Recapturing the dark experience

– Encounters with natural darkness in Nordic settlements

Sofia Tonetti

Recapturing the dark experience

- **Encounters with natural darkness in Nordic settlements**

Sofia Tonetti

Publishing and archiving

Approved students' theses at SLU are published electronically. As a student, you have the copyright to your own work and need to approve the electronic publishing. If you check the box for **YES**, the full text (pdf file) and metadata will be visible and searchable online. If you check the box for **NO**, only the metadata and the abstract will be visiable and searchable online. Nevertheless, when the document is uploaded it will still be archived as a digital file.

If you are more than one author you all need to agree on a decision. You can find more information about publishing and archiving here: https://www.slu.se/en/_subweb/library/publish-and-analyse/register-and-publish/agreement-for-publishing/

☒ YES, I/we hereby give permission to publish the present thesis in accordance with the SLU agreement regarding the transfer of the right to publish a work.

☐ NO, I/we do not give permission to publish the present work. The work will still be archived and its metadata and abstract will be visible and searchable.

Abstract

Artificial light at night is recognized as an increasing environmental problem with some negative consequences for biodiversity, human health, and nature connection. We need to increase our understanding of how human beings experience natural darkness in their everyday life in order to understand its role in human settlements. This study draws on phenomenology in its approach to investigate the subjective experience of natural darkness in a Nordic context. Deep interviews were conducted with four participants in different settlements in order to explore the lived psychological meaning of darkness for them. The results illustrate the general psychological structure of this lived meaning of darkness for the four participants structured into six constituents: (1) Darkness creating supportive boundaries (2) Being in the present space and moment (3) Understanding nature and our place in the universe (4) The diversity of placed darkness (5) Feeling at home in darkness (6) Managing darkness. The discussion highlights the experiential values of experiencing natural darkness supportive to people's attachment to their local environment as they develop competence to handle and embrace the experience. The results call for more attention of the diversity of human experiences of lightening and darkness and states in between, in order to clarify the meaning of natural darkness in different types of settlements. Transdisciplinary research could identify pathways to integrate the important role of experiencing natural darkness for human health and well-being. This perspective may open up new space for critical evaluation of existing strategies on light pollution and intervention in planning practices for settlements.

Preface

This study will bring forward international perspectives and the subjective experience of darkness. These were the two things I felt the need to emphasize in this degree project. While trying to see environmental psychology from the perspective of my 67-year-old mother-in-law from Argentina, I sensed the need to tell more and different stories about experiencing our natural world. Instead, I ended up my search for international perspectives just at the spot where I stand now, the Nordic region, with an exploration of a phenomenological method criticised for its aspiration to be objective. Perhaps my intention from the start had to do with questions of power. A recognition of my inability to tell stories of how the environment is perceived. "These are dark times" is a metaphor and a sign of the western dualism of light and darkness that is absent in many languages.

It is my intention that this study can help to understand the dynamic interaction between people and their physical outdoor environment and bring forward a more nuanced approach to darkness. When exploring artificial light at night and experiences of darkness it was necessary to cross the theoretical borders of environmental psychology which had a broad outcome and led to more questions than answers. It is my hope that this thesis can shed light on some key questions relevant for strategic use in the development of sustainable societies.

Many thanks to Fredrika Mårtensson, my supervisor, for encouragement and invaluable guidance in the field of environmental psychology. I am also grateful for support on the method from Elisabeth von Essen and proofreading as well as inspiration from my friend Sarah Jones. A big thanks to the interview participants that kindly shared personal memories and thoughts, your words are essential in this study. Leo also made this possible with his motivation and joy. Finally, the bat scientist Johan Eklöf, even though I have never met you, you truly inspired me to explore the potential of darkness.

Sofia Tonetti
Uppsala, 2024

Thiago and Elvira,

Ljuset sover

Det är skönt med mörkret

Förut var jag rädd men nu vet jag säkert att mörkret är en bädd, en säng för ljuset att få sova i när da´n är slut och allt blir tyst och man får drömma. Det är skönt med mörkret. Himlen ger oss natt, stjärnorna tänds och gnistrar som sagans silverskatt.

- FRANCES NILE

Table of contents

List of figures

Abbreviations

LED	Light Emitting Diode
ART	Attention Restoration Theory
SCN	Suprachiasmatic Nuclei
SLU	Swedish University of Agricultural Sciences

1. Introduction

The world is becoming a brighter place. Artificial lights from buildings, streetlights, decoration, and commercial signs are lightening up dark night skies all over the world. Urbanization demands supporting infrastructure, energy, and transport, aspects that requires light (Dunn, 2020). Light is also increasingly present in human life in the form of digital screens (Lyytimaki, 2020). Recently the ecological, health and experiential consequences of artificial light at night have received much attention from researchers.

1.1. Impacts of artificial light at night for life on earth

Light is essential for life on earth and artificial light makes different activities possible outdoors after dark (Boyce, 2019). The problem today is that an abundance of artificial light alters our night skies, causing negative impacts on ecosystems (Longcore and Rich, 2004) and human health and well-being (Chepesiuk, 2009; Tähkämö et al., 2019).

Artificial light is increasing over earth surface at a scale of 0-20% per year, varying on different geographical areas (Hölker et al., 2010). Key factors for this acceleration are urbanization, as well as an extension of numbers of hours we use artificial light (Hölker et al., 2010; Kyba et al., 2017). More efficient and cheap lightning methods requiring LEDs (Light Emitting Diode, LED) have also caused even higher levels of brightness at night (Helldin and Jägerbrand, 2020).

Several studies have described and measured ecological impacts from exposure to direct light sources (Gaston et al., 2015). However, the harm caused from artificial

skyglow, when artificial light is scattered in the atmosphere and reflected back to the earth, has turned out to have far greater impact on ecosystems across widespread areas, than direct light sources (Falchi et al., 2016). Skyglow causes a diffuse glow that is visible from great distances. A well-known example of biological consequences is an impact on insects that use the Milky Way to navigate and become disoriented by artificial skyglow from cities far away (Kyba and Hölker, 2013).

The ecological disturbance of artificial light at night has been well established in research (Longcore and Rich, 2004) and astronomers have expressed worries over sky glow since the 19th century. However, it was not until recent decades that artificial light at night has been described as a growing environmental problem (Stone, 2018), where studies indicating significant ecological impacts of light at night have increased (Davies and Smyth, 2018). Some of the most severe consequences are an impact on the reproduction and migration patterns of most species (Jägerbrand and Spoelstra, 2023).

Two biological cycles have turned out to be essential in terms of ecological consequences, the circadian rhythm, and the photoperiodic timer. These cycles are predictable rhythms that are coordinated by light and darkness. The circadian rhythm is a natural internal cycle that guides physiological and behavior processes in all living organisms. These cycles are important for sleep-wake cycles, hormone production, body temperature, heart rate, blood pressure, metabolism, growth and behavior. The rhythms are synchronized by the hormone melatonin and track the 24 hours dark/light cycle. A specific photosensitive cell in the back of the eye communicate signals of light and darkness to the inner master clock Suprachiasmatic Nuclei (SCN) that guides the circadian rhythm. The SCN sends signals to different part of the body, where one is the pineal gland that produces and secrets the hormone melatonin. Melatonin production is regulated by both the time of the day and the exposure to light and darkness. Exposure to artificial light can interrupt melatonin production with negative effects on physiological functions (Kørner, 2023:336-338).

The exposure of nighttime lightening has been related to several health problems (Chepesiuk, 2009). Pottharst and Könecke, (2013), describe a disruption of our circadian rhythms as linked to insomnia, depression, cardiovascular diseases, obesity, loss of night-vision, and the suppression of melatonin.

The photoperiodic timer refers to the capacity of plants and animals to use the lengths of the day and night to predict events related to a specific season, for example hibernation, migration or reproduction (Kørner, 2023). One example of the consequences of a disruption of this timer is migrating birds that use the direction, duration and spectral characteristics of natural light as a source of information to navigate. Artificial light has in this sense caused causalities around illuminated buildings (Hölker et al., 2010).

In general, the ecological consequences of artificial light at night are widely known but the exact effects are considered complex since artificial light can seem to have positive outcomes for some species. Long term impacts on larger ecosystems are likely negative (Helldin and Jägerbrand, 2020). The implications of exposure to artificial light at night also requires further research since the use of it is gradually increasing and the exact consequences of LEDs are a comparably new invention. Nevertheless, as pointed out in this section, all living beings are fundamentally dependent on the natural light and dark cycles, and an alteration of these rhythms have enormous consequences for humans, animals and plants (Kørner, 2023).

So far, this thesis has pointed towards ecological impacts from artificial light at night. Recent years research has also started to emphasize consequences linked to experiential and existential value of darkness and the night sky (Bogard, 2008; Gallaway, 2014; Stone, 2018). Artificial light at night has resulted in fewer occasions to experience natural darkness (Gallaway, 2014). American and Italian researchers have demonstrated that 83% of the world's population, and over 99% of people living in Europe and the United States, live under light polluted skies, where The Milky Way is considered to be obscured (Falchi et al., 2016). The fact that fewer people experience the night sky is also related to the way many of us perceive the world today. The frequent usage of screens representing the world have resulted in the lack of direct sensing hearing, smelling, and touching of our

surroundings. Additionally, people in an urban context experience the world in a built environment, lit up at night which also provides few opportunities for experiencing natural darkness (Lyytimaki, 2020).

The experiential consequences can be associated with a growing disconnection from our natural world at large, known as the extinction of experience (Pyle 1978; Miller, 2005; Soga and Gaston, 2016). Soga and Gaston (2016) mean that such disconnection has consequences in terms of a loss of opportunities for humanity to gain health benefits from nature. Interaction with nature is considered an important factor for human health and well-being (Ottosson and Grahn, 2005; Hartig et al., 2014). Insights from the field of environmental psychology have demonstrated that natural settings have beneficial qualities in terms of finding possibilities for rest and restoration from stress and mental fatigue (Kaplan and Kaplan, 1989). It is also proved that spending time in nature is associated with health aspects related to physical activity, air quality and social cohesion (Hartig et al., 2014). Contact with the natural world has also been recognized as leading to sustainability related outcomes, such as pro-environmental behavior (DeVille et al., 2021).

Increased recognition of the consequences of fewer having the opportunities to experience natural darkness and the night sky has led to research focusing on the experiential value of darkness (Stone, 2018; Dunn and Edensor, 2024). The night sky has served as an inspiration for philosophers, poets and artists for thousands of years where this attachment has led to a recognition of its emotional, spiritual and creative value (Pottharst and Könecke, 2013). Apart from serving the purpose of an aesthetic asset and being an important cultural heritage, the night sky has also played an important scientific role in the history of humanity.

Experiencing the night sky has enabled different scientific discoveries such as navigation systems or the calendar (Dunn and Edensor, 2024). The night sky and natural darkness have also made it possible to experience seasonal changes and time. Today this information is scientifically measured and mediated through technology, decoupling us from the actual subjective and qualitative experience. This shift of framework for perceiving the natural darkness can be linked to Shifting Baseline Syndrome (Lyytimäkki, 2020). The latter means a gradual acceptance of

new environmental conditions perceiving it as the normal state of the environment due to a deficit of experience of past conditions (Soga and Gaston 2018). A psychological consequence of this shift has been described by the journalist Jo Marchant (2021). Before the invention of the mechanical clock people experienced time with the help from the lived experience of the night sky and the shifting position of the stars and the moon. The arrival of the mechanical clock with an escapement has made us think that time is something that we can see on a clock and quantitatively measure. Instead of listening to our body clocks we undertake everyday activities dictated by mechanical schedules.

In sum the loss of experiencing natural darkness has turned out to have profound cultural (Gallaway, 2014) and psychological (Marchant, 2021) consequences. Potentially, the night sky, being such a great source of inspiration and important for contemplation for humanity, is a vital aspect also for human health and well-being.

1.1.1. Light pollution

The concept "light pollution" helps to frame the notion that too much artificial light at night is becoming an environmental problem (Stone, 2018). Davies and Smyth (2018), argue that artificial light at night should be seen as a pollutant equal to greenhouse gas emissions and that it should be in the focus for global change research in the 21st century. Light pollution has even been called "A drastically overlooked form of climate change" (Restoring Darkness, 2023).

