



Nature as a part of children's health promotion in Finnish daycare centers

Lotta Pajarinen

2020 Laurea



Laurea University of Applied Sciences

**Nature as a part of children's health promotion in Finnish
daycare centers**

Lotta Pajarinen
Degree Programme in Social Services
Bachelor's Thesis
December 2020

Laurea University of Applied Sciences

Abstract

Degree Programme in Social Services

Bachelor's Thesis

Lotta Pajarinen

Nature as a part of children's health promotion in Finnish daycare centers

Year

2020

Pages

68

The purpose of this Bachelor's thesis was to clarify how nature is utilized in Finnish daycare centers for promoting children's health and what are the possible health benefits nature creates. The thesis aimed to provide an overview of the current role of nature in health promotion in daycare centers as well as share possible future prospects around the topic. The theoretical framework of the thesis defines the concepts of Finnish early childhood education, nature, health and well-being as well as nature's role in health promotion. The Act on Early Childhood Education and Care (540/2018) and the National Core Curriculum for Early Childhood Education and Care (2018) together with other relevant sources created the base for the theoretical part.

The thesis was implemented as a narrative overview. By comparing the results of six national studies the thesis aimed to convey new conclusions on the topic. In order to find comparable studies inclusion and exclusion criteria were set for the data collection including national research implemented in Finnish daycare centers. Qualitative content analysis was used as the data analysis method. The results indicated that nature supported the fulfilment of children's basic needs such as healthy nutrition and adequate rest. Natural environments promoted children's physical activity, creative play and use of imagination. The thesis found that nature contacts promoted children's health in urban daycare centers. In conclusion, the absence of green spaces in modern societies causes different health related risks and daycare centers have the possibility to ensure children's nature contacts in urban environments. National decision-making is in a key position for ensuring children's sufficient exposure to a natural environment in their early childhood.

Keywords: early childhood education, nature, health, daycare center, well-being

Table of Contents

1	Introduction	5
2	Early Childhood Education in Finland.....	6
2.1	The National Core Curriculum for Early Childhood Education and Care (ECEC).....	6
2.2	Nature in Early Childhood Education	7
2.3	Health Promotion in Early Childhood Education	9
3	Nature.....	10
3.1	Definition of Nature	10
3.2	Nature in Social Work and Green Care	12
4	Defining Health and Well-being	14
4.1	Definition of Health.....	14
4.2	Definition of Well-being.....	15
4.3	Health versus Well-being.....	16
5	Nature Promoting Health.....	16
5.1	Nature in Health Promotion	17
5.2	Nature Promoting Physical Health	18
5.3	Nature Promoting Mental Health.....	20
5.4	Nature and Child's Health and Development.....	20
6	Methodology of the Thesis	21
6.1	The Objectives of the Thesis and the Research Question	22
6.2	Literature Review: A Narrative Overview.....	22
6.3	Ethical Consideration	24
6.4	Data Collection	25
6.4.1	Inclusion and Exclusion criteria.....	25
6.4.2	Keywords.....	27
6.5	Data Analysis.....	29
6.6	Analysis Method: Qualitative Content Analysis	32
6.7	Qualitative Content Analysis of Selected Studies.....	33
7	Results	37
8	Conclusions and Discussion.....	42
	References.....	47
	Figures	55
	Tables	56
	Appendices	57

1 Introduction

Currently over 70 % of Finnish population live in the cities (Finnish Environment Institute 2020). Increased traffic, the loss of nature's biodiversity and air and soil pollution have become problems of modern societies (Roslund et al. 2019). The traditional models of public health are no longer valid in front of modern problems caused by urbanization and hence the corresponding relationship between people, health and living environments should be reconsidered (Maller, Townsend, Pryor, Brown & St. Leger 2006). Due to urbanization and changed lifestyle human's connection to nature has decreased. The positive impacts nature has on health and well-being are lately acknowledged as possible tools in public health promotion and use of natural environments could respond to the current health problems (Jäppinen, Tyrväinen, Reinikainen & Ojala 2014; Tapaninen 2014). Ecosystem services and nature's rich biodiversity have the potential to prevent diseases and support health promotion in modern societies (Jäppinen et al. 2014).

Indeed, the importance of green areas as promoting health and well-being of people is highlighted in urban living environments (Finnish Environment Institute 2020). Nature contacts are known to enrich human microbiomes and thus act as a protection against immune system diseases (Hahtela 2019). Therefore, regular exposures to nature can be considered as important in health promotion (Sinkkonen 2018). Even though nature is known to have a positive impact on human health and well-being for long, the scientific research around the phenomenon has started only recently (Tourula & Rautio 2014). Children spend multiple hours a day in daycare centers in their early childhood and hence daycare environments have the potential to affect children's health (Roslund et al. 2019). About 77 % of Finnish children aged 1-6 years old participated in early childhood education in 2019 and 76 % of them in municipal daycare centers (THL 2020c). Early childhood education implemented in daycare centers aims to promote every child's all-encompassing growth, development, health and well-being (Act on Early Childhood Education and Care 540/2018, 1, 3:1).

This Bachelor's thesis aims to answer the research question 'What is known about daycare centers supporting children's health and well-being using nature as a method in Finland?' By comparing six national studies this thesis aims to clarify the current state of nature's role in Finnish daycare centers in health promotion. In a form of narrative overview thesis aims to provide an overview of how nature is utilized in daycare centers as creating or sustaining children's health and what are the possible health benefits nature creates on children's mental and physical health. The selected studies consist of national research implemented in Finnish daycare centers in the 21st century. Since I am completing the early childhood education teacher qualification the daycare centers were selected as targets of research in this thesis.

Nature's healing and empowering features interest me on personal level and the use of nature within in the field of social services on professional level. Nature in health promotion is a current topic and the effects nature has on human health have awoken researchers' interest in somewhat nearby future. In this Bachelor's thesis I get to combine my two main interests: early childhood education and nature-based approach.

2 Early Childhood Education in Finland

Early childhood education is a societal service and a part of Finnish education system (Finnish National Agency for Education 2018). Early childhood education can be defined as “a systematic and goal-oriented entity that consists of upbringing, education and care, with a special emphasis on pedagogy” (Ministry of the Education and Culture 2018). Even though child's guardians have the primary responsibility for the child's upbringing, early childhood education supports guardians in their pedagogical work and supplements child's upbringing and well-being. Early childhood education aims to prevent social exclusion and promote equality among children and their participation. (Finnish National Agency for Education 2018.) Early childhood education is implemented in daycare centers, family-based daycares and in open early childhood education and care (Act on Early Childhood Education and Care 540/2018, 1, 2). Act on Early Childhood Education and Care (540/2018) sets the legal framework for Finnish early childhood education and defines child's right to early childhood education as well as how to organize early childhood education in Finland. The Act sets several goals for early childhood education focusing on i.a. child's development, well-being, learning, safety, equality, social interaction and participation (Act on Early Childhood Education and Care 540/2018, 1,3).

