful moment"

Sharing

27% of respondents shared a personal experience or reflection on their experiences with nature. Some examples:

"Without animals in nature, there is no good life for me. My greatest happiness is the one cow that I have been able to rescue from slaughter. She was four years old and is now ten years old!!"

"Nature slows down, offers silence, but also stimulates with its space, providing the place for perspective, tranquility, and reflection"

"Moment of realisation; I wanted to fill every day with enjoying and pausing to appreciate nature. I'll do more of that"

Other comments

The other 27% of comments related to various topics, including suggestions for additional questions (e.g. about study, work or other background characteristics) and suggestions for improvement of the questionnaire. Interestingly, quite a few of the suggestions for improvement were about the questions and response formats of the two validated questionnaires on nature relatedness and subjective happiness.

With regard to the items in the NQ-spirit test, there were a few critical comments on the statement in the exaltation subscale about doing things that are scary or uncomfortable. For example:

"Do I occasionally do scary or unusual things in nature? Oh, I don't find anything scary about nature or places, no matter how remote."

Limitations and recommendations

While our survey provides valuable quantitative insights into the spiritual connection between adults and nature, several limitations should be acknowledged. Firstly, the sample used in our survey was obtained through convenience sampling methods, primarily via social media and local neighborhood platforms. As such, the sample may not be representative of the broader adult population, potentially introducing selection bias. Additionally, the majority of respondents in our sample were of Dutch nationality, limiting the generalizability of our findings to other cultural contexts.

Secondly, the self-reported nature of the data collected through surveys introduces the possibility of response bias, as participants may provide socially desirable responses or inaccurately recall their experiences. Furthermore, our reliance on self-report measures, such as the NQ-spirit test and other validated questionnaires, may be subject to interpretation bias and may not fully capture the complexity of individuals' spiritual connections with nature.

Thirdly, while our study explored gender and age differences in nature spirituality, other demographic factors such as socioeconomic status, education level, and geographic location were not fully examined. These factors could potentially influence individuals' experiences and perceptions of nature spirituality, warranting further investigation in future research.

Lastly, the cross-sectional design of our study limits our ability to draw causal conclusions about the relationship between nature spirituality, nature relatedness, and subjective happiness. Longitudinal studies are needed to better understand the temporal dynamics and potential causal pathways underlying these relationships.

Recommendations for future research include conducting longitudinal studies to track changes in spiritual nature intelligence over time and exploring the effectiveness of interventions tailored to different life stages. Studies exploring individual differences in receptivity to spiritual nature experiences could provide valuable insights. Additionally, exploring digital tools such as mobile apps to support nature connection could be beneficial. Educators and practitioners can use the NQ-spirit model to design tailored interventions and curricula aimed at strengthening adults' spiritual connection with nature. Further research could explore the effectiveness of these interventions and identify additional competencies that contribute to nature connectedness in adulthood.

Conclusion

In this chapter, we introduced the NQ-spirit test, a self-assessment tool aimed at enhancing individuals' spiritual connection with nature aligning with the NQ-spirit



model's nine competencies. We also presented the outcomes of a large-scale survey involving 537 adult participants who completed the test. The survey provides valuable insights into the reliability and dimensionality of the NQ-spirit test, as well as correlations with measures of nature relatedness and subjective happiness. Moreover, respondents' feedback, captured through open-ended questions, highlights their engagement and offered suggestions for refining the survey instruments, demonstrating the importance of ongoing refinement and improvement.

6. Summary and Conclusion

This report described the theoretical background for the development of a model and test for adults who want to live closer to nature, in a more spiritual way. We started with an exploration of the relationship between adults and nature, recognizing how life stages and transitions shape spiritual growth and connection with the natural world. Drawing from scientific research on encounters with wilderness and everyday connections with nature, we then examined the spiritual dimension of nature experiences, emphasizing its importance. We discussed the transformative potential and challenges of wilderness programs, as well as individual differences in openness to spiritual experiences, laying the groundwork for further investigation

Following that, we delved into three distinct types of spiritual encounters with nature: enrapture, empathy, and exaltation. These experiences entail deep sensory immersion, a sense of interconnectedness with all living beings, and profound humility in the face of the vastness of the universe, often sparked by interactions with trees and other natural elements. We then addressed the obstacles obstructing the establishment of a connection with nature in contemporary society, including fears, societal norms, and the allure of technology.

Recognizing the benefits of spiritual nature connection, we presented Spiritual Nature Intelligence (NQ-spirit) as a competency-based approach to fostering nature connectedness tailored for adults. We also introduced a daily nature spirituality test, developed to assess individuals' spiritual connection with nature. Insights from a large-scale survey shed light on gender and age differences in daily nature spirituality and the potential influence of daily engagement with nature in a spiritual manner on subjective happiness.

Closing statement

This report has laid the theoretical foundation for the development of a model and test aimed at helping adults live closer to nature in a more spiritual way. By exploring the relationship between adults and nature, considering how life stages and transitions influence spiritual growth, and delving into the transformative potential of wilderness programs, we have underscored the importance of spiritual experiences in nature.

Moving forward, the introduction of Spiritual Nature Intelligence (NQ-spirit) as a competency-based approach tailored for adults, along with the development of a daily nature spirituality test, offers promising avenues for fostering nature

connectedness and understanding its impact on subjective happiness. Through ongoing investigation and application of these insights, we aim to empower individuals to cultivate deeper spiritual connections with the natural world and enrich their lives accordingly.



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