The International Dark sky association tries to act against light pollution with dark sky reserves, sustainable lighting plans and light pollution education. Their definition of light pollution is "any adverse effect of artificial light at night" (IDA 2023). In a recent publication by Springer Nature's inaugural cross-imprint book series that addresses and supports the United Nations' seventeen Sustainable Development Goals, Light pollution is defined as "The excessive or misdirected artificial light that interferes with natural darkness" (Kørner 2023:336).

According to Taylor Stone (2018), the concept has gained acceptance among researchers and its consequences are linked to extensively investigated factors.

Similarly, Rodrigo- Comino and colleagues (2023), have studied more than 600 research articles and concludes that light pollution and its consequences have gained attention from researchers during recent decades. However, despite the topic gaining interest there are but a few efforts to mitigate light pollution in practice (City of Light Jyväskylä Finland n.d.). Likely explanations for this shortage of action are, according to Rodrigo-Comino and collegues (2023), that light pollution is considered a complex problem, it is difficult to control and has diverse consequences. The degree of light pollution also depends on several factors and actors in society (Rodrigo-Comino et al., 2023).

However, the heavy focus on describing artificial light at night as an environmental impact problem has led to a bias for solutions which estimate, reduce or control light at night (Falchi et al., 2016; Boyce, 2019; Thurairajah et al., 2021). Specific technical and policy solutions concentrating on finding adequate light levels do not nesessarily respond to the root of the problem and risk negative responses from stakeholders who can feel activity inhibited. From a techical perspective, even if energy efficiency is imporoved with, for example LED s, light levels have continued to increase worldwide (Stone, 2018). Stone (2018) argues that light pollution is an insufficient concept to address the challenges with excessive use of artificial light at night. With such a focus we also tend to miss a more holistic approach on human well-being values drawing on experinces of darkness and a perspective where people can have daily access to natural dark space.

1.2. Framing the problem

In recent years research has pointed towards serious side effects of artificial light at night. Scientists, policymakers, and stakeholders have frequently referred to this challenge as light pollution. At the same time as the concept has helped to address the challenges with excessive use of artificial light at night, the notion of "pollution" and the focus on environmental impacts have been seen as constraints which stand in opposition to lightening practise and technology (e.g. Stone, 2018).With such

focus we tend to miss a more holistic perspective adressing the human need for night and darkness.

The introduction of this thesis has grounded the idea of a lack of focus on the potential for everyday experiences of natural darkness in the places where we live. Experiences of natural darkness can be understood as a connection with nature where cycles of natural light and darkness, and changing seasons has been guiding the circadian rhythms of life for millions of years. Against the background of increased urbanization and a modern life lived in a built environment, as well as the frequent exposure to screens, the loss of interaction with our natural world is a major problem. The intention of this study is to look at the problem with artificial light at night through the lens of experincing natural darkness rather than seeing it throught the lens of environmnetal consequenses. This focus leads to framing the problem differently and therefore also the research focus and priorities. Drawing on personal experience, the Nordic region is an example where people can still, in the 21st Century, experience naturally dark cycles in their everyday lives.

Several scholars from the humanities and social sciences have tried to bring forward experiences and encounters with natural darkness in different settings (Edensor, 2015, Dunn and Edensor, 2020, Morris, 2011; Frey and Harper, 2023, Robert Shaw, 2015). The benefits of activities in a nocturnal environment, such as stargazing, have also gained interest (Bell et al., 2014; Frey and Harper, 2023). However, despite the growing literature emphasizing experiences of natural darkness, there is limited clarity about the subjective and lived experience in relation to place in our everyday life.

In taking this approach, one important criticism is highlighted. Often experiences of darkness are associated with negative aspects. Earlier research has also focused on darkness related to fear and insecurity (Boomsma and Steg, 2012). This study seeks to widen the perspective of experiences of darkness from the Nordic example. What alternative narratives, interpretations, and imaginations of experiences of

natural darkness emerge in a Nordic context and how do these alternatives impact the ways in which we live, feel and make meaning in the world?

2. Aim

The aim of the study is to increase our understanding of the lived experience of natural darkness in relation to place in our everyday life.

Research questions:

How can people sense and experience darkness?

How can people make meaning of darkness?

How can they relate darkness to their body and well-being?

What experiential values can darkness bring to settings and surroundings in people's everyday life?

3. Theoretical perspective

The following section is an exploration of academic literature that functions as a frame of reference to understand and describe the results from this study. The study takes departure in a generally defined environmental psychology where a key component is the interest in human relation to the physical environment. General literature and approaches are used to investigate and understand how people can perceive, experience, and make meaning of darkness in their everyday environment.

3.1. An ecological approach to perception

An important theoretical entrance for understanding experiences of darkness in this study is ecological psychology. Traditional theories in psychology consider perceptions and experiences as something entirely connected to the mind where mental processes are separated from the environment (Heft, 2013). As opposed to traditional theories of perception, an ecological approach emphasizes the importance of the holistic, multi-perceptual and embodied relationship between humans and the environment. Experiences of our surroundings are understood in relation to an environment (Heft, 2013). This points to a transactional approach (Heft, 2013) where the focus is on the meaningful engagement with the environment (Tuan, 1974).

Several key concepts from the ecological approach have helped to explain the relationship between humans and their environment (Michaels and Palatinus, 2014). One concept is *affordance,* denoting the possibility for action and distinct behaviors in relation to particular features in an environment (Gibson, 1977).

The theory of *affordance* has been frequently referred to in environmental psychology often representing the possibility for a certain behaviour in relation to features in an environment, for example, independent mobility and child friendly environments (Kyttä, 2003). In this study *affordances* are used in a broad sense while trying to address the meaning in general of dark surroundings.

Anthony Chemero (2018) has attempted to expand the theory of *affordances.* He argues that perception is a dynamic interaction between the environment and the person depending on the conditions of an entire situation. In this perspective the perceived *affordances* are influenced by characteristics of the perceiver and various social factors, for example history, culture, emotions and psychology, in addition to the conditions of the physical environment (Stoltz and Schaffer, 2018).

The anthropologist, Tim Ingold (1992) has used the concept of *affordances* in relation to the environment for his own thinking. According to Ingold the relational perspective that the theory of *affordances* offer can create a more exact language that connects the natural world and the separately created worlds of culture. Additionally, he suggests that a cultural implication of the idea of *affordances* can be related to what differentiates people. As opposed to different ways of organizing sensations to meaningful interpretations, Ingold relates *affordance* to people's differentiation with respect to the characteristics of the environment which is constantly moving forward with its own activity, and people´s different adjustments to their surroundings by practiced skills of perception and action. Perception is not just about exploring objects that exist in the world, but also about being present and aware in the moment, and in this way taking part in the ongoing formation of the world (Ingold 2018:40).

An example of how the perception of natural darkness works can be found in Matti Tainios (2023) account for experiencing an old forest in deep natural darkness. As concluded by Tainio (2023), our vision is considered ineffective in darkness, yet perception of natural darkness is not a sensory denial. The experience of dark surroundings is an experience where we relate to the surrounding space with all our senses. Experiencing the natural dark forest, according to Tainio, is a different sensation compared to the sensation of closing your eyes and thinking, in the sense

that it makes us feel something. Experiencing the qualities of the surrounding forest creates a distinct atmosphere (Tainio, 2023). Furthermore, perceiving natural darkness is multisensory, and a sequence of auditory, haptic, olfactory as well as visual interactions that occurs in the presence of our surroundings. From this perspective natural darkness is an immersive experience that effects our sense of self (Shaw, 2015).

Addressing *affordances* in relation to perceiving nature has helped to explain the functional relationship were specific elements of nature support mental well-being. Brymer and colleagues (2021) suggest that nature offers *affordances* for well-being in terms of offering a sense of perspective, mental and emotional sanctuary and supports a sense of being immersed in the moment. Darkness is not the same as nature, but it can be studied in relationship to our natural surroundings. Tainio (2023) suggests that being immersed in the old dark natural forest provided opportunities to face darkness that creates a certain ambient related to historical nights. Ancient nights *afforded* a completely different experience, compared to the modern, bright and loud nights in the cites today (Gonlin and Nowell, 2017). The night of prehistoric times has been linked to *affordances* of darkness, coolness and quietness (Gonlin and Nowell, 2017), all helpful qualities to sustain circadian rhythms, vital for health and well-being.

3.2. Experiencing darkness

The previous section has addressed how experiences of darkness can be seen as an active and meaningful engagement with the environment. The following part covers aspects that are of particular importance to shaping our experience of darkness and considers some theoretical insights and concepts on meaning making in dark surroundings.

3.2.1. Making meaning of place in darkness

As pointed out by Edward Relph (1976) our natural surroundings are directly experienced places that we fill with meaning. Relph (1976) suggests that places

become ours by a repetitive presence and association within them. From a phenomenological perspective, places are closely linked to human existence (Seamon, 1982) where various places can have a meaning in human life (Manzo, 2005) which is a fundamental principle in this study.

Yi Fu Tuan (1974) was one of the first to describe how our perception of the world and the environment are linked with an emotional relationship. Several concepts have after that helped to develop the explanation of how places play a fundamental role in human existence (Seamon, 2013). The concept of place attachment has been frequently referred to representing the affective bound to a place (Manzo, 2003). Numerous scholars have tried to expand the idea of place attachment arguing that this affective bound is far from a static relationship to place, indicating more dynamic implications of the concept (Manzo, 2003; Manzo, 2005). In this study I understand our relationship to places in darkness as an active and meaningful occurrence. The notion of *Place Insideness* and *Place Outsideness* (Relph, 1976) help to frame the idea that perceiving places in darkness is both a meaningful and dynamic occurrence. *Place Insideness* refers to a profound experience of a place when we do not even reflect on its meaning to us, and it is part of our identity. In contrast, *Place Outsideness* means that we feel alienated from a place (Relph, 1976). While these two concepts can highlight the different meanings dark surroundings have in a person's life, it is important to recognize that being inside or outside a place is interrelated. One can feel inside a place because of a possibility to access the outside, and outsideness can be valued because of the ability to enter the safety of the inside (Morgan, 2010). Natural dark surroundings might be appreciated because of the promise of daylight.

Emotions have played a fundamental role when describing our relationship to places. Emotions are however something complex since they can be hard to delimit to something concrete (Morgan, 2010). Our relationship to places after dark can lead to questions of identity, a sense of belonging and ownership (Dunn, 2016). Domestic dark spaces at home have been connected to fear and violence, as well as relaxation and intimacy (Shaw, 2015). In addition, meaningful places can generate

complex psychological processes where we prefer to stay at a place than anywhere else or make us feel bad to have to abandon a place (Mocrei-Rebrean, 2021).

Our everyday movement in space with daily routines, activities and behaviors has turned out to be an important dimension in making meaning of an environment (Seamon, 2013). When people interact with a physical setting, engaging their thoughts and feelings, it tends to become meaningful (Sveneaus, 1999). Over time we develop *environmental competences* (Pedersen, 1999) thorough our interaction with everyday places. Repeated encounters with an environment tend to increase a person's capacity to deal with the surrounding which intensifies the emotional bond to the place (Bergman, 2015). Having an emotional connection towards one´s surrounding has been linked to an explorative mode and the capacity to see the possibility for meaningful engagement in a setting (Bergman, 2015). Being continuously exposed to dark settings might develop skills and abilities to handle and see the meaning in these surroundings.

3.2.2. Frames of reference adding meaning to darkness

Meaning making in relation to place are not just the result of the meaningful interaction in an environment, but also exists in a larger political framework (Manzo, 2003; Williams, 2014). Drawing on these conclusions our relationship to places after dark must be understood as framed by an intersubjective understanding of darkness in a certain context. Dunn (2020:156) refers to making sense of place as a "political act" since it relates to "what should" and "what should not happen" in places after dark. One contemporary understanding that has influenced Western perception of the environment is the image of the globe seen from space (Ingold, 2000). According to Ingold (2000) this perspective has made us conscious of the physical limits of the world, forming a distance towards the world as an ambience of our everyday dwelling. A consequence of this approach is a perspective of the world as something outside us where our surrounding world belongs to us, and we must manage it with interventions (Ingold, 2000). In contrast, Ingold (2000) refers to a spherical perspective of the environment where the everyday places, and a local

perspective forms our experiences of the world. This directly lived environment can be described as the sphere of human life, where the world is experienced from within (Ingold, 2000:2009-2017). Personal and meaningful experiences with the environment such as the alterations of the seasons or the shift in day and night are part of this life-world pertinent to the focus in this study.