2.1 The National Core Curriculum for Early Childhood Education and Care (ECEC)

The National Core Curriculum for Early Childhood Education and Care (ECEC) 2018 made by the Finnish National Agency for Education is based on the Act on Early Childhood Education and Care and is the national instruction for implementing early childhood education in Finland (Act on Early Childhood Education and Care 540/2018, 5, 21). The National Core Curriculum for ECEC aims to support and instruct the organization, implementation and development of quality and equal early childhood education on the national level (Finnish National Agency for Education 2018). The local early childhood education and care curricula as well as every child's individual early childhood education plan are based on the National Core Curriculum for ECEC. The local early childhood education and care curricula take pedagogical emphases and other important factors that supplement the National Core Curriculum into consideration. (Act on Early Childhood Education and Care 5, 22.) Individual early childhood education plan secures child's right to receive systematic and goal-oriented education, care and upbringing. Child's personal

needs and best interest set the foundation for the child's early childhood education plan. (Finnish National Agency for Education 2018.)

2.2 Nature in Early Childhood Education

In Finland nature, yards and playgrounds are utilized in many ways in early childhood education: they offer natural materials, a platform for physical activity and nature experiences as well as possibilities to different plays and exploring (Finnish National Agency for Education 2018). The National Core Curriculum for ECEC (2018) recognizes nature, yards, playgrounds and urban environments as learning environments where child has the possibility to learn more about nature. In early childhood education learning environment refers to a space, place, community, practice, tool or equipment which promotes child's development, learning and interaction. Learning environments enable the use of different pedagogical approaches, participation and interaction and are designed and built together with child. They aim to encourage child towards curiosity, play, learning, physical activity, experiencing and exploring as well as artistic impression. Child has the possibility to explore the surrounding world with all senses and whole body. (Finnish National Agency for Education 2018.)

Environmental education in early childhood education aims to strengthen child's relationship with nature and sustainable and responsible ways to act (Figure 1). Via positive experiences child starts to enjoy the nature. The focus of environmental education is on the natural phenomena: child learns about different environment-related concepts. Environmental education includes three dimensions: learning in environment, learning from environment and acting for the environment. Nature activates senses but can also act as a place for esthetic beauty and relaxation. Environmental education guides child towards sustainable lifestyle and in respect of nature. In order to act responsibly, child needs to learn practical skills such as moderateness, responsible eating, reducing garbage via recycling etc. (Finnish National Agency for Education 2018.) Daycare centers implement environmental education in a natural environment since positive relationship with nature created in childhood promotes environmentally responsible behaviour in adulthood (Finnish Environment Institute 2018).

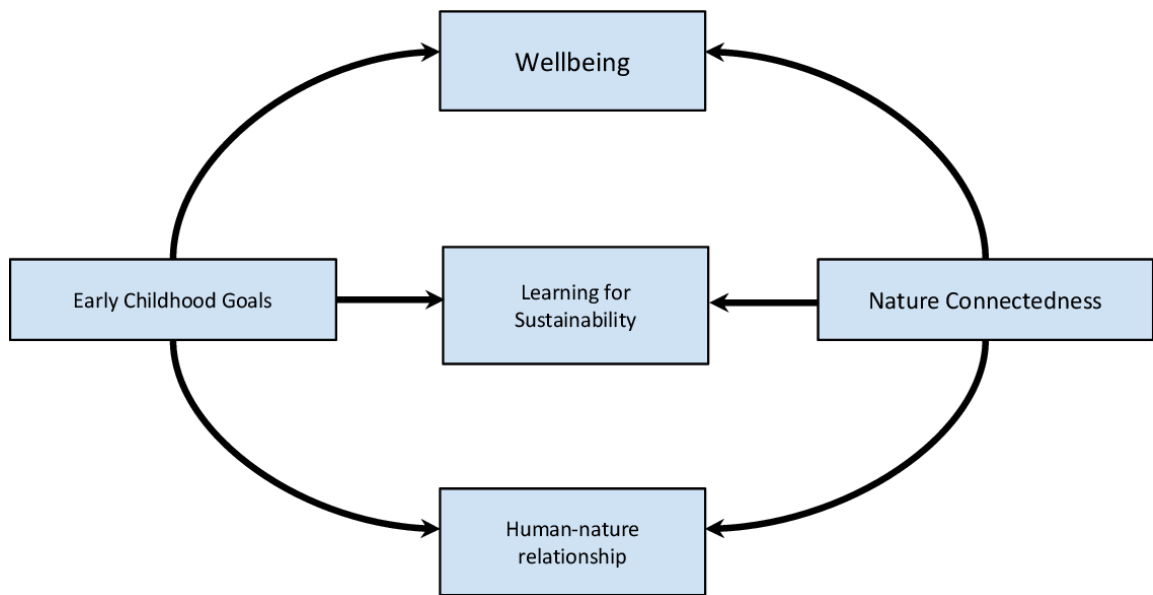


Figure 1: “Relationship between Early Childhood Goals and Nature Connectedness.” (Barrable 2019)

Since more and more children are living in urban environments it is particularly important that there are easily accessible nature areas near daycare centers and schools. The recommendation given by the Ministry of the Environment states that the distance to the nearest green area of a school or daycare center should not be further than 300 meters. (Finnish Environment Institute 2018.) ‘School forest’ refers to a nearby forest of a daycare center or a school. ‘School forest’ is a diverse green area which is visited regularly and aims to promote children’s and youth’s health, well-being and participation as well as learning about different subjects and about the diversity of nature. (Sahi 2014.) Metsämörri action is aimed for children and is part of Suomen Latu (an outdoor association in Finland) action. Metsämörri action aims to encourage children to play, move and explore in nearby nature. Action is led by trained instructors and can be implemented e.g. in early childhood education. (Suomen Latu 2020.)

In nature-oriented daycare centers nature is visited throughout the year regardless the weather. The first forest preschool in Finland was founded in 2005. (Behm 2017.) In 2012 there were 143 nature-oriented daycare centers in Finland (Polvinen, Pihlajamaa & Berg 2012). It is unknown how many nature-oriented daycare centers or daycare groups exist in Finland at the moment. Nature-oriented approach varies between the groups and is implemented differently in daycare centers; some nature-oriented groups spend the whole day in the forest while some only part of the day. (Honka 2015.) Saarinen (2014) resulted that 16 % of the 757 daycare centers answering to a national survey had a nature-oriented group and 24 % of answered daycare centers implemented some kind of nature-based activities in addition to the regulated nature activities.

2.3 Health Promotion in Early Childhood Education

Early childhood education guides child towards healthy and well-being supportive lifestyle (Finnish National Agency for Education 2018). Early childhood education aims to “promote the holistic growth, development, health and wellbeing of every child according to the child’s age and development” (Ministry of the Education and Culture 2018). Together with a guardian of a child early childhood education aims to ensure child’s all-encompassing well-being and to guide child towards ethically responsible way of life including the aspect of sustainable development (Act on Early Childhood Education and Care, 540/2018, 1,3:10; 1, 3:8). The social, cultural, economic and ecological aspects of healthy and sustainable lifestyle are considered in early childhood education (Finnish National Agency for Education 2018).

The environment of early childhood education and care needs to develop, promote child’s learning, be healthy and safe while considering child’s age, development and other similar factors (Act on Early Childhood Education and Care 540/2018, 2, 10). Regardless personal background every child is entitled to early childhood education in Finland. Child’s personal needs and best interest set the foundation for the child’s individual early childhood education plan. Goals promoting child’s development and well-being as well as possible medical treatment plan are noticed in the individual plan. When implementing early childhood education municipality does collaboration with other stakeholders including the health care professionals such as maternity clinics. (Finnish National Agency for Education 2018.)

Healthy, safe and physically active lifestyle is valued in early childhood education. In order to obtain this kind of a lifestyle physical activity and rest are included in daycare environments. The influence of physical activity, emotions, rest and healthy relationships on well-being and health are discussed together with a child. Child is guided towards diverse and healthy diet and positive attitude towards eating. Early childhood education supports child’s capacity to take care of personal hygiene and health. Early childhood education is implemented in physically, socially and mentally safe environment where bullying is not allowed. A clear and systematic day structure promotes child’s well-being. The aspect of care in early childhood education refers to nursing the physical basic needs of a child as well as the emotional caring. (Finnish National Agency for Education 2018.)

According to the Act on Early Childhood Education and Care (540/2018, 1,3:3) early childhood education aims to carry out versatile pedagogical action regarding child’s physical activity. Early childhood education encourages child towards physically active way of life. It is important to a child to do sports and outdoor activities throughout the year. Sufficient physical activity promotes child’s growth, development, learning as well as well-being. When child is doing physical activities in a group it supports child’s interaction skills and thus strengthens child’s social well-being. Early childhood education aims to secure that a child daily has enough time

and chances to do spontaneous sports both in- and outdoors and to develop child's motoric skills such as balance. Child experiences sports with different senses and equipment and through play. Different seasons of the year define the framework for the outdoor activities. (Finnish National Agency for Education 2018.)

3 Nature

Human approach to nature is multidimensional: nature is considered as protected nature out of human touch, living nature where human is a part of the organic entity and utilized nature, a source of ingredients and materialistic well-being (Valkonen 2016). In this chapter the definitions of 'nature' and 'environment' are observed from various perspectives including the dimensions of protected nature 'wilderness' out of human reach as well as living nature, where current societies are part of the entity. In form of green care action, the utilization of nature produces emotional well-being instead of material. Political decision-making and environmental responsibility affect nature's role in social work.

3.1 Definition of Nature

Instead of one there are several definitions for 'nature' (Valkonen & Saaristo 2016). Since the perception of 'nature', 'natural' and 'wild' are shaped by present culture it is nearly impossible to find universally approved definitions for the terms (Väyrynen 1996). The definitions of 'nature' and 'environment' vary from time to time and the understanding of nature is shaped by current societal norms and values. How nature is defined is in relation to society and the separation between nature and society has become difficult since human touch can be found almost everywhere. (Valkonen & Saaristo 2016.) Since human has tried to utilize nature at its maximum capacity the modern society is more dependent on nature than ever before (Valkonen 2016). Environmental problems are no longer only environmental but also societal e.g. global warming (Valkonen & Saaristo 2016). According to Maller et al. (2006) environmental sustainability should be considered simultaneously with human sustainability in order to avoid negative impacts on public health since natural environment and human health are related. The environment, human and economy should be equally considered in political decision-making and action (Valkonen & Litmanen 2016).

Valkonen (2016) draws a picture of western cultures where world is divided into two realities: culture, a reality including people and social and to nature, un-human reality including anti-social and animals. These two realities are in interaction, but they function under their own laws. The relationship between culture and externalized nature has varied throughout the history when shaped by logos, God or human himself. On the conceptual level nature is separated from culture but in reality nature and society are inseparable. (Valkonen 2016.) Also,

the concept of ‘the balance of nature’ is ambivalent; nature is simultaneously considered as harmonic idyll but also as a dangerous, even fatal environment where natural disasters are part of nature’s cycle (Väyrynen 1996).

Nature has existed before human and untouched nature, wilderness, out of the reach of a human touch has become the opposite of today’s society. Return to wilderness is sometimes seen as a solution to western world’s problems. (Valkonen 2016.) Abbey (1987) reflects the relationship between the sense of freedom and wilderness as:

“We can have wilderness without freedom; we can have wilderness without human life at all, but we cannot have freedom without wilderness.” (Abbey 1987)

The International Union for Conservation of Nature (IUCN) defines ‘wilderness areas’ as “protected areas that are usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition” (IUCN 2020). According to IUCN the primary object of the wilderness areas is to protect the natural state of those areas but also enable people to experience wilderness. Again, the protection of wilderness areas does not only aim to promote nature’s well-being but also human benefit.

As a physical environment nature refers to Earth’s soil as well as to hydros- and atmospheres including the plants and animals and nature environments which are little shaped by human (Institute for the Languages of Finland 2020). According to the Cambridge Dictionary (2020) ‘nature’ refers to “all the animals, plants, rocks etc. in the world and all the features, forces and processes that happen or exist independently of people, such as the weather, the sea, mountains, the production of young animals or plants, and growth”. Nature can be also understood as a human nature referring to personal characteristics or as characteristics of objects or things (Sihvola 1996; Institute for the Languages of Finland 2020). In this thesis (personal) characteristics-related nature approach is ignored and ‘nature’ is understood accordingly Maller et al. (2006) as “an organic environment where the majority of ecosystem processes are present”. Maller et al.’s definition also includes individual natural elements as well as surroundings from wilderness areas to farms and gardens.

‘Environment’ refers to “the physical, social and cultural factors that are present in the natural or built environment and with which humans have an interactive relationship. The environment is perceived above all as the human living environment on the state and quality of which human activity has a positive or negative impact.” (Statistics Finland 2020.) Culture defines which environments are considered as ‘natural’ (Valkonen 2016). In social work the concept of ‘environment’ is understood as more of an abstract term covering social, physical and cultural environments rather than referring to physical nature (Närhi & Matthies 2001). According to Hallikainen (1998) personal backgrounds affect how people experience the surrounding

environment. Experiencing environment is interaction between a person and an environment where person is a participant rather than a subject or an object (Hallikainen 1998).

3.2 Nature in Social Work and Green Care

In Finland, social work consists mostly of public services provided by the municipalities. Due to a wide selection of the public services and highly academic social work education, “social work has been rather socio-politically and sociologically orientated”. (Närhi 2001.) According to Närhi & Matthies (2001) politics and ecology are inseparable both on theoretical and practical level and they state that:

“Nature , or the environment, is becoming an essential part of political, cultural and social processes - it is becoming a social construction. “ (Närhi & Matthies 2001)

Nature can be considered as a political phenomenon since nature-related stands are simultaneously societal stands (Valkonen 2016). Natural resources are targets of political campaigns as they are considered essential to modern society and social work is unavoidably involved in these campaigns (Närhi & Matthies 2001). Environmental problems and social problems such as inequality are linked on the national and international level (Närhi 2001). According to Närhi & Matthies (2001) “social injustice, social exclusion and the issue of human resources cannot be dealt with without taking the environment into account.” Also, Maller et al. (2006) state that in the future nature can become a determinant of health and well-being and therefore accessibility to nature should be considered as a social justice issue since it can create inequality.

According to Närhi & Matthies (2001) there are two different understandings of the meaning of ecology in social work. More common view in which Närhi & Matthies refer as ‘systems theoretical thinking’ emphasizes the social environment versus ecocritical approach which criticizes today’s industrial society and the ecological movements. Both theories share the same perspective of viewing person as a part of holistic system including nature. The differences between the theories are on the emphasis of the social work in society and on the environment. “In the eco-critical approach, the environmental crisis concerns nature and the environment, but it also encompasses human beings and their relationships, values and cultural assumptions” (Närhi & Matthies 2001). Whereas systems theoretical thinking “does not take a stand on environmental questions” nor criticise modern society, which creates environmental problems. (Närhi & Matthies 2001).