Historical, religious and cultural perspectives have also influenced Western understandings of darkness. Darkness has been related to extreme fear of the dark and negative associations in Western history (Edensor, 2015). The anthropologist Jack Galinier (2010) describes that darkness was associated with obscurity, diabolism and evil spirits during The Middle Ages (Jaque Galinier et al., 2010:820). Darkness during the 17th and 18th centuries was related to death, sin and witchcraft (Koslofsky, 2011). Christian perspectives have also contributed to shape a dualistic understanding of darkness where darkness has been linked to evil and light to good. Descriptions from the Bible relates light to the creation of the world, that God saved the world from darkness and chaos, and describes the darkness that existed before the appearance of Christ. Dunn and Edensor (2020) suggest that these biblical understandings have shaped a positive view of light.

During Enlightenment scientific ideas about objectivity and illumination generated values that complemented a Christian dualistic understanding of darkness and light (Bille and Sørensen 2007:272). The theory of Cartesian dualism might also have fueled a binary perspective on darkness. This worldview generated Eurocentric values that supported the notion that Africa was the "Dark Continent" filled with primitive qualities related to savagery and ignorance that the Enlightenment civilizing mission was supposed to do something about (Dunn and Edensor, 2020).

Le Gallic and Pritchard (2019), describes the dualistic view of light and darkness in Western history as problematic in many ways and suggests that old interpretations still guide present understanding on light and darkness.

One example of how this dualism have been problematized is by Sarah Pritchard in her article "The Trouble with Darkness" (2017). Pritchard suggests that both light pollution and darkness have been portrayed in a way that miss both political and

historical dimensions. She exemplifies her arguments with NASA´s (2012) photos of the world at night where sources of light considered natural such as fires and volcanos are concealed. This increases the contrast between urban lit regions and darker regions. Based on these pictures, light pollution portrayed as the focal environmental problem by NASA is restricted to the urban, industrialized world, and the human development problems associated with light poverty are ignored.

Light pollution and darkness, as described by Pritchard, can be problematized in a similar way as the concept of wilderness. William Cronon (1995) argued for re-thinking wilderness. Research at that time, and the environmental conservation movement had treated the concept in a way that risked "separating nature from culture, with an idealization of landscapes of leisure, without addressing fundamental questions of livelihood and in a way that sees any human use of nature as an abuse" (Pritchard 2017: 323). According to Cronon (1995) this risked shaping the understanding of wilderness in a colonial, racist, and patriarchal way (Pritchard, 2017). Prichard (2017) suggests that the same arguments can be applied on contemporary discourses on light pollution and darkness where she sees the need of thoughtful and reflective strategies based on lessons learned from environmental history. Prichard celebrates protecting the night sky but underlines that we should do so in a way that considers both the environment and social justice. These understandings call for a more nuanced and holistic approach to darkness, emphasizing historical perspectives as a contribution to widening the discussion.

Besides Pritchard (2017), several other research perspectives have tried to problematize past understandings of light and darkness as opposites, suggesting that they are false and shaped by a Western worldview (e.g., Bogard, 2008, 2013; Edensor, 2013, 2015, 2017; Gallaway, 2014; Dunn and Edensor, 2020). Despite the evidence, old understandings of light and darkness as opposite continue to influence current understandings. According to Dunn and Edensor (2020) an example of this is artificially lit cities in Europe and North America described as "over-illuminated", which can be understood as "overdeveloped". Satellite pictures of the earth that have been used in some contexts, relating lights at night with economic progress and sustainable energy usage (Lyytimaki, 2020) have fueled this position.

3.2.3. Sensing darkness

Recent research has contributed to broadening our understanding of darkness which can be interpreted as challenging the dualistic perspective described above.

Staying in dark spaces has turned out to generate sensory experiences that has resulted in different qualities related to darkness. Experiences in darkness are often related to an immersion in darkness together with a kind of uncertainty about one's surroundings or what will happen (Sumartojo, 2020). It is not solely that our vision changes and adapts to a darkening surrounding, dark spaces bring forward other senses than vision such as sound, smell and taste that becomes more necessary (Dunn and Edensor, 2020). Darkness also makes us think how our body is positioned in relation to our surroundings (Morris, 2011). Edensor and Dunn (2020) suggest that a consequence of this is that the world is experienced in a different way at night and that darkness let other senses than vision shape an experience and influence social interaction in a certain way. One example that they refer to is that, trying to feel your surroundings gives room for unfamiliar and unasked thoughts and sensations, and a concentration on sound can encourage more focused and intimate conversations without distractions from visual impressions (Edensor, 2013). Shaw (2015) has demonstrated that in the domestic dark spaces of the home, we are more open to the affectivity of the other. The ability to choose the affectivity towards the other is understood as important and in that sense, Shaw suggests that controlling the darkness at home is an act of power.

Research on dark sky parks, restaurants with dinners served in the dark, concerts in the dark and ethnographic accounts on sensing darkness have concluded that qualities such as intimacy, imagination and reflection appear to be related to darkness (Edensor, 2013:462) According to Edensor (2013), a likely explanation is that dark spaces reduce our capacity to see, and it becomes harder to decide depth and distance which provokes an imaginative and affective experience of space. Our inability to see in the dark might also be that dark spaces trigger mystery and speculation and are associated with supernatural beliefs and different dangers (Dunn and Edensor, 2020).

Dark spaces have also been associated with creativity and thought. The psychologist Anna Steidle and Lioba Werth (2013) have demonstrated that dim illumination and darkness can facilitate performances and an explorative processing style. Darkness has turned out to increase freedom from constrains which facilitates creativity. Experiencing natural darkness can also be associated to experiencing nature in general, which has been related to mind wondering and creativity (Williams et al., 2018).

In sum based on these findings, sensing darkness affords a completely different experience tied to a certain affective experience of space compared to an experience in light.

3.2.4. Light and darkness and the in-between

Dark places are almost always experienced in relation to light. It has been argued that a solely focus on darkness have turned out to be less fruitful (Pritchard and Le Gallic, 2019). Edensor (2013) suggests that total darkness is almost never experienced on Earth. Instead, we more often come across different levels of brightness, shadows and gloom. In addition to this, light and darkness are filled with opposed values related to the associated experiences. What may be a peaceful and calm environment for some, can make others afraid (Edensor, 2013). Moreover, landscapes at night are often perceived as a moving landscape that is felt with tactile experiences, shaped by expectations, and sometimes co-created with others in the moment (Lund, 2021).

A better understanding of experiences of dark places could benefit from seeing light and darkness as related rather than opposed to each other (Edensor 2017), or as what, Le Gallic and Pritchard (2019) express, as two aspects of the same phenomenon where the boundaries are considered fluid.

This perspective leads to the purpose to investigate various aspects of darkness such shadows or different light levels. The Japanese writer Junichiro Tanizaki (1977) in his classic book, *In Praise of Shadows* pictures a different view on light and darkness where he emphasizes the potential of gloom. Western culture is criticised

for abandoning darkness for light, instead eastern culture can contribute with a more constructive view on darkness. Tanizaki refers to the importance of shadows in Japanese culture, compared to the overbright Western perspective. In his essays he makes it clear how shadows influence spaces and, offer calmness and reflection (Sumartojo, 2020).

Another example of recognizing different aspects of dark places would be to investigate experiences from people living with darkness during several months of the year (Le Gallic and Pritchard, 2019). According to Le Gallic and Pritchard (2019) accounts from people living in Nordic regions show that they have a more intimate relationship to darkness. Almost complete darkness during several months of the year might contribute to more nuances and expanding the language and perspectives on different types of darkness (Le Gallic and Pritchard, 2019).

3.2.5. Summary

This section has aimed to provide a summary of the literature describing meaning-making and darkness. The lived experience of natural darkness includes interaction with everyday places and involves experiences of the night sky and natural light. These everyday experiences might strengthen our understanding of ourselves and our surroundings with the potential of *Place Insideness*. Ideas related to darkness are shaped by certain world views, where a Western biased perspective has led to a dualism and the inability to see power-dimensions, nuances and broadening the perspectives of different types of darkness. Experiencing darkness concerns a certain atmosphere (Dunn and Edensor, 2024) connected to the surrounding space (Tainio, 2023). Sensing darkness relates to characteristics such as reflection, unfamiliarity, intimacy, creativity and imagination (Edensor, 2013). This atmosphere is also linked to historical times, which afforded calmness and quietness (Gonlin and Nowell, 2017).

4. Method

4.1. Research design

This section introduces my choice of a phenomenological approach and its relevance for the study. I will then describe the data collection and research processes, as well as my application of Giorgi´s (2009) descriptive phenomenological psychological method. Throughout the study a qualitative approach is used, recommended when earlier research in an area is limited, and something needs to be explored (Cresswell and Cresswell, 2017:57). The idea is to understand the complexity of the subjective experience of darkness which also makes a qualitative study best suited (Creswell and Creswell, 2017). Brinkmann and Kvales (2015) work on qualitative research is used as a general guide on how to conduct semi-structured interviews. As suggested by Englander (2012), a phenomenological perspective will complement this approach. The last part contains a discussion about the method where some of the challenges and strengths with qualitative and phenomenological research, and the Descriptive Phenomenological Psychological Method in particular are identified.

4.1.1. Phenomenology as research method

The study started with research questions acknowledging the need to understand how a certain phenomenon, darkness, is perceived from the point of view of the lived experiences. A phenomenological perspective (Husserl 1977; Merleau-Ponty,1962) was used as a guiding approach since it is considered helpful while

trying to investigate lived experiences. When studying experiences of darkness in particular, a phenomenological focus has also earlier been demonstrated as relevant (Shaw, 2015).

A phenomenological philosophical perspective was developed by Edmund Husserl, that 1970 published the work *Logical Investigations* where he described a new way to study consciousness. Several researchers at the time as Max Scheler (1874-1976 and Martin Heidegger (1889-1976) have contributed to the development of the phenomenological perspective but were not involved in Husserl's work. It is important to emphasize that phenomenology is not one specific established method. Philosophers recognized as phenomenologists have diverse perspectives and interpretations of what they understand as a phenomenological approach (Moran, 2002). One main division in phenomenological research tradition is the difference between descriptive and interpretative approaches. The interpretative stance comes from work from Martin Heidegger and Hans Gadamer and recognizes that the researcher and the participants together seek to interpret the underlying meaning of the phenomena. In contrast the descriptive perspective that comes from work from Husserl and is further developed by Merleau- Pounty sees it as possible to set a side previous knowledge of a phenomenon and describe the essence of it (Moran, 2002). In this study of investigating darkness, I approached the task under influence of the phenomenological philosophy of Husserl (1965) and the Descriptive Phenomenological Psychological method of Giorgi (2009, 2012, Giorgi et al.,2017).

In general, a phenomenologist perspective tries to understand a phenomenon as it appears to the perceiver and treats the given as something that is present to her consciousness (Giorgi, 2012). According to Giorgi (2009), phenomenology is the investigation of the structure and the search for the essence of a phenomena. For Husserl our consciousness is always engaged in the real-world which made him interested in studying the environment and *the life-world* (Moran, 2002). *Life-world* means the world as lived in everyday life. This is the world that all human beings experience in a diversified way (Giorgi, 2009). Giorgi (2009), emphasise

that Husserl with *life-world* mean the common everyday world into which we are all born and live. Another important concept for phenomenological research is the term *intentionality*. Although *intentionality* from this perspective means much more than our intention in a certain situation, one can interpret the concept as there always being a meaning in human behavior (Churchill, 2022).

Important in phenomenological research is to look at what is being given as it presents itself for the consciousness, neither adding nor subtracting from it. A phenomenological attitude of the *phenomenological reduction* must be applied. Usually we see something, and we judge it as existing. Husserl argues against this approach and mean that we first need to look at how the object present itself for us. This means that the natural attitude of everyday life and all the knowledge that derives from it is put aside (Giorgi, 2009). We need to look at objects from the view of how they are experienced. The reductionistic approach means that the experienced phenomenon is reduced to the phenomena as presented to the consciousness. The main task is then to clarify the meaning of the experienced phenomena (Giorgi, 2009).

An essential phenomenological epistemological concept while focusing on the phenomena as it presents itself for us is *Bracketing*- to avoid all pre-understandings of the phenomena. Husserl called this method *Epoché* (Moran, 2002). To be able understand an experience, we need to *Bracket* what we already know about it. Bracketing includes setting aside both our preunderstandings and the "natural attitude", the way the world appears to us. Acknowledging the Epoché allow us to see the world from the experiences of others without critical judgement (Churchill, 2022). Giorgi (2009) means that *Bracketing* refers to "keeping a tension between the past and the present in order to establish their respective roles" (Giorgi 2009:3).