‘Green care’ is an umbrella term for nature-based services produced in different surroundings for different client groups (Soini, Ilmarinen, Yli-Viikari & Kirveenummi 2011). Green care action can be used in social and health care services, upbringing and well-being services e.g. rehabilitative work, early childhood education and tourism (Vehmasto & Kettunen 2018). The

roots of green care action take place in the Netherlands where the concept of care farming was first defined in the 1970's. In Finland the concept of green care was first presented in 2008. The first form of green care in Finnish social and health care services started in institutions: sanitariums and mental hospitals were located in beautiful nature settings and gardening and farming were parts of everyday life of nursing homes and orphanages. (Soini et al. 2011.) Also, gardening and parks have been a part of mental health work for centuries. Green environments are used both in care and rehabilitation and among different client groups such as elderly, people with disorders and prisoners. (Rappe 2014.)

In goal-oriented, professional and responsible green care action nature is an element maintaining and promoting people's well-being and health. Green care action is based on nature-based methods and guided nature experiences where nature is more than just a setting for action (Figure 2). Nature-based methods such as multisensory experiences, a view from window, sounds, nature pictures and the use of natural materials as well as different surroundings such as forests, water systems, gardens, farms, urban environments and in some cases even indoor spaces are used in green care action. Animals, gardening and farming are part of green care activities. (Vehmasto & Kettunen 2018.) Data collected from the fields of ecopsychology, wilderness experiences, horticultural therapy and animal assisted therapy indicate that an engagement with nature improves health (St. Leger 2003). Nature, experiences and participation are the foundation of green care action (Vehmasto & Kettunen 2018).

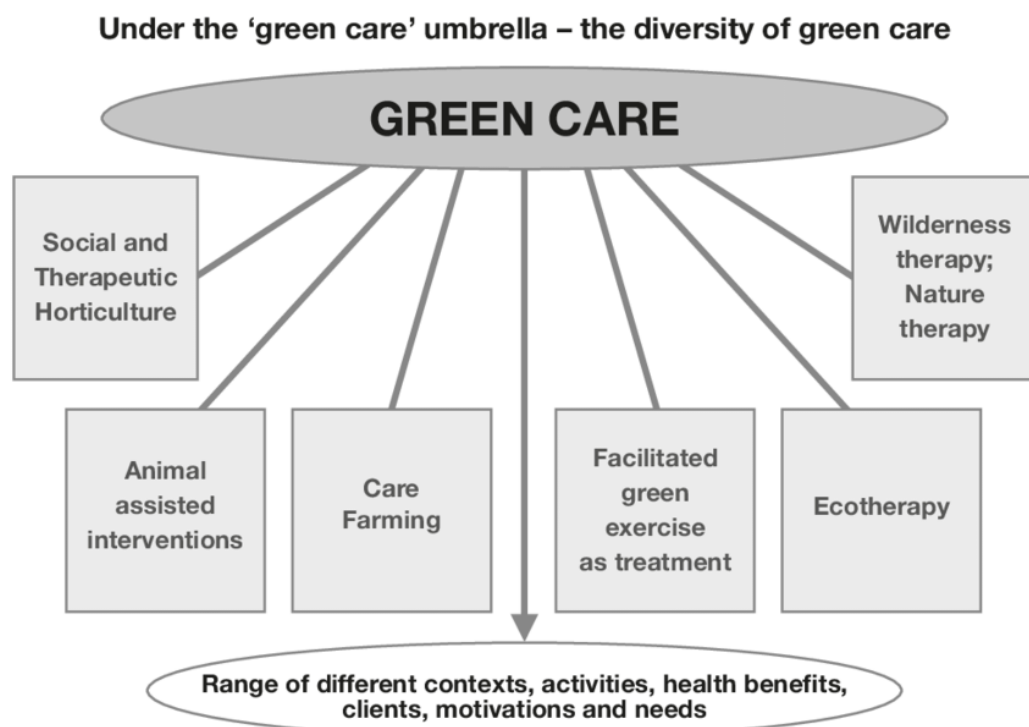


Figure 2: The green care umbrella. (Lund, Granerud & Eriksson 2015)

Green care action can be divided into Green Care and Green Empowerment services. Green Care services are implemented in social and health care services aimed for clients with special needs or need for rehabilitation e.g. unemployment or clients with mental health problems or substance abuse. Green Care services support physical, mental and social performance or rehabilitation of the service user and aim to strengthen health, participation or everyday life management of the client. The provider of Green Care service is a professional of social and health care services. Green Empowerment services on the other hand are aimed for everyone and consist of hobbies as well as well-being and upbringing services. They aim to promote the overall well-being and health of the service user and do not require profession of social and health care services from the service provider. (Vehmasto & Kettunen 2018.) A lack of research on the impacts of green care action and required co-operation between multiple occupational fields are challenges green care action faces in Finland (Soini et.al. 2011).

4 Defining Health and Well-being

The World Health Organization 'WHO' (1946) recognises the possibility of enjoying the highest possible state of health as everyone's fundamental right regardless of race, religion, political belief, economic or social condition. Regardless health being considered as everyone's right and numerous definitions of 'health', the actual meaning of health is still argued (Oleribe et al. 2018). Well-being is strongly connected with health. In this chapter the terms 'health' and 'well-being' are defined and the distinctions and connections between the terms are observed.

4.1 Definition of Health

"Health is a positive concept emphasizing social and personal resources, as well as physical capacities." (WHO 2020b)

According to the World Health Organization health is a positive concept (see the quotation above) and can be defined as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO 1946). According to Crinson (2007) WHO's definition of 'health' "differs from the traditional medical model, which defines health as the absence of illness or disease and emphasizes the role of clinical diagnosis and intervention." According to the WHO definition health and wellbeing as well as health and participation in society are linked (Crinson 2007). Huber, Knottnerus & Green (2011) criticise the operationalization of the WHO definition of 'health' and claim that definition unwittingly supports the medicalization of people and ignores people with chronic illnesses and disabilities. Oleribe et al. (2018) criticize the word 'complete' in WHO's definition to be absolute, and difficult to measure.

Huber et al. suggested a new formulation of health as “the ability to adapt and to self-manage” (2011) whereas Oleribe et al. (2018) suggested all-encompassing definition of health to be “a satisfactory and acceptable state of physical (biological), mental (intellectual), emotional (psychological), economic (financial), and social (societal) wellbeing”. Finnish institute for health and welfare (THL) on the other hand defines health as a resource which enables a good quality of life (2020a). WHO (1946) emphasizes the importance of healthy development of a child and recognises “the ability to live harmoniously in a changing total environment” as an essential factor to such development. For example, due to the national vaccination programme and high standards of hygiene Finland has succeeded in tackling many infectious diseases and epidemics, especially among children (Ministry of Social Affairs and Health 2019).

Mental and physical health are inextricably linked, and they reciprocally influence each other: “Mammalian stress responses (i.e. fight, flight or freeze) are known to affect physiological processes regulated by the autonomic nervous system, including cardiovascular, respiratory, digestive, repair and defence functions.” (Crinson 2007.) Many medical conditions such as irritable bowel syndrome, asthma and migraine headaches are linked with stress. Correspondingly, stronger immune function is associated with high levels of social support and hardiness. (Crinson 2007.) According to Crinson (2007) it is difficult to determine which comes before, mental or physical illness, since “behavioural and social risk factors for physical and mental health problems tend to overlap”.

4.2 Definition of Well-being

The new economics foundation ‘NEF’ (2012) defines ‘well-being’ as “how people feel and how they function, both on a personal and a social level, and how they evaluate their lives as a whole.” Shortly, ‘well-being’ can be defined as “an individual’s experience of their life overall” (NEF 2014). Mutual themes arising from the diverse definitions of wellbeing are ‘feeling good’ and ‘functioning well’. A broad definition of well-being includes individual experiences of one’s life as well as comparison between personal life circumstances and social norms and values. In conclusion well-being can be considered as two-dimensional entity consisting of objective and subjective wellbeing. (Crinson 2007.)

According to THL (2020b) ‘well-being’ can be divided into three dimensions; health, material well-being and the experienced quality of life. The term well-being refers to both individual and community level well-being. On the community level well-being can refer to for example, living conditions, employment, working conditions and income and on the individual level social relationships, self-impression, happiness and social capital. (THL 2020b.) Subjective well-being varies a lot between individuals (Crinson 2007). This thesis focuses on individual level well-being. According to WHO (2020a) there is no universal definition of ‘mental well-being’ since the term can have multiple meanings on the individual, communal and cultural levels. Mental

well-being can refer to factors such as feeling of happiness, absence of disease or negative elements in life or economic wealth. According to WHO mental well-being should not be considered as a state that is present or absent but rather as “a continuum and as operating within a spectrum” where an individual can be at any point. (WHO 2020a.)

The quality of life is used when measuring the experienced well-being (THL 2020b). WHO (2020a) defines the term ‘quality of life’ as “an individual’s perception of his or her position in life in the context of the culture and value systems in which he or she lives, in relation to his or her goals, expectations, standards and concerns”. This definition includes dimensions such as happiness, health status, positive aspects of coping, resilience, satisfaction and autonomy. Regardless increased level of well-being there are still significant differences in all dimensions of well-being between population groups in Finland. Income, education and profession have remarkable influence on well-being and disadvantages can focus on certain population groups which in turn increases the societal division. (THL 2020b.)

4.3 Health versus Well-being

Finnish institute for health and welfare (THL 2020a) considers ‘health’ being one dimension of ‘well-being’. Simultaneously THL defines ‘health’ as a state formed by physical, social and mental ‘well-being’. The definitions of the terms are overlapping. The meanings of ‘health’ and ‘wellbeing’ are individual and differ regarding the context and personal needs (Crimson 2007). According to Crimson (2007) this limits broader definitions of health, since wellbeing is not objective or measurable. Eckersley (2001) points out that “despite the apparent links between health and emotions, the relationship between health and subjective well-being is not clear-cut.” Regardless subjective well-being is strongly linked with experienced health, the correlation with objective health is weak (Eckersley 2001). Eckersley concludes that the difference between well-being and health is in well-being excluding physical health and instead including positive emotions. Well-being is not as strongly focused on mental and physical illnesses and diseases as health. Subjective well-being unlike health is associated with self-esteem. (Eckersley 2001.) Eckersley (2001) lists how genes, environment, life events, circumstances, culture, personality, goals and various adaptation and coping strategies influence experienced happiness and thus well-being. Regardless health (when measured by mortality and life expectancy) has increased lately, well-being has not (Eckersley 2001).

5 Nature Promoting Health

Nature has shaped peoples’ religions, worldviews and understanding of esthetic beauty. For long, nature is known to have positive impacts on human health and well-being but still, the

scientific research around the phenomenon has started only recently. Not until the 21st century the health benefits gained from nature have properly emerged as targets of research and health promotion work. (Tourula & Rautio 2014.) Ecosystem services and health are connected. The term 'ecosystem services' refers to nature's diversity such as ecosystems, organisms and gene sources which benefit human mental and physical health as well as social and economic well-being. (Jäppinen et al. 2014.) In this chapter nature's role in health care is discussed. Nature's impacts on mental and physical health are separated regardless they reciprocally affect each other; mental health influencing physical health and vice versa (Crimson 2007). Nature's impacts on child's health is located under separate subheading.

5.1 Nature in Health Promotion

"Health promotion is the process of enabling people to increase control over, and to improve their health." (Health Promotion Glossary 1998) In health promotion 'health' is considered as a resource for everyday life allowing people to live individually, socially and economically productive life (Health Promotion Glossary 1998). 'Health promotion' can be defined as aiming to create well-being and prevent diseases (THL 2020a). The Ministry of Social Affairs and Health (MSAH) is primarily responsible for guiding and overseeing health promotion work in Finland, aiming to reduce health inequalities among population. The Health Care Act sets the base for Finnish health promotion which is part of public health activity. Lifestyles and the living environments are recognised to have an impact on public welfare. Clean, safe and accessible living environment is one of the central issues in public health work. (Ministry of Social Affairs and Health 2019.)

Increased traffic, the loss of nature's biodiversity and air and soil pollution are problems of urban societies (Roslund et al. 2019). Decreased amount of physical activity, long time periods of sitting and overweight cause risks of cardiovascular diseases, diabetes and mental disorders which are recognized as modern problems (Tapaninen 2014). The positive impacts nature has on health and well-being are acknowledged as possible tools in public health promotion and use of nature environments could respond to the health problems of modern society (Jäppinen et al. 2014; Tapaninen 2014). Studies indicate that natural environments such as green gardens, plants and broad green spaces improve experienced state of health and performance by affecting physiological processes, emotions and behaviour (Korpela 2010).

The use of green environments in health promotion work is seen as a challenge of the current era on national and international level (Korpela 2010). Due to little research around nature's abilities in health promotion, urbanization and current lifestyle it is difficult to utilize the opportunities nature has to offer (Partonen 2014; Jäppinen et al. 2014). Uwajeh & Ezennia (2019) acknowledge that regardless a small amount of studies nature has proven to have a positive impact in health care. Uwajeh & Ezennia recognise the recovery rate of patient from

post operations as one of the most important impacts and list pain management and increased sense of well-being as positive impacts nature creates in health care. Improved mood and sleep, decreased stress level and help in weight control are health benefits gained from nature (Partonen 2014).

Jäppinen et al. (2014) conclude that “possible savings on health-care costs can be obtained” if the health benefits gained from nature are considered in public health promotion work and in physical and mental illness prevention. Ecosystem services and nature’s rich biodiversity can be utilized in preventing diseases and promoting health and well-being (Jäppinen et al. 2014). Ecological psychology studies the interaction between a human and physical environment and can be applied in urban planning, architecture as well as therapy work. Ecopsychology takes into consideration ecosystems and other living organisms in mental health work and environmentally sustainable lifestyle is seen as affecting mental health. Recently the focus of the field has been on research around stress relieving impacts of nature. (Korpela 2010.)