A key principle leading phenomenological research is the method of *free imaginative variations*. Giorgi (2009) suggests that an active imagination is necessary while trying to find the meaningful structure of an experience. Furthermore, he recommends that varying the meaning can be done by exploring

different possibilities of what is being said and focusing on what is being said from different perspectives (Giorgi, 2009).

Life world, Intentionality, Phenomenological reduction, Bracketing and Free imaginative variations are all key concepts that derives from Existential Phenomenological Research and will serve as guiding principles in this study.

4.2. Research process

4.2.1. Sample and Participants

The purpose of the sample was to find variations in the responses and as recommended by Giorgi (2009) to get as extensive descriptions as possible of the lived experience. The phenomenological approach often starts with the question; "What is it like?" (Giorgi, 2009 in Englander 2012:18). Fundamental for finding participants was asking the question; "Do you have the experience that I'm looking for?" (Englander, 2012:19). The participants needed to possess information on everyday experiences of darkness and not as something they had encountered just occasionally. A large sample is not regarded as essential in a descriptive study but according to Giorgi (2009), at least three participants are suggested for the purpose to get rich data with different descriptions. In total four participants were recruited for this study and interviewed during the fall of 2023.

The participants were recruited strategically based on indications of them having experience of natural darkness as an integrated part of their everyday life and place of residence. The selection of participants was also based on differences in age, life-path (moved a lot or lived in the same area for a long time) and everyday surroundings (one in the countryside, one on a boat and two in medium sized cities). The recruitment process was also done by means of convenience in the sense that the participants were part of my social network and gathered from contacts to contacts via a recruitment email. One of the participants is an acquaintance of mine but this was considered as having less importance for the results. The characteristics

of this person as a key informant and that we do not have an everyday relationship made this person a good choice to interview.

The sample consisted of people that live in the Nordic countries (appendix III). Three of them are born and grew up in Sweden and one in Denmark. Two of them are female and two of them are male. The participant´s occupation varied at the time of the interviews. Two of them had experiences from military and three of them from teaching.

4.2.2. Deep interviews

One of the most common ways to generate empirical data in a qualitative study is through *The Deep Interview*. The objective of such an interview is to create depth of meaning from the point of view of the participant (Rutledge and Hogg, 2020). One way of doing so is by open-ended questions. To build trust and comfort in the interview situation is believed to be fundamental in *The Deep Interview*. Interview techniques such as probing or asking for further clarification to generate a deeper meaning is used (Brinkmann and Kvale,2015; Rutledge and Hogg, 2020).

The deep interviews conducted in this study where semi-structured, which means that they were held in a dialogue-like style based on general themes and questions (Brinkmann and Kvale, 2015). Before each interview, the informants were sent a short description of the purpose of the study and some themes to reflect upon beforehand. Themes included their experience with natural darkness such as specific places and situations in darkness and how darkness relates to well-being. Information and questions sent beforehand are not in line with a phenomenological approach (Englander and Morley, 2021) but was identified as something important for this study.

When performing the interviews, I loosely followed an interview agenda to guarantee addressing the lived experience of natural darkness in relation to place in our everyday life. In the process I used two entry points that was related to the research questions that further shaped the dialogue. First, what I had interpreted as

important when considering artificial light at night and darkness, such as darkness related to well-being and the circadian cycle (Kørner, 2023) or the experiental value of darkness (Gallaway, 2014), and second what I understood as meaningful for the participant based on the persons context and surrounding.

The interview agenda (appendix II) was constructed around questions addressing the participants experience of darkness. General themes in the agenda included 1) *Person and everyday surroundings* 2) *Places and circumstances* 3) *Sensing darkness* 4) *Meaning making related to a situation* 5) *Meaning making in general.* Each interview started by clarifying that the results from the interview was going to be used in a degree project in Environmental Psychology at The Swedish University of Agriculture Sciences and accessible to the general public. I also clarified the possibility to withdraw from the study at any time, the option to reject to talk about certain themes and that the names of persons and places were going to be replaced in the results.

The design of the interview situation was prepared striving to generate descriptions of experiences related to darkness. The descriptive focus in Giorgi´s method is recurrent throughout the whole research process. Both data collection and analysis aimed to maintain a descriptive aspect in the study. Questions was designed to generate as detailed descriptions as possible (Giorgi, 2009). For example, *describe a situation where you have experienced natural darkness?* Phenomenological philosophers recognize that a person is always in a situation, and that an experience is directly lived, a lived experience (Englander, 2021). In the interviews a principal focus was consequently on actual situation in which darkness was experienced. Open-ended questions were used allowing the participants to take the conversation in a direction more freely striving at a dialogue. The purpose of this dialogue was to discover deeper and more detailed information about the described experience.

Commonly, a phenomenological interview starts with a question asking for a description of a situation in which the participant experience the phenomenon (Von Essen and Englander, 2013). In order to establish a relaxed atmosphere where the

informants felt free to share thoughts and reflections (Brinkmann and Kvale, 2015), I found it important to dedicate the first part of the interview to more relaxed talking about the person's background and context in general. The fact that two of the interviews were conducted digitally which meant the inability to recognize bodily expressions made this even more relevant. Questions generating descriptions of experiences of darkness came in the middle part of the interview.

Two of the interviews were held at the digital platform Zoom due to informants living far away. One interview was held at the home of the participant. The last interview took place at my office which was the choice of the participant. The interviews lasted between 36-57 minutes and were recorded with my cell phone. Two of the interviews were transcribed verbatim and two was transcribed with the help of a transcription tool in word.

4.3. Ethical considerations

In the development and handling of the data and information I tried to follow the guidelines and recommendations presented by the Swedish Research Council (Swedish Research Council, 2017).

While conducting a qualitative study it is regarded as specifically important to take into consideration ethical questions since the informants might share personal information (Kvale and Brinkmann, 2015). Knowing that the interviews could take a direction towards fearful and unpleasant situations occurring in darkness, I was aware of the potential emotional response that the topic could generate. Even though aspect of fear related to darkness was not the focus of the study, it became important that the interview followed a certain structure and to be careful to not engage in a therapeutic relationship of which I do not have the professional experience (Brinkmann and Kvale, 2015). In addition, in the phenomenological interview, the individual is important but compared to clinical or counseling the phenomenon investigated is considered more relevant (Englander, 2012).

Empirical data was handled careful in a systematic and critical way (Swedish Research Council, 2017). Only myself and my supervisor had access to the actual interviews. The interview participants received written information about the study and its purpose, as well as information about what participation meant and confidentiality of the data. Oral consent was obtained from all participants before starting the interviews. Information was given about the possibility to withdraw from the study at any time. All names of places and people were replaced with fictive names in the interview transcripts.

4.4. Data analysis

The Descriptive Phenomenological Psychological Method (Giorgi, 2009) was used to analyse the data. Before starting this process, it is important as Husserl suggests to *Bracket* all my previous knowledge of what darkness might mean to people. I tried to be aware of my preconception and wrote it down to be able to distance myself from it. My intention was also to try to analyse the transcripts as close as possible to the informants' own words, an important assumption aligned with the phenomenological psychological reductionism. What follows is a description of how I conducted and interpreted the four steps, based on Giorgis's work (2009, 2010, 2012, Giorgi et al.,2017).

1. After the data was recorded and transcribed, I followed Giorgi's first step which required me to read thoroughly each transcript and to listen to the recorded audio to get a sense of the whole. I then asked myself what the interview was about in general, paying a specific focus to the implication of the meaning of darkness for the participants.

2. The next step required me to reread the material and divide the data into meaning units. Giorgi (2009) suggests that the reason for doing so is that the material from the entire interview is too big to handle at the same time. The meaning units need to be sensitive to the psychological reality and are not just neutral sentences from the data (Giorgi, 2009). When re-reading the

transcript, I marked each time there was a transition in meaning. In this step and the following steps, Giorgi emphasizes the importance of adopting the phenomenological attitude, to look at the phenomenon studied, natural darkness reducing it to the essence of how it is experienced, bringing forward the greater meaning of natural darkness. This approach is different from the perspective at the first step that is a direct description in a natural attitude (Giorgi, 2009).

3. Once I had identified the meaning units, I converted them to psychological statements in third person. Giorgi (2009) declares that this step is perhaps the most challenging one where one needs to form a careful description of the exact features of the experienced phenomenon. In this step it is important to try not to speculate or interpretate the material where, *Bracketing* previous knowledge is specifically important (Giorgi, 2009). Here I focused on the descriptions and tried to re-describe what it was like for the interviewed person to experience darkness in a way that put the lived experience into its context and at the same time brought forward the more general essence of the experience. An example of how this psychological statement looked like was that The participant also lived in what others call Northern Greenland where she experiences it to be two months of darkness. The participant thinks that this darkness is another type of darkness compared to the darkness she is used to in Denmark.

4. During the last step I started by reading through step 3 to get a sense of what the phycological statements was about and what meaning it had for the informant. This step required me to use *free imaginative variations*. Elisabeth von Essen (2021) interprets this process of varying the meaning of the phenomenon as reflecting, clarifying and expanding the meaning of the phenomenon. Here I tried to explore different possible meanings of what was said. The aspects that could be imaginatively varied without collapsing the whole experience were considered essential. I then summarized the essential aspects and arrived at certain overreaching units. First, I made an individual

compilation from each interview, I then formed constituencies of all the overreaching units. Quotations from the empirical data was used to help to clarify and deepen the meaning of the constituents. All quotes in the results were translated from Swedish to English. Finally, I formed one essential general psychological structure. The general structure represented the main finding of the study. In the results the constituents were also explored independently although it is important to stress that according to Giorgi (2009), the constituents are interrelated. The constituents are numbered in the results but should not be interpreted in a certain order. The results also included a visual representation of the constituents where the centre of the figure represents the lived psychological meaning of darkness.

4.5. Method discussion

The Descriptive Phenomenological Psychological method was used in the study since it is considered a precise and scientific method to study human experiences (Giorgi 2009, 2012, 2017). The transparent and structured way of collecting and analyzing data seemed relevant when trying to understand the subjective experience of darkness. I believe that the method also seeks to offer new insights in how people experience darkness. The method is also used earlier in psychology when investigating lived experiences (Von Essen and Englander, 2013; Von Essen, 2021; Williams et al., 2023).

A challenge with the choice of approach in this study was the difficulty to fully understand the phenomenological philosophical approach. Performing analysis based in a phenomenological approach requires some judgement, which of course is easier with some experience of the craft. Although I consider myself a beginner, I have endeavored to use the phenomenological approach in smaller student projects before and believe I have experience of the qualitative perspective from earlier work and studies.

Following Giorgi's steps took time and was a challenging process considering the time limits of a master thesis. Other challenges included that the interviews were done in Swedish, but the analysis was conducted in English, which might have led to the disappearance of important linguistic precision. Languages are not interchangeable, and I realize the importance of conducting the whole research process in one language. One of the interviews was performed with a person with Danish as native language which might have complicated things further. Despite realizing these challenges, I find Giorgi's (2009) steps to be supportive and good to think with when it comes to enter deeply into the subjective meaning of an experience.

As Englander and Morley (2021) point out, it is not difficult to follow the steps in the Giorgi's method, the challenge is for a beginner to adopt a phenomenological psychological attitude as, this requires training. Even though the method expects one to set aside all previous knowledge, I am aware that my role does influence the results. *Bracketing* personal experience is not possible to implement to a full extent since my assumptions are incorporated in the topic being investigated. This is also something that is acknowledged by qualitative researchers and that writing is a process that is tied together to the author, how the text is understood by the readers and how the study affects the participants of the study (Creswell and Poth, 2017). I consider it impossible to generate objective research and believe that we are always influenced by our own cultural and social background and values. The Descriptive Phenomenological Psychological method can appear as striving to generate objective perspectives and relates to what Donna Haraway term as "a gaze out of nowhere", (Haraway,1991:188), which is Haraway's main critic on research that seeks to be objective (Haraway and Manifesto, 1991).

A phenomenological study brings forward the general meaning from several individuals of the lived experience of a phenomenon where the purpose is to reduce and clarify the individual experiences of the phenomenon (Creswell and Poth, 2016). All participants are represented in all the constituents.