5.2 Nature Promoting Physical Health

Nature provides a platform for physical activities and social interaction (Natural Resources Institute Finland 2016). Regular physical activity prevents chronic diseases e.g. cardiovascular diseases, diabetes, obesity, depression and osteoporosis as well as premature death. Increased physical activity improves health. (Warburton, Nicol & Bredin 2006.) The impact nature environments have on public health can be seen as nature tempting people to spend time outdoors and thus motivating people to engage in physical activities. For example, parks promote physical and mental well-being by offering possibilities to physical activity. The accessibility of parks or other corresponding outdoor spaces and the amount of physical activity are connected. Nearby nature areas support the experience of refreshing. (Tourula & Rautio 2014.) The access to nature should be close since the health benefits gained from nature are born through regular visits to nature (Tyrväinen 2014).

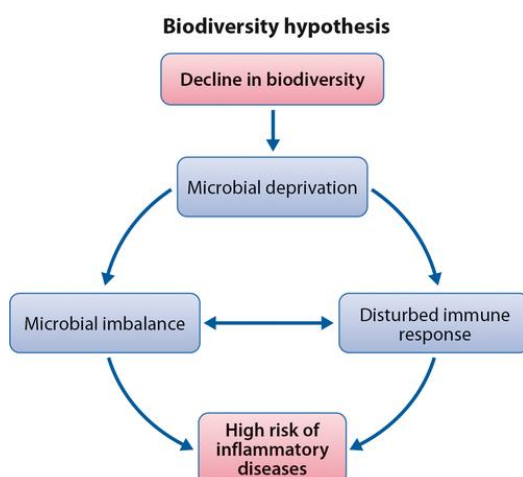


Figure 3: Biodiversity hypothesis (Haahtela 2019)

Nature does not only affect health indirectly through physical activity, but it has a direct impact on human biology. According to biodiversity hypothesis (see Figure 3 above) nature contacts enrich human microbiomes, promote immune balance as well as act as a protection against allergy and inflammatory disorders (Haahtela 2019). Due to urbanization and changed lifestyle human's connection to nature's microorganisms has decreased which in turn creates immune system disorders such as allergy, asthma, diabetes and rheumatism (see Figure 4 below). Approximately every fifth resident in developed societies suffers from immune system disorder. Therefore, regular visits to nature specially to forests and agricultural surroundings with rich and diverse microbe and microorganism societies are a good way to protect from immune system diseases. (Sinkkonen 2018.)

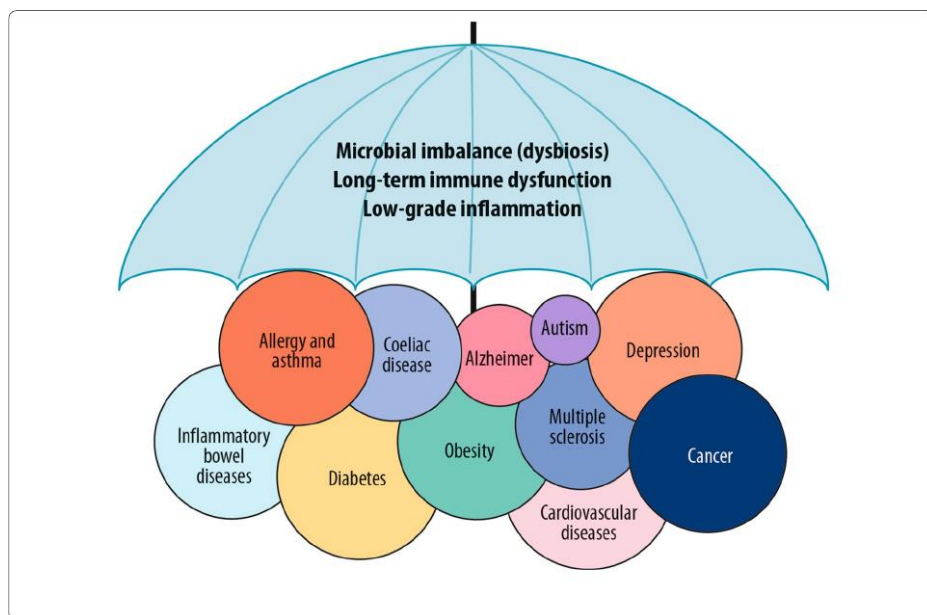


Figure 4: “Several non-communicable diseases have been suggested to share the same underlying risk factors such as microbial imbalance, long-term immune dysfunction and low-grade inflammation.” (Haahtela et al. 2019)

Pasanen, Tyrväinen & Korpela (2014) implemented a study which explored the relationship between perceived health and physical activity indoors, outdoors in built environments, and outdoors in nature. The study aimed to clarify if the known benefits of physical activity (such as improved general and mental health) and exposure to nature are evident in everyday life when person is repeatedly in contact with nature. According to Pasanen et.al (2014) the results indicated that repeated exercise in nature promoted better emotional well-being. Still, physical activity in both built and natural outdoor surroundings offered equally positive impact on general health and sleep quality was weakly connected to repeated physical activity in nature. Even though the study implemented by Pasanen et.al resulted that nature surroundings strengthen the benefits gained from physical activity, is the topic still rather unknown. Nevertheless, an environment that encourages to physical activity, such as nature, promotes the health benefits gained from physical activity and therefore nature environments can be considered as creating health benefits.

5.3 Nature Promoting Mental Health

Nature can improve emotional well-being either directly via senses and thus relief stress or indirectly by encouraging to physical activity or social interaction and through them improve emotional well-being (Korpela 2010). Interaction with nature improves self-esteem, mood, emotions and behavior (Puhakka et al. 2019). Being in nature surroundings affects human physiologically since it can lower the blood pressure, muscle tension and the amount of stress hormone 'cortisol' in body (Tyrväinen 2014). Already a green space seen through window is studied to have a positive impact on concentration and in reducing anxiety (Korpela 2007). The use of plants, pictures of nature themes or water elements indoors have shown to have a positive impact on health (Uwajeh & Ezennia 2019). Regardless nature can improve the mood, it is good to acknowledge that how people experience nature depends on personal backgrounds and preferences (Tyrväinen 2014).

Studies show that nature contact relieve the negative effects caused by stressors in urban environments (Puhakka et al. 2019). Natural environments are known to offer physiological, emotional and attention restoration (Berto 2014). There are two leading theories around the restorative benefits of exposure to natural environments - Attention Restoration Theory (ART) and Stress Recovery Theory (SRT). In ART nature is considered to ease mental fatigue as in SRT nature is considered to decrease stress. The theory behind ART is that since the natural setting involuntary engages people's attention "the executive system that regulates directed attention gets to rest, pessimistic thoughts are blocked, and negative emotions are replaced by positive ones." (Berto 2014.) Despite ART is widely-recognised theory, it is uncertain which parts of attention are affected by exposure to nature (Ohly et al. 2016).

Besides the nursing effect of green environment nature provides both restorative and multisensory experiences. When environments are mixed with elements from nature the ability to function increases. The increased functionality promotes social interaction and the sense of participation and community. (Rappe 2014.) People recover particularly efficiently in their favorite spots. Recovering experiences are stronger in unbuilt natural environments such as forests and beaches than in built urban environments. (Natural Resources Institute Finland 2016.) "Shinrin-yoku", forest bathing, is a Japanese nature-based method aiming to relax and recruit. With a help of forest bathing it is possible to achieve emotional well-being from nature. In practice, forest bathing means a short visit to the forest and when surrounded by trees visitor receives nature's own aroma therapy. The popularity of forest bathing is based on the stress relieving impact it has on people. (Tourula & Rautio 2014.)