41

Each interview brought forward several individual important aspects of the phenomenon that might have been excluded in the results. The tendency of this method to aspire for objectivity might have "silenced" both the participants and myself, as mentioned by (Creswell and Poth, 2016) as one of the challenges with phenomenological research. Furthermore, they bring forward that this "silence" is contradictory to qualitative research that aspires to give space to all voices and perspectives (Creswell and Poth, 2016). Even though the quotes used in the results bring forward important linguistic nuances and life to the study, I consider it impossible to give enough space to the exact experience the participants described in the interviews.

According to Creswell and Poth (2016), the participant in a phenomenological study needs to be selected wisely based on individuals that have experienced the phenomenon. I consider that my background in environmental science and a pre-understanding of natural darkness might have influenced the choice of the participants. Even though I consider the participants selected as deeply involved in experiences and the challenges of natural darkness, the majority had a positive and perhaps nostalgic approach to darkness. This was also a purposeful decision since I wanted to bring forward positive understandings in order to nuance our overall understanding of darkness.

The main critic of phenomenological research is that nothing is ever given and that there is always interpretations and different perspectives (Sellars, 1965 in Brinkman and Kvale, 2015). An interview is never an objective dialogue and there is always power dynamics in terms of my scientific experience and concerning my role as an interpreter of the results (Kvale and Brinkmann, 2015). I believe that at least trying to understand the subjective experience of the other is a big step towards understanding another perspective. The different settings where I conducted the interviews (at the informant's home, via the digital platform Zoom and at my office) each challenged the interview situation in a way that it become far from a free dialogue. The interview that was conducted in the informant's home and the interview at my office specifically challenged power-dynamics. Here it became

particularly important to assure that the informants felt comfortable with these settings.

Before the pilot interview, I tried one informal interview with a friend but soon discovered that the topic required reflection and that experiences of darkness seemed abstract. For this reason, I decided to give background information and themes to reflect upon to the participants before conducting the actual interviews. For this study the focus was the human relation to the physical environment which also made it important with a form of contextualization pointing towards darkness related to places and everyday life.

The first interview aimed to be a pilot interview, testing if the topic and themes generated rich descriptions. The material from the pilot interview turned out to be useful, so I decided to use that interview in my study. An important component in qualitative research is to uphold reliability. While conducting semi-structured interviews it is beneficial, and a way to maintain the reliability of the study, to use the same base and themes for all interviews. After conducting the first interview, I felt that I needed to stick to the same framework as designed for the first interview. The study may have benefited from interviews, each of which was carried out more as an explorative pilot interview, and something that is also recognized as necessary by phenomenologist researchers (Englander and Morley, 2021).

Despite the different challenges noted early in the study, I decided to explore a phenomenological approach since it motivated me to investigate unexplored ground on the subjective experience of darkness. As noted by Creswell and Poth (2016:163), phenomenological research is a form of deep learning which can have a transformative effect on the researcher. This is aligned well with my conclusion of conducting this type of investigation.

5. Results

5.1. Introduction

The following section presents the lived experience of natural darkness among participants living in different settlements in the Nordic hemisphere. The analysis of the interviews revealed a general psychological meaning structure of their lived experience containing six constituents. Each constituent is described independently, but it is important to stress that they are interrelated.

5.1.1. The general psychological structure

The lived experience of natural darkness for the four participants are described as supportive boundaries that both contribute to a sense of place and well-being and open up for excitement and adventure. Alterations between day and night, darkness and light, activity and rest are seen as essential for well-being. They experience natural dark surroundings as important for finding mental and physical space for recovery, reflection, sleep, and rest in a fast-moving modern world overloaded with stimuli and stress. The lived meaning of darkness is a sensuous experience which allows one to be in the present space and moment. Natural darkness makes it possible for the participants to experience natural light, like stars, the moon and the Northern Lights, as well as the presence of wild animals. The participants insights give them a feeling of how the world works and of their place in the Universe. They experience being comfortable in natural darkness as something one can practise. However, they reflect that darkness in a Nordic context as leading to fearful and challenging situations linked to questions of survival. The participants express that

being alone and darkness has a special relationship where this combination is associated with both challenging and fearful situations, but also positive feelings. Natural darkness is seen as important to be able to manage and control, where the instrumental function of light is experienced as essential to be able to perform everyday tasks in darkness. They experience-darkness as contextual depending on the geographical surroundings and season of the year. Natural darkness is experienced together with light, shadows, shapes, and structures. In this sense the lived experience of darkness is described as an experience of a diversity of darkness(es).
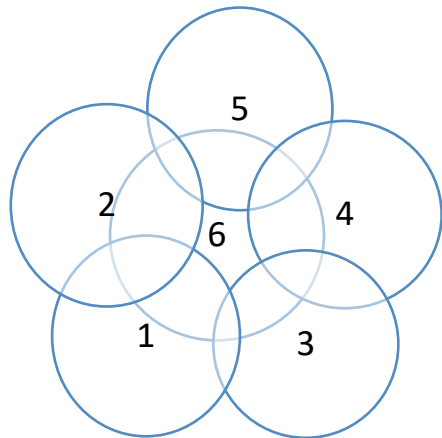
1) Darkness creating supportive boundaries

2) Being in the present space and moment

3) Understanding nature and our place in the universe

4) The diversity of placed darkness

5) Feeling at home in darkness

6) Managing darkness

Figure 1. The interdependent constituents that made up the general psychological structure. Each constituent is entwined with the others, and no one is more important than the other. The centre of this map symbolizes the phenomenon of what it is like to experience natural darkness by the participants in this study. Number 6 Managing darkness is placed in the middle because a person experiences but also must deal with darkness more concretely and moderate the different challenges experiences of darkness entails.

5.1.2. Darkness creating supportive boundaries

This constituent concerned the participant´s experiences of darkness as supportive boundaries from stress in everyday life and other aspects of well-being. Darkness was experienced by the informants as related to sleep, recovery and reflection. David saw alternations of light and darkness, and activity and rest as essential for human well-being. During the darker period of the year and during dusk the participants felt it was beneficial to slow down, engage in quiet and peaceful activities, in order to function as a human being in a work-driven everyday life. They saw darkness as establishing mental and physical time and space boundaries that humans need for health and well-being. One could say that this can be described as a physical sense of spaciousness. Maja described the mental and physical borders that darkness sets.

> (…) I think that darkness sets limits to what I can do, but also mentally. Sometimes it feels good to have a mental limit (laugh), or it´s like there´s only this, your world is so small now. There is only this that you can see and this that you have to think about. It can sometimes be quite good to not have to think about everything. Not fixing everything and I think that maybe that is why I like small places, because there isn´t much to think about right here. Then I feel that I can find peace (…)

Maja experienced that breaking these boundaries can, when self-chosen, be associated with excitement and a liberating feeling of turning invincible and comments sailing alone in darkness in the cold Swedish winter.

> But I believe that I think that darkness sets limits. But then if you do something that is difficult in the dark, then you feel that you are really tough, I think (laugh) it´s like that.

The absence of the boundaries that darkness sets during summer in Greenland is experienced by Maja with freedom.

> Yes, at the same time, it´s a pretty cool experience, so if you don´t have to work, if you have the weekend or vacation or something, then it´s pretty cool to experience that you can do exactly what you want, there is no limits because it will become dark.

The participants experienced that disrupting the limits that darkness sets can also be negative for our health. David described that artificial lights and the constant stimuli from screens are stressful. Modern life is seen as related to stress and exhaustion as it lacks pauses and recovery due to people being constantly digitally connected and stressed in cities. Dark environments with few stimuli are experienced as stress-reducing.

5.1.3. Being in the present space and moment

The second constituent identified was characterized by the participants experience of natural darkness as enabling one to be in the present space and moment. Memories of playing in darkness and sounds of darkness was signs of this presence. One could say that the experience of darkness was linked to a restriction in time. Alma described the excitement of playing outside in darkness as a child and being in a natural dark environment hearing without seeing the route of migratory birds. David recalled the sounds of the cracking stones while climbing in darkness or the sound of the surface, when discovering the possibility to navigate on a dark trail. The informants described memories of being in dark environments as being attentive to other senses then vision such as hearing and feeling your way through the surroundings. Alma described the difference between walking in the forest during daylight compared to walking at night as:

> It is completely different! You have to many impressions when it´s daylight, or you have a lot of impressions. But when you walk there in the dark, then you are here and now. And you look at things in a different way and you listen when you walk in the dark. So you are here and now. You are not disturbed by anything.

Alma also recalled a situation that she labels as a very strong memory when walking her dog at night, pointing towards this presence in time and space.

> (…) So during that time we lived outside Ängby, about one kilometre. And then we had a dog and, in the evening, always at 10, I went out with that dog, by then we lived near Ängby´s last streetlight. But I decided to walk in the opposite direction, where it was dark and then I could hear the routes of the migratory birds, I remember that very well. It sounded like a beep, but

you could never see them, and it was when we were walking there in the dark, you know, and I could hear the migratory birds during a few weeks. That memory is stuck in my mind, so I remember what darkness is like.

5.1.4. Understanding nature and our place in the universe

The third constituent concerned how natural darkness was experienced by the participants as an opportunity to understand nature, wildlife and our place in the universe. The experience of darkness was directly associated with gaining access to reflection and a wider picture of the world. David suggested that experiencing natural darkness facilitates an understanding of how nature works. The participants described how experiences of the night sky enabled existential thoughts about our place in the universe. Maja described navigating alone at sea during dark hours and how the night sky stimulates reflective and existential thoughts.

> I like that, small rooms. And then, yes then it´s like another room can open inside of me. (…) But… If you look up, it is not a small room, you have a huge room. Specially if you have the stars and then…yes then it feels like, if I look up then I just feel really small. Yes a small person on a very big sea. No, yes and there are quite large forces in nature. Yes, and maybe with the stars it´s a bit philosophical, but with the stars you will think that they have been here in the universe for millions of years and they will continue to exist during millions of years. And in that perspective, it feels like I'm pretty insignificant (…) It feels like you don't have much function in the Universe, yes in cosmos. It feels like I´m not significant in the, in the big history, the big history of universe. But I think that is a pretty good feeling because… Yes it feels like I become free because there is no need for me to be important. So I don´t need to be good at everything or that I have to do something that people will remember. So I think I become free because(...).

David described darkness as the foundation for understanding how nature works.

> (Laugh) because I also think that this is about getting closer to nature because for example when it comes to Northern Lights, Northern Lights is a natural phenomenon that occur almost every day if you just look for it, if you are outside long enough and it´s a clear weather… it´s also a spiritual experience for a person to be able to see it and you can´t see it without darkness, so darkness is the foundation for experiencing Northern Lights and the stars and how the world and the universe works which depends on darkness. So darkness creates these experiences,

without darkness we cannot have these experiences of nature. Having the darkness close to us makes us experience things like what the world is like and how small we are on earth. And in that we can find questions about life, the way we live and if you ask yourself such questions and existential questions, and that is perhaps why you feel smallness in the dark (…)

Alma´s experience of natural darkness together with nature relates to wild animals where she was aware of not scaring them while walking at night since she knows that they are awake.

(…) Then I walk down here in the dark and I don't need a flashlight even though I have one. You can still see if you walk in the dark. And that's when you hear the deer barking in the bushes and that they get scared. Are you coming here? They hear I'm coming. And, and I can sometimes hear the moose stomping and so on and then I coughs or sing a song or something in the dark and then the animals want come.

5.1.5. The diversity of placed darkness

This constituent relates to the participants´ experiences of darkness in relation to a geographical location and its physical aspects. They experienced darkness with respect to a certain type of environment, context, season, and temperature. Some participants experienced darkness in a Nordic context associated with a wet and cold environment which can create challenging situations. David described the difference between trying to survive in a dark jungle compared to trying to survive in a cold and dark Nordic surrounding which he perceived as significantly more challenging.

(…) and then I also have to connect it to the fact that darkness is enhanced by coldness. The coldness is very important. It's not the same thing to have darkness, in a dark place in the south near the equator because there they won't feel the same smallness and fear. Just being in freezing temperatures is a question of survival. In the jungle you can be naked, and you will still survive for several days before you die of thirst. If there is freezing temperatures and you can't handle it, then you won't exist anymore after maybe one day. And you can sense that too (…)

The informants fell that the experience of natural darkness is amplified with the experience of natural light from stars, the moon, the Milky Way, the Northern Lights and the sea. They experienced that natural darkness together with natural

light reveals physical structures and shapes. Maja recalled looking for the white foam that usually surrounds a cay while trying to navigate close to land during darkness.