5.4 Nature and Child's Health and Development

Regular visits to green areas promote child's health and well-being and has same refreshing and calming effects on a child as on adult (Finnish Environment Institute 2018). Nature surroundings

have a positive impact on child's body control, motoric skills as well as intellectual and socioemotional development. In nature child has the possibility to calming, relaxation, refreshing, strengthen self-esteem and stress relief. (Polvinen et.al. 2012.) According to Heerwagen (2009) nature contact can be visual, active engagement, passive or multi-sensory. Natural material and nature as a space encourage child towards play. The transformability of nature is appealing to a child. Playing outdoors is known to support child's emotional, cognitive and social development. (Heerwagen 2009.)

"It is especially important for children to be exposed to microbes in nature." (Finnish Environment Institute 2018.) Allergies are the most common chronic disease among children and youth (Saarinen 2014). Nature contacts in early childhood affects child's commensal microbiota and exposure to natural environments strengthen child's immune defence which in turn prevents inflammatory diseases e.g. asthma and atopic skin (Puhakka et.al. 2019; Finnish Environment Institute 2018). The more diverse the visited nature area is the more benefits it provides (Finnish Environment Institute 2018). According to Saarinen (2014) child's relationship with nature can be maintained and developed in daycare centers since they already have a strong basis for nature-based activities. The relationship formed with nature in childhood transfers into adulthood.

The amount and quality of green areas affect the health and physical activity of children (Tourula & Rautio 2014). Physical activity benefits general child development since movement stimulates brain development (Puhakka et al. 2019). "Exposure to nature has positive effects on - children's concentration, academic performance, and the ability to perform mentally challenging tasks." (Puhakka et al. 2019.) Nature can also be utilized in reduction of children's ADHD (Attention Deficit Hyperactivity Disorder) symptoms (Tourula & Rautio 2014). Study implemented by Faber Taylor & Kuo (2009) resulted that children with ADHD concentrated better after a walk in the park than after corresponding walk in the downtown or neighborhood. Also, a study by van den Berg & van den Berg (2011) indicated similar results. Two groups consisting of children with ADHD were observed, questioned, and tested both in the woods and in a small town. Study resulted that both groups concentrated better in the woods.

6 Methodology of the Thesis

This thesis has been carried out as a narrative overview aiming to answer the research question 'What is known about daycare centers supporting children's health and well-being using nature as a method in Finland?' Literature review in form of narrative overview was selected as a method due to its ability to address a broad research question. By combining already existing data together it was possible to provide an overview of relatively unknown topic of 'nature in health promotion'. In this chapter the inclusion and exclusion criteria behind data collection

are explained and justified and initial search implemented in databases of Google Scholar, HELDA and Laurea Finna is presented. Qualitative content analysis as an analysis method is introduced and possible ethical dilemmas regarding the topic and consideration around them are discussed.

6.1 The Objectives of the Thesis and the Research Question

This Bachelor's thesis aims to answer the research question:

- 'What is known about daycare centers supporting children's health and well-being using nature as a method in Finland?'

Thesis aims to clarify the current state of nature's role in Finnish daycare centers in health promotion by combining different national studies around the topic and comparing their results. The selected data consists of six national research implemented in Finnish daycare centers. Thesis aims to provide an overview of how nature is utilized in daycare centers as creating or sustaining health and what are the impacts nature has on children's mental and physical health if there are any. If possible thesis attempts to provide new conclusions around nature's role in health promotion in daycare environments. Thesis is carried out as literature review in form of a narrative overview.

Since I am completing the early childhood education teacher qualification the topic of the thesis deals with early childhood education. It was natural for me to approach the subject from the perspective of early childhood education implemented in daycare centers since it is the most familiar form of early childhood education for me. Nature's healing and empowering features interest me on personal level and the use of nature within in the field of social services on professional level. I acknowledge that the diverse nature of Finland provides amazing setting for nature-based approach in social services. Nature in health promotion is a current topic and the effects nature has on human health have awoken researchers' interest in somewhat nearby future. In this Bachelor's thesis I get to combine my two main interests: early childhood education and nature-based approach.

6.2 Literature Review: A Narrative Overview

This Bachelor's thesis has been carried out as a literature review. Literature review can be used as a data collection tool, a method, a mixed research method and a methodology (Onwuegbuzie & Frels 2016). Literature review is often used as a tool in data collection for theoretical framework but it can also be considered as a method since different strategies and procedures (Figure 5) are used in writing process in order to identify, record, understand, meaning-make and transmit information relevant to chosen topic (Onwuegbuzie & Frels 2016). Literature review focuses on already existing research and by combining the research results together it

creates a base for new research results (Salminen 2011). Both quantitative and qualitative information can be collected and analyzed in a literature review (Onwuegbuzie & Frels 2016). Five different main goals can be recognised among literature reviews; theory development, theory evaluation, to provide an overview on a certain topic, problem identification and “to provide a historical account of the development of theory and research on a particular topic.” (Baumeister and Leary 1997.) This thesis aims to provide an overview on nature’s role in health promotion executed in Finnish daycare centers.

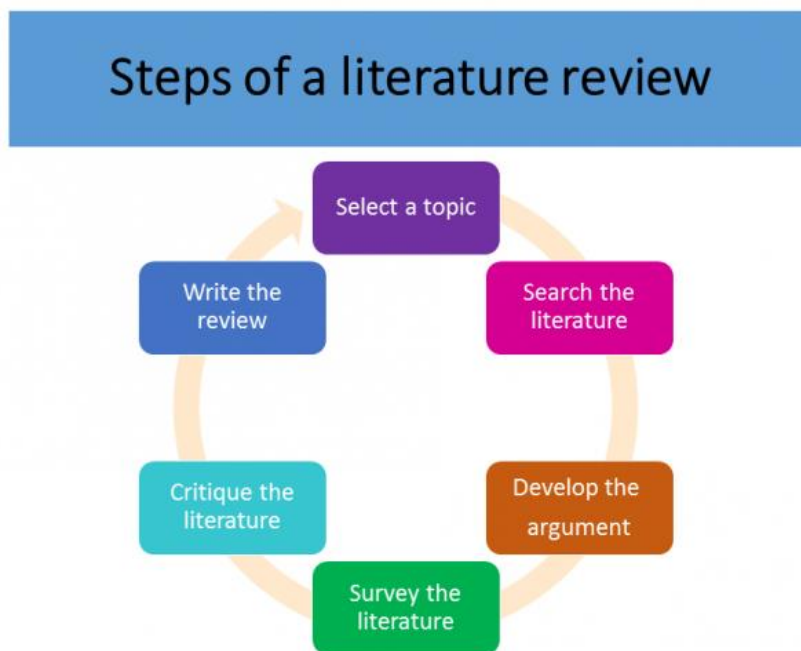


Figure 5: Steps of a literature review (Moll-Willard 2019)

The choice of using literature review as a method in this thesis is three-dimensional. Firstly, due to COVID-19 pandemic the societies are under constant changes and it creates a situation where it is not possible to guarantee that an empirical research/project started in collaboration with a working life partner could be finished together. The theoretical approach to the topic ensured that I was able to continue the research under the changing circumstances. Secondly, nature as a resource in health promotion is still rather unknown topic. The use of green environments in health promotion work is acknowledged as a challenge of today (Korpela 2010). Hence, it seemed more beneficial to approach relatively unexamined topic from the perspective of literature review by combining already published data together rather than trying to produce new, somewhat uncertain data around the topic. And thirdly, due to the broadness of the topic ‘nature’ and ‘health’ being both comprehensive entities thesis required a research method which allowed a broad research question. Literature review as a method enables addressing a broad research question versus a single empirical study (Baumeister and Leary 1997).