The participants described different types of darkness. David described the darkness from September- November as being the darkest darkness and after that comes the snow. Maja experienced another type of darkness in Greenland compared to the darkness that she is used to in Denmark due to having only three hours of light in wintertime in Greenland. The darkness in Sweden is experienced as different from the darkness in Denmark since natural darkness in Sweden during wintertime is experienced together with snow.

5.1.6. Feeling at home in darkness

This constituent is about the participants´ experience, also related to other people's feelings in darkness, such as familiarity, sense of fear and being alone.

The informants experienced that natural darkness is unusual for the majority of other people, considering that other people have distanced themselves so much that they feel scared or unfamiliar and avoid dark spaces. Alma and David expressed that some people are not even aware of natural lights such as the moon and the stars and how these lights help to create the silhouettes and structures we acknowledge during nighttime.

Natural lights together with darkness are considered as everyday experiences by Maja and David. The Northern Lights, the Milky Way and the moon are described by David as "non-experiences" that occur every day but are perceived as a rare, different, and magical experiences by other people. David illustrated his opinion that natural darkness is unusual for most people with a description of a first encounter.

> The first thing they usually discover is just woaw! It´s very dark but I can actually still see with
> for example the help of the moonlight or the stary sky. It is like a "non-experience" and you
> become closer to yourself and woaw! This is what it feels like! (…) it´s not possible today,

because you can't experience it if you don´t come to a place like this, people experience it today in the mountains when they really get the chance to get out there and to see the stars, they don´t need to see the Northern Lights but just the stars in such a way, it´s magical! I like it to but for someone who has never seen it, it is just woaw! Can it look like this! And that touches them deep inside. I think they will be changed.

Most of the participants saw themselves as used to darkness but had accounts of both positive and fearful situations. They were respectful of the combination of darkness with other natural challenges such as climate, landscapes and seascapes. They felt inhibited by lack of night vision and poor sense of distance. In particular one informant considered a cold Nordic climate is related to fearful situations and questions of survival. Other participants discussed fearful situations in darkness as related to the unexpected of who is out there or what will happen. Henrik talked about fear and being alone in darkness.

I think quite a few people would be a little bit more alert, like when you are in a dark environment and are also alone.

On the contrary Maja felt good being alone in darkness.

Yes I think darkness is part of that you, that you notice that you are alone. But normally I feel good about that. (…) But I am alone, as you say in English, I'm alone but not lonely. I think that darkness contributes to that because if there was someone else out there, I would not see that. But If I saw someone approaching me, I would be really scared.

5.1.7. Managing darkness

This last constituent relates to the participants´ experience of managing darkness without artificial light.

The participants experienced that artificial light and lamps have an important beneficial function to control darkness with light to be able to perform everyday tasks. Alma described how she normally does not use flashlights while walking outside in her home environment but how it becomes necessary while checking her mailbox in darkness. Henrik experienced everyday tasks such as getting dressed,

finding things close to you, and navigating as easy things to do with light but as challenging to perform in darkness.

> It is these everyday things that become harder to perform when it is dark.

In order to handle a dark environment, the participants experienced the importance of using memory of a place in daylight, hearing and feeling the surroundings, and maintaining night vision. They also experienced the importance of being able to control or influence when it is dark. Henrik described the implications of restricting the use of light during dark hours in military service as the instrumental function of light in darkness becomes more evident. Further he experienced it as easier to control light during summer rather than controlling darkness during winter.

6. Discussion

The motivation of this study concerned the loss of human- nature interaction. This manifested itself in the problem of light pollution caused by artificial light. The framing literature in the introduction of this study grounded the idea that light pollution has been described through the lens of environmental consequences instead of directing focus towards the human need for night and darkness. The aim was to understand the lived experience of natural darkness in relation to place in our everyday life.

The following section first discusses how the six constituents from the results *1) Darkness creating supportive boundaries 2) Being in the present space and moment 3) Understanding nature and our place in the universe 4) The diversity of placed darkness 5) Feeling at home in darkness 6) Managing darkness* interrelates and answers to the aim framed by the research questions. The results are then considered in the wider theoretical context. Finally, suggestions are given for future research.

6.1. A new narrative of darkness

The results illustrate that the participants experience natural darkness as *supportive boundaries*. This was clearly articulated by one of the participants who made meaning of natural darkness as creating physical and mental limits including for everyday activities. Natural darkness was associated with sleep, recovery and reflection by the participants in the study, which are key components for well-being. However, natural dark places set physical and spatial limits that we transgress. Visiting or staying in the city that never sleeps, being digitally connected, or being active at night challenges these time and space boundaries. Crossing the boundaries

that darkness sets can be experienced with a liberating feeling of excitement for example when staying active at night during a summer without darkness.

The second constituent of the results refers to experiencing natural darkness as being in the *present space and moment.* The participants refer to darkness as being situated in a small room in a room, an enclosure in time and space leading to a heightened sense of presence. This sense of presence that darkness creates is also mentioned by Edensor (2013) who suggests that the exclusion of stimuli from outside directs our attention to the present moment which mediates reflection and support intimate conversations. Dunn and Edensor (2020) also suggest natural darkness gives room to other senses than vision enabling a more affective experience of space. The room in a room concept described by one participant can be related to their heightened experience of space in the reduction of vision.

There were some convergences between constituents *2) Being in the present space and moment* and *3) Understanding nature and our place in the universe.* One participant describes hearing but not seeing the routes of the migratory birds in the evening. This can both be interpreted as an everyday experience of ones surrounding linked to a sense of presence and as way of experiencing nature and our place in the universe.

Another example of this convergence between constituent two and three is that one participant not only refers to darkness as opening a room inside of her linked to the present moment, but also to the experience of the night-sky opening a room out there in the Universe. All participants related darkness to the night sky. They also discussed natural light increasing the experience of natural darkness where the night sky turned out to be important for existential reflection. A feeling of smallness in relation to the night sky had a calming effect and provided guidance of our place in the Universe.

According to Attention Restoration Theory (ART; Kaplan and Kaplan, 1989) nature can restore one´s depleted resources by soft fascination stimuli, implying little mental effort. Further this can enable a chance to reorganize one's thoughts

and generate reflection also recognized by White et al (2023). A sense of presence and reflection are qualities that have been studied earlier in relation to nature and well-being (Brymer et al., 2021). This may suggest that being in the present moment and in nature and the Universe is the foundation for more cognitive advanced thinking such as reflection. The results in this study might support Marchants (2021) claim for the importance of subjective experiences of natural darkness, as providing us with insights to better understand ourselves and nature. Experiencing natural darkness can be considered the foundation for generating this reflecting process relating to finding meaning in life.

The fourth constituent concerns the experience of *The Diversity of placed darkness.* Darkness was perceived by the participants in relation to their surroundings, where total darkness turned out to be just one aspect together with varying degrees of natural light. This coincides with the suggestion of Le Gallic and Pritchard (2019) that natural darkness is an experience together with natural light. Furthermore, the participants reflect that dark places are felt and sensed in relation to their everyday surroundings. In the Nordic region the experience of darkness is dependent on physical aspects such as cold, wet and snow. These physical characteristics might expand the experience of space which broadly might support the theoretical insights that reflects that dark spaces are felt and sensed (Dunn and Edensor, 2020; Shaw, 2015; Taino, 2023).

The fifth constituent, *Feeling at home in darkness* concerns how the participants feel familiarized with natural darkness. The participants describe that people with few experiences of natural darkness relate dark places to fear and feeling unsafe. This suggests that being comfortable in natural darkness is something one can practice. Ingold (2018) relates the concept of *affordances* to what differentiates people and argues that people are different from each other in terms of their different adjustments to their surroundings by practiced skills of perception and action. This experienced constituent raises the possibility that we make meaning of darkness as a result of practiced skill of perception. Being able to perceive dark surroundings as meaningful relates to an increasingly practised bodily interaction with the surrounding (Bergman, 2015) and the development of *environmental*

competencies (Pedersen, 1999) to handle the challenges of natural darkness in the Nordic region.

The sixth constituent *Managing darkness* suggests that darkness is experienced as being important to control and manage. This constituent reflects how power influences a positive view and supports Shaw (2015), that acknowledges that power affects a meaningful experience of darkness. *Managing darkness* together with the constituents *The Diversity of placed darkness* and *Home in darkness* demonstrates that the experiential value darkness brings to settings and surroundings can be critically examined. Perceiving darkness as meaningful in this Nordic context relates to continuously being exposed to these settings and having the power to control and act in this cold environment. A failure to recognize these critical insights on experiential values on darkness risks missing the fundamental questions of livelihood, leading to a romantic view and idealizes dark spaces. This aspect of experiencing darkness is also further discussed by Sarah Pritchard in the theoretical insights.

The results from this study combined with the framing literature review create a wider context for reflection. The way people seem to experience natural darkness in Nordic regions is a component of the range of natural rhythms sensed by living organisms to thrive. Rhythms of day and night, darkness and light are fundamental cycles that guide life on earth. The results highlight daily and seasonal alterations and that space for darkness in our everyday life enables well-being. Artificial light disrupts natural shifts and tends to make us forget our need for darkness. Drawing on conclusions from existing research on the potential of natural environments for achieving social-ecological and biophysical resilience against stress (White et al., 2023), natural dark environments might also play an important role for our health.

The role of natural darkness in the lived experience demonstrates that culture guides human behavior. Darkness sets physical and spatial limits that we transgress. A place boundary might exist to protect us from outside chaos (Mocrei-Rebrean, 2021). Crossing these boundaries can be appreciated because of a promise to access light and the day. Visiting or staying in the city that never sleeps, being digitally

connected, or being active at night challenges these time and space boundaries. In the short run this leads to exploration and excitement, but in the long run may disrupt the circadian rhythms and possibly lead to exhaustion in an individual. It is likely that we must make an active effort to find spaces for darkness in today's artificially lit world, especially in an urban context.

The results are consistent with Sumartojo (2020) conclusion that experiences of natural darkness are an embodied and immersive experience where we relate to our surroundings with all our senses creating a certain affective experience of space. This approach to our surroundings suggests two points. First this active, meaningful, and direct engagement with our surroundings with different senses can generate an attachment to the physical place (Mocrei-Rebrean, 2021), which might result in a feeling of *Place Insideness* (Relph, 1976). Secondly, dark surroundings as affording certain experiential qualities.

First and foremost, experiencing a natural dark place is a possibility to feel entwined or related to our surroundings. This sense of belonging to the physical place is a way of experiencing our world from within where we are part of our surroundings, and we perceive the world in a spherical way (Ingold, 2000) or as a form of *Place Insideness*. An illustrating example is once again the participant that describes hearing but not seeing the routes of the migratory birds in the evening. Artificial light at night makes this event impossible and that we no longer perceive the world in equal terms as other animals, but more as something that is outside ourselves, disconnecting us from our surroundings. The findings from this study demonstrating the potential of darkness to relate us to our surroundings, are consistent with Shaw´s (2015) indication, that darkness has a "place-shaping" capacity that connects us to our surroundings. This also points towards a transactional approach related to *affordances* of natural darkness.

The experiences of natural darkness from everyday life in this study, might bring forward the idea that natural darkness affords certain experiential qualities to

settings and surroundings. Natural dark places might afford both a sense of immersion in the moment and a reflective perspective of one's place on earth.

The effects of experiencing natural darkness may be similar to the outcomes of experiencing natural environments in general. Natural environments have not only been proved to generate psychological restoration, but also enhance a building capacity that supports well-being (Hartig et al., 2011). Hartig and colleagues (2011) have argued that the support one gains from natural environments differ from the support one receives in everyday environments. Natural environments have turned out to enhance learning and personal development through problem solving and provide opportunities for reflection. Artificial light at night might erase this space for reflection and presence related to well-being in the sense that it might be the opposite of soft fascination (Kaplan and Kaplan, 1989).

The result from this study accompanies earlier research (Bell et al, 2014; Gallaway, 2014; Dunn and Edensor, 2024) bringing forward concrete examples of the psychological consequences of the extinction of night experience. The loss of interaction with our natural world (Pyle, 1978) reduces the motivation to care for our environment (Gaston and Soga, 2016; Chawla, 2020). One can speculate on more consequences of fewer people experiencing natural darkness. What outcome have a loss of existential reflection, access to the bigger picture, a sense of being in the present moment and understanding our place in the Universe have for people?

A main consequence of fewer experiencing natural darkness can be an overall sense of *Place Outsideness* (Relph, 1976) where we feel distanced from our surroundings, and to the earth as the place we inhabit (Ingold, 2000). A gradual separation from direct subjective sensory experience of natural darkness is leading to the natural environment losing the role as the fundamental frame of reference for perceiving the world (Mocrei-Rebrean, 2021; Gaston and Soga, 2018). Experiencing a connection to darkness has been described as having "a transformative potential for understanding self and landscape" (Shaw 2015:5). According to Marchant (2021), personal experiences of the night sky, such as the shifting position of the stars, the

moon, and the sun have historically provided us with important insights about ourselves and how nature works. Today we do not need to be aware of the night sky or natural darkness since information about how the world works is mediated by different types of technologies. Marchant suggests that a scientific understanding of the world has downplayed personal and qualitative experiences of the environment (Marchant, 2021). The results in this study might support Marchants (2021) claim for the importance of subjective experiences of natural darkness, as providing us with insights to better understand ourselves and nature. These insights are linked to Ingold (2000) spherical perspective where every-day experiences of places and a local perspective forms our understanding of the world.

Finally, the results in this study highlight how our perceptual experience of darkness is complex. A diversity of environmental characteristics as proposed by (Dunn and Edensor, 2020) and the subjective viewpoint of the perceiver shaped how we experience darkness. As earlier evidence also has demonstrated (Le Gallic and Pritchard, 2019), this complexity further problematizes the old understandings of darkness and light as binary and brings forward a more nuanced and ecological understanding of meaningful engagement with dark settings. Taken together the results from this study suggest that artificial light at night conceal what it really is to experience the diversity of placed darkness.

6.2. Future research

Impacts of artificial light at night is a major challenge for achieving a sustainable society. As argued by Kørner (2023), artificial light at night plays a crucial role in realizing the United Nations Sustainable Development Goals. If artificial light at night should be in the focus of global change research (Davies and Smith, 2018), we must clarify the important role of dark environments, addressing both subjective and placed based approaches. Efforts on light at night tends to derive from a global outlook (Ingold, 2000) solely addressing mitigation and managing light at night (Falchi and Cinzano, 2016 and Bará et al. 2021). This perspective might result in the explicit consequence that humans are separated from their surroundings, freeing us from responsibility (Ingold, 2000). By adopting this global and perhaps anthropocentric perspective, we risk missing other alternative approaches to tackle global challenges such as embracing our need for darkness and seeing its potential.

As also suggested by (Dunn and Edensor, 2020), future research would benefit from embracing the complexity of darkness, accepting it, beyond the old dualistic perspective focused on fear and safety. While darkness related to these values also should be considered important, an exclusive association with these conditions are not sustainable in a Nordic context where darkness is part of life during several month of the year.

To date darkness and health in a Nordic region have principally been associated with depression and suicide (Rosenthal et al., 1984). A more salutogenic focus on natural darkness has the potential as a component of therapeutic landscapes or nature tourism. Darkness is the much-needed space that has recently been ignored. In the foreground of increased psychological stress in society, what *affordances* have a therapeutic landscape or place for recreation during darkness or darker periods of the year? A salutogenic approach on natural darkness would draw on perspectives from environmental psychology where current research is focused on health-promoting experiences and interventions (Pálsdóttir et al. 2018). Such an approach can lead to new insights and research questions focused on the need for

natural darkness to sustain health and circadian rhythms. The purpose of darkness and the problem of light pollution following the critic of Pritchard (2017) poses the question: Who can and how can we access these landscapes?

Research in environmental psychology tends to focus on experiences of light and activities in daylight (Sandström et al., 2002; Beute and de Kort, 2014; Johansson et al., 2014). Both light and darkness are important components of life on earth where it connects everyday life to a diversity of cultural, biological and ecological factors. A better understanding of darkness and light would benefit from seeing it as relational instead of treating it as separate units (Le Gallic and Pritchard, 2019). An interesting example is the children's book "Natten Lyser!" by Lena Sjöberg (2018), which focuses on the already existing natural light at night and what happens when we shift the focus and start to think from dark environments.

Another perspective that could benefit from starting from the potential of dark environments is urban planning where the focus tends to be on darkness related to fear and safety (Boomsma and Steg, 2012). It is my hope that future research can embrace darkness and start with this condition as a baseline for human well-being for example looking at *affordances* of darker seasons or the nightscape (Nowell and Gonlin, 2020). Planning, management and landscape design would also benefit from working with darkness as a way to tackle the problem with excessive use of artificial light at night. However, from a planning perspective it is important to stress that darkness in the Nordic region can be a challenging condition related to a cold climate. A trans-disciplinary scope could integrate the design and planning for settlements involving practices such as dark sky ordinances which restrict artificial lighting; smart lighting solutions; crucial public awareness and education on light pollution, the benefits of natural darkness and light poverty aspects; and zoning to conserve natural areas as dark spaces within and outside of cities and livelihood space.

Earlier work on perceptions of darkness have mainly focused on qualities related to vision (Dunn and Edensor, 2020). Mason, (2020) suggests that visual and sonic dark landscapes are more related to each other than visual and sonic landscapes

with light. The sonic environment is an important part of shaping our experience (Cerwén, 2019). Another possible research direction is to investigate darkness and soundscapes together or explore darkness with other senses.

Finally, this qualitative study that investigates the perspectives from four participants living in a Nordic context invites future research focusing on a diversity of methods, where I see the specific potential of mixed methods focusing on both the subjective experiences of well-being and physiological measures of health related to dark environments. The challenges of trying to describe the subjective experience of darkness also lead to the question of whether it is methodological possible to describe subjective experiences. This leads to the potential to explore alternative approaches to address experiences in relation to dark settings. However, the subjective experience is a powerful source of information to understand self and nature and manifests the importance of qualitative research. It enables a deeper understanding of the important role to experience natural darkness for human well-being.

References

Bará S, Falchi F, Lima RC and Pawley M (2021) Keeping light pollution at bay: A red-lines, target values, top-down approach. Environmental Challenges 5: 100212.

Bell R, Irvine K, Wilson C and Warber S (2014) Dark nature: exploring potential benefits of nocturnal nature-based interaction for human and environmental health. *European Journal of Ecopsychology* 5(1): 1-15.

Bergman SA (2015) Omförhandling med staden: en miljöpsykologisk studie av parkourutövning.

Beute F and de Kort YA (2014) Salutogenic effects of the environment: Review of health protective effects of nature and daylight. *Applied psychology: Health and well-being* 6(1): 67-95.

Bille M and Sørensen TF (2007) An Anthropology of Luminosity:The Agency of Light. *Journal of Material Culture* 12(3): 263-284.

Bogard P (2008) *Let there be night: testimony on behalf of the dark.* University of Nevada Press.

Bogard P (2013) *The end of night: searching for natural darkness in an age of artificial light.* Hachette UK.

Boomsma C and Steg L (2012) Feeling Safe in the Dark. *Environment and Behavior* 46(2): 193-212.

Boyce PR (2019) The benefits of light at night. Building and Environment 151: 356-367.

Brymer E, Crabtree J and King R (2021) Exploring perceptions of how nature recreation benefits mental wellbeing: a qualitative enquiry. *Annals of Leisure Research* 24(3): 394-413.

Cerwén G (2019) Listening to Japanese gardens: an autoethnographic study on the soundscape action design tool. *International journal of environmental research and public health* 16(23): 4648.

Chawla L (2020) Childhood nature connection and constructive hope: A review of research on connecting with nature and coping with environmental loss. People and Nature 2(3): 619-642.

Chemero A (2018) An outline of a theory of affordances. How Shall Affordances Be Refined? : Routledge, pp.181-195.

Chepesiuk R (2009) Missing the dark: health effects of light pollution. National Institute of Environmental Health Sciences.

Churchill SD (2022) *Essentials of existential phenomenological research.* American Psychological Association.

Creswell JW and Poth CN (2016) *Qualitative inquiry and research design: Choosing among five approaches.* Sage publications.

Creswell JW and Creswell JD (2017) *Research design: Qualitative, quantitative, and mixed methods approaches.* Sage publications.

Davies TW and Smyth T (2018) Why artificial light at night should be a focus for global change research in the 21st century. *Global Change Biology* 24(3): 872-882.

DeVille NV, Tomasso LP, Stoddard OP, et al. (2021) Time spent in nature is associated with increased pro-environmental attitudes and behaviors. *International journal of environmental research and public health* 18(14): 7498.

Dunn N and Edensor T (2020) *Rethinking Darkness: Cultures, Histories, Practices.* Routledge.

Dunn N and Edensor T (2024) Dark skies: places, practices, communities. Taylor & Francis.

Dunn N (2016) *Dark matters: a manifesto for the nocturnal city.* John Hunt Publishing.

Dunn N (2020) Place After Dark: Urban peripheries as alternative futures.

Edensor T (2013) Reconnecting with darkness: Gloomy landscapes, lightless places. *Social and Cultural Geography* 14(4): 446-465.

Edensor T (2015) The gloomy city: Rethinking the relationship between light and dark. *Urban studies* 52(3): 422-438.

Edensor T (2017) Seeing with light and landscape: a walk around Stanton Moor. *Landscape Research* 42(6): 616-633.

Englander M (2012) The interview: Data collection in descriptive phenomenological human scientific research. *Journal of phenomenological psychology* 43(1): 13-35.

Englander M and Morley J (2021) Phenomenological psychology and qualitative research. *Phenomenology and the Cognitive Sciences*. 1-29.

Falchi F, Cinzano P, Duriscoe D, et al. (2016) The new world atlas of artificial night sky brightness. *Science advances* 2(6): e1600377.

Frey S and Harper NJ (2023) Healing with the Night: Investigations into Experiences of Natural Darkness in Overnight Recollective Practices. *Ecopsychology*.

Gallaway T (2014) The value of the night sky. *Urban lighting, light pollution and society*. Routledge, pp.279-295.

Galinier J, Monod Becquelin A, Bordin G, et al. (2010) Anthropology of the night: Cross-disciplinary investigations. Current Anthropology 51(6): 819-847.

Gaston KJ, Visser ME and Hölker F (2015) The biological impacts of artificial light at night: the research challenge. The Royal Society, 20140133.

Gibson JJ (1977) The theory of affordances. *Hilldale, USA* 1(2): 67-82.

Giorgi A (2009) *The descriptive phenomenological method in psychology: A modified Husserlian approach.* Duquesne university press.

Giorgi A (2012) The Descriptive Phenomenological Psychological Method. *Journal of phenomenological psychology* 43(1): 3-12.

Giorgi, A., Giorgi, B. & Morley, J. (2017). The Descriptive Phenomenological Psychological Method.

Gonlin N and Nowell A (2017) *Archaeology of the night: Life after dark in the ancient world.* University Press of Colorado.

Haraway D and Manifesto AC (1991) Science, Technology, and Socialist-feminism in the late twentieth century," In Simians, cyborgs and women: The Reinvention of nature (New york; Routledge, 1991), PP. 149-181.

Hartig T, van den Berg AE, Hagerhall CM, et al. (2011) Health Benefits of Nature Experience: Psychological, Social and Cultural Processes. In: Nilsson K, Sangster M, Gallis C, et al. (eds) Forests, Trees and Human Health. Dordrecht: Springer Netherlands, pp.127-168.

Hartig T, Mitchell R, De Vries S and Frumkin H (2014) Nature and health. *Annual review of public health* 35: 207-228.

Heft H (2013) An Ecological Approach to Psychology. *Review of General Psychology* 17: 162 - 167.

Helldin J and Jägerbrand A (2020) Ljusföroreningar–ett underskattat miljöproblem. Biodiverse.

Husserl E and Frege G (1977) *Readings on Edmund Husserl's" Logical Investigations".* Springer.

Hölker F, Wolter C, Perkin EK and Tockner K (2010) Light pollution as a biodiversity threat. *Trends in ecology & evolution* 25(12): 681-682.

Ingold T (1993) The temporality of the landscape. *World archaeology.* 152-174.

Ingold, T (2000) The Perceptions of the Environment. London: Routledge

Ingold T (2018) Back to the future with the theory of affordances. *HAU: Journal of Ethnographic Theory* 8(1-2): 39-44.

IDA (2023) International Dark-Sky Association: Who We Are. Accessed Sept 05, 20123. http://www.darksky.org/about

Johansson M, Pedersen E, Maleetipwan-Mattsson P, et al. (2014) Perceived outdoor lighting quality (POLQ): A lighting assessment tool. *Journal of Environmental Psychology* 39: 14-21.

Jägerbrand AK and Spoelstra K (2023) Effects of anthropogenic light on species and ecosystems. *Science* 380(6650): 1125-1130.

Kaplan R and Kaplan S (1989) *The experience of nature: A psychological perspective.* Cambridge university press.

Koslofsky C (2011) *Evening's empire: a history of the night in early modern Europe.* Cambridge University Press.

Kvale S and Brinkmann S (2015) *Interviews.* Sage.

Kyba CC and Hölker F (2013) Do artificially illuminated skies affect biodiversity in nocturnal landscapes? : Springer, 1637-1640.

Kyba CC, Kuester T, Sánchez de Miguel A, et al. (2017) Artificially lit surface of Earth at night increasing in radiance and extent. *Science advances* 3(11): e1701528.

Kyttä M (2003) Children in outdoor contexts: affordances and independent mobility in the assessment of environmental child friendliness. Helsinki University of Technology.

Kørner LD (2023) The Necessity of Natural Darkness for Humans and Biodiversity. *World Congress of Architects.* Springer, 335-344.

Longcore T and Rich C (2004) Ecological light pollution. *Frontiers in Ecology and the Environment* 2(4): 191-198.

Lund, K. A. (2020). Creatures of the night: Bodies, rhythms and Aurora Borealis. In *Rethinking Darkness* (pp. 127-137). Routledge.

Lyytimaki J (2020) Maps of light pollution in odd places: Are night time satellite pictures making us to forget natural darkness? *International Journal of Sustainable Lighting* 22(1): 1-11.

Manzo LC (2003) Beyond house and haven: Toward a revisioning of emotional relationships with places. *Journal of Environmental Psychology* 23(1): 47-61.

Manzo LC (2005) For better or worse: Exploring multiple dimensions of place meaning. *Journal of Environmental Psychology* 25(1): 67-86.

Marchant J (2021) The Human Cosmos: Civilization and the Stars. Penguin.

Masson D (2020) How does the dark sound? Rethinking Darkness. Routledge, pp.150-160.

Michaels CF and Palatinus Z (2014) A ten commandments for ecological psychology. *The Routledge handbook of embodied cognition*. 19-28.

Miller JR (2005) Biodiversity conservation and the extinction of experience. *Trends in ecology & evolution* 20(8): 430-434.

Mocrei-Rebrean L (2021) Psychology of dwelling and visual appropriations—an anthropological application. Sustainability 14(1): 82.

Moran D (2002) *Introduction to phenomenology.* Routledge.

Morgan P (2010) Towards a developmental theory of place attachment. Journal of Environmental Psychology 30(1): 11-22.

Morris NJ (2011) Night walking: Darkness and sensory perception in a night-time landscape installation. *cultural geographies* 18(3): 315-342.

Merleau-Ponty, M. (1962). The phenomenology of perception. New York. Humanities Press.

Ottosson J and Grahn P (2005) A Comparison of Leisure Time Spent in a Garden with Leisure Time Spent Indoors: On Measures of Restoration in Residents in Geriatric Care. *Landscape Research* 30(1): 23-55.

Pedersen DM (1999) Dimensions of environmental competence. *Journal of Environmental Psychology* 19(3): 303-308.

Pottharst M and Könecke B (2013) The night and its loss. Space–Time Design of the Public City. 37-48.

Pritchard SB (2017) The trouble with Darkness: NASA's suomi satellite images of earth at Night. *Environmental History* 22(2): 312-330.

Pritchard SB and Le Gallic S (2019) Light (s) and darkness (es): looking back, looking forward. *Journal of Energy History/Revue d'Histoire de l'énergie*.(2).

Pálsdóttir AM, Stigsdotter UK, Persson D, et al. (2018) The qualities of natural environments that support the rehabilitation process of individuals with stress-related mental disorder in nature-based rehabilitation. *Urban Forestry & Urban Greening* 29: 312-321.

Pyle R. M. (1978): The extinction of experience. – Horticulture 56: 64–67, Cincinnati, OH

Restoring Darkness (2023) https://restoringdarkness.com/about/ (2024-01-09)

Relph E (1976) *Place and placelessness.* Pion London.

Rodrigo-Comino J, Seeling S, Seeger MK and Ries JB (2023) Light pollution: A review of the scientific literature. *Anthropocene Review* 10(2): 367-392.

Rosenthal NE, Sack DA, Gillin JC, et al. (1984) Seasonal Affective Disorder: A Description of the Syndrome and Preliminary Findings With Light Therapy. Archives of General Psychiatry 41(1): 72-80.

Rutledge P and Hogg JL (2020) In-Depth Interviews. DOI: 10.1002/9781119011071.iemp0019. 1-7.

Sandseter EBH (2010) Scaryfunny: A qualitative study of risky play among preschool children.

Sandström M, Bergqvist U, Küller R, et al. (2002) *Belysning och hälsa: en kunskapsöversikt med fokus på ljusets modulation, spektralfördelning och dess kronobiologiska betydelse.*

Seamon D (1982) The phenomenological contribution to environmental psychology. *Journal of Environmental Psychology* 2(2): 119-140.

Seamon D (2013) Place attachment and phenomenology. *Place attachment: Advances in theory, methods and applications*. 12-22.

Shaw R (2015) Controlling darkness: Self, dark and the domestic night. *cultural geographies* 22(4): 585-600.

Shaw R (2015) Night as Fragmenting Frontier: Understanding the Night that Remains in an era of 24/7. Geography Compass 9(12): 637-647.

Sjöberg L (2018) *Natten Lyser!* Opal

Sumartojo, S. (2020) On darkness, duration and possibility. In *Rethinking Darkness* (pp. 192-201). Routledge.

Soga M and Gaston KJ (2016) Extinction of experience: the loss of human–nature interactions. *Frontiers in Ecology and the Environment* 14(2): 94-101.

Soga M and Gaston KJ (2018) Shifting baseline syndrome: causes, consequences, and implications. Frontiers in Ecology and the Environment 16(4): 222-230.

Steidle A and Werth L (2013) Freedom from constraints: Darkness and dim illumination promote creativity. *Journal of Environmental Psychology* 35: 67-80.

Stoltz J and Schaffer C (2018) Salutogenic affordances and sustainability: Multiple benefits with edible forest gardens in urban green spaces. *Frontiers in Psychology* 9: 2344.

Stone T (2018) The value of darkness: A moral framework for urban nighttime lighting. *Science and engineering ethics* 24: 607-628.

Sveneaus, F. (1999) The hermeneutics of medicine and the phenomenology of health. Steps towards a philosophy of medical practice. Department of health and society, Linköping university

Tainio M (2023) Nothing to See? Paying Attention in the Dark Environment. The Nordic Journal of Aesthetics 32(65-66).

Thurairajah U, Littlewood JR and Karani G (2021) A Novel Approach to Controlling Outdoor Light Pollution by Adopting Smart Science and Technology to Improve Residents Quality of Life in the Built Environment. In: Littlewood J, Howlett RJ and Jain LC (eds) Sustainability in Energy and Buildings 2020. Singapore: Springer Singapore, 369-380.

Tuan, Y. (1974). Topophilia: a study of environmental perception, attitudes, and values. Englewood Cliffs, N.J., Prentice-Hall.

Tähkämö L, Partonen T and Pesonen A-K (2019) Systematic review of light exposure impact on human circadian rhythm. *Chronobiology international* 36(2): 151-170.

The city of light Jyväskylö (n.d.). https://valonkaupunki.jyvaskyla.fi/en/city-light-jyvaskyla/what-city-light (2024-01-09)

The Swedish reseach council (2017) Good Research practise. 2017. https://www.vr.se/english/analysis/reports/our-reports/2017-08-31-good-research-practice.html (2023-11-05)

Von Essen E (2021) Young adults' transition to a plant-based diet as a psychosomatic process: A psychoanalytically informed perspective. *Appetite* 157: 105003.

Von Essen E and Englander M (2013) Organic food as a healthy lifestyle: A phenomenological psychological analysis. *International Journal of Qualitative studies on Health and Well-being* 8(1): 20559.

White MP, Hartig T, Martin L, et al. (2023) Nature-based biopsychosocial resilience: An integrative theoretical framework for research on nature and health. *Environment International*. 108234.

Williams DR (2014) Making sense of 'place': Reflections on pluralism and positionality in place research. *Landscape and urban planning* 131: 74-82.

Williams HJ, Broomé RE and Markette N (2023) Fathers' Lived-Experience of Childbirth: A Descriptive Phenomenological Psychological Inquiry. *Journal of Humanistic Psychology*. 00221678231194096.

Williams KJ, Lee KE, Hartig T, et al. (2018) Conceptualising creativity benefits of nature experience: Attention restoration and mind wandering as complementary processes. *Journal of Environmental Psychology* 59: 36-45

Appendix I

Invitation to participate in a study about the importance of natural darkness

My name is Sofia Tonetti and I am currently writing a master thesis in environmental psychology at The Swedish university of agriculture sciences. The education is about how outdoor environments can be designed and used to promote health and well-being. I am now looking for participants for an interview study.

I have decided to investigate the significance of natural darkness in people's everyday life. The background is that outdoor environments are increasingly more illuminated. Artificial light has turned out to influence circadian rhythms, well-being, and health. Today people even talk about light pollution, and it has become gradually more difficult for people to experience natural darkness. There are also studies about darkness as a problem in the built environment connected to insecurity and risks, but that is outside the scope of this study.

In this study I want to understand the potential of natural dark environments in our everyday life and which values people associate with it. The purpose is to explore people's experiences of natural darkness.

What does it mean to be part of the study?
The interviews can be conducted on site or digitally (e.g. Zoom or Teams) and you need to set aside an hour for our dialogue. The interview will be about your experiences and encounters within surroundings in natural darkness. We will talk about concrete places and situations where you experienced natural darkness and

perhaps you will complement your descriptions with maps and photos. You will receive a couple of questions in advance which will serve as the starting point for our conversation.

How will the material from the interview be handled?

Your participation in the study is voluntary and you can choose to cancel your participation at any time, without giving any reason. The interview will be recorded. Only me and my supervisor will have access to the material from the interview. When presenting the results, names and places will not be possible to identify. The result will be published in the form of a master's thesis that is accessible to the public. Once the thesis has been approved, the recorded material will be deleted. Please feel free to contact me if you have questions. You can of course ask questions even if you have not decided whether you want to be part of the study. If you know someone who might be interested in participating in the study, please feel free to forward the letter.

All the best
Sofia Tonetti
Sofia.ekbom@gmail.com
0704038766

Supervisor
Fredrika Mårtensson,
fredrika.martensson@slu.se
Department of People and Society
Swedish University of Agricultural Sciences

Appendix II

Interview agenda

Introduction
- Purpose of the interview, consent and presentation

Person and everyday surroundings
- Your background and places of importance

Places and circumstances
- At what places and during which circumstances do you come in to contact with natural darkness
- Do you have any special memory of a place/circumstance in natural darkness?

Sensing darkness
- Feelings and sounds in darkness during a specific memory.
- Darkness related to well-being
- Darkness and seasons

Meaning-making in relation to a specific situation
- How would you describe the situation when you XXXX to a friend?
- What do you associate with such a situation in the dark?

Meaning-making in general
- Fear and darkness
- Thoughts in general about the topic
- How do you think others relate to the topic
- What comes to your mind when you hear the word light pollution?

<u>Final</u>

- Would you like to add something before we finish?

Appendix III

Interviews

Alma (Pseudonym)

Interview conducted: September 29 2023

Interview lengh: 44 minutes

Place of residence: Swedish country side

Position: Retired preschool-teacher

Maja (Pseudonym)

Interview conducted: October 27 2023

Interview lengh: 57 minuets

Place of residence: Boat in Denmark, Previously lived in Greenland

Position: Sailor, Teacher

David (Pseudonym)

Interview conducted: October 27 2023

Interview lengh: 40 minutes

Place of residence: Middle sized city in the north of Sweden

Position: Owner of hotel, Educator, Mountain guide

Henrik (Pseudonym)

Interview conducted: November 2 2023

Interview lengh: 36 minutes

Place of residence: Middle sized city in the middle part of Sweden

Position: Military service