Literature review can be divided into three main types; narrative literature review, systematic literature review and meta-analytic review which can be divided into further subtypes (Salminen 2011). This thesis is implemented as a narrative overview. Green, Johnson & Adams (2001) define narrative overviews as a “comprehensive narrative syntheses of previously published information”. Regardless definition created by Green et al. instructs how to write ‘a narrative review of the literature for publication in peer-reviewed journal’, their description is suitable for other purposes as well. Narrative overview combines information from many different sources together into a readable form. A successful narrative overview conveys a clear message; it describes existing information around the topic and based on this evidence provides conclusions. With the help of narrative overview, it is possible to provide a broad approach to a topic and provoke thoughts and controversy. The role of objectivity is essential in narrative overviews. The first step in writing process is to perform an initial search in which already published literature is searched and analysed. (Green et al. 2001.)

Literature review can be a shared case study since it “is designed to examine multiple cases in an attempt to examine a phenomenon” (Onwuegbuzie & Frels 2016). This thesis aims to clarify the current state of nature-based approach in early childhood education by comparing several already published national studies around the topic and analyzing their results. Baumeister and Leary (1997) remind that a writer of a literature review should be open to new ideas since literature reviews do not include hypotheses formed in advance. Successful literature review should keep in mind four types of conclusions; the hypothesis is correct, the hypothesis can be assumed to be true in the current state “until contrary evidence emerges”, it is not known if the hypothesis is true or false or the hypothesis is false. (Baumeister and Leary 1997.)

6.3 Ethical Consideration

This thesis follows ‘The responsible conduct of research and procedures for handling allegations violations of misconduct in Finland’ (the RCR guidelines) set by the Finnish Advisory Board on Research Integrity (2012). In thesis writing process the accuracy with proper referencing, respecting other researchers’ work as well as sharing truthful results are essential factors. Since this thesis is based on already existing ethically implemented studies no research permits are needed. Thesis does not cause physical or mental harm to anyone or compromise anyone’s legal protection.

When writing a literature review there are certain features that need to be taken into account in order to avoid unethical implementation of the review. Baumeister and Leary (1997) highlight the importance of the distinction between assertion and evidence. While writing this thesis I must try to distinguish between the cases when someone is stating something with or without there being any proof behind the statement and when there is solid evidence behind a statement. It is important to distinguish the sources; who has stated something and who has

proved the statement (Baumeister and Leary 1997). Since there are many research around the same topic, the most current research reflects on the previously executed research. This leads to the situation where many studies work around the same topic and one needs to be careful while referring to different researchers who has stated or concluded and what and for example, who has started to investigate the topic in the first place.

The author of a literature review should be aware of not “trying to make a case for one particular position or conclusion” (Baumeister and Leary 1997). Meaning that by selecting material that fits only one particular conclusion the author of a literature review ignores some material which results in misleading the reader. Baumeister and Leary find this approach even intellectually dishonest. I need to be aware of the risk of misleading the reader by providing one-sided approach to the matter. This can be avoided by executing a comprehensive data collection and sharing truthful results. The author of a literature review should have an open mindset throughout the writing process and as mentioned before ‘literature reviews do not include hypotheses formed in advance.’ (Baumeister and Leary 1997.)

6.4 Data Collection

6.4.1 Inclusion and Exclusion criteria

The research question of this Bachelor’s thesis is ‘What is known about daycare centers supporting children’s health and well-being using nature as a method in Finland?’ When determining the inclusion and exclusion criteria (Table 1) for the data collection there were already few limitations set by the research question. Firstly, as the research question indicates the focus of this literature review is in ‘Finland’. Therefore, data collection only focused on national research and ignored the international studies around the topic. Of course, international studies can be mentioned in the thesis as comparison or as examples how to implement nature-based approach in early childhood education, but the main focus is on national research.

Inclusion Criteria	Exclusion Criteria
National studies implemented in Finland	International studies implemented outside Finland
Manual and electronic publication from 1 st of January 2000 till 2020	Publications before 2000
Studies in Finnish or English	Studies in other languages than Finnish or English
Studies considering mental or physical health	Studies considering social health
Studies implemented in Finnish daycare centers	Studies implemented in Finnish family-based daycare premises and open early childhood education
Studies other than Bachelor's or Master's theses	Bachelor's and Master's theses

Table 1: Inclusion and Exclusion criteria

Secondly, research question ponders how 'daycare centers' support child's health both in public and private sectors. Regardless family-based daycare and open early childhood education are part of Finnish early childhood education system they are excluded from this thesis. Daycare centers were selected as research targets of the thesis due to their easily comparative features regarding facilities as well as group size. Open early childhood education can be implemented in different clubs, open daycare centers as well as residential parks (city of Vantaa 2020). This diversity of premises challenges the comparison between daycare centers and open early childhood education units since they are not necessarily corresponding. The group size in family-based daycare is maximum of four children (Tehy 2020). Small group size can create one-sided results and thus affect the results of the thesis. Therefore, family-based daycares were excluded from the data collection.

Also, time frame was set for data collection only including studies implemented in the 21st century. The reason behind the chosen time frame is two-dimensional; firstly, thesis aims to share as current knowledge around the topic as possible. Secondly, as mentioned before the health benefits gained from nature have properly emerged as targets of research as late as the 21st century (Tourula & Rautio 2014). Therefore, it felt natural to draw the line between the 20th and 21st century and indeed the difference between the amount of results was rather small with or without this custom range. Despite WHO (1946) defines 'health' as "a state of complete physical, mental and social well-being" only physical and mental well-being are included in selected data. The social dimension of well-being is excluded from this thesis due to the broadness of social aspect in early childhood education including i.a. child developing

interaction skills and play as building interaction. Data collection focused on studies implemented in Finnish and English and excluded the studies implemented in other languages. Data collection focused on studies other than Bachelor's or Master's theses.

6.4.2 Keywords

When entering the research question (What is known about daycare centers supporting children's health and well-being using nature as a method in Finland?) to Google Scholar search field with quotation marks, the search resulted no hits while without quotation marks the search resulted 18 800 hits within time frame of 2000-2020. When briefly scanning the results, it was obvious that the search needed to be specified by forming different keywords for the search. English keywords 'nature', 'natural environment', 'green space', 'early childhood education', 'Finnish day care', 'Finland', 'day care', 'health' and 'well-being' were selected as search words in data collection since they covered all the wanted features of desired studies.

Many of the English keywords (Table 2) were included in the research question (What is known about *daycare* centers supporting children's *health* and *well-being* using *nature* as a method in *Finland*?). 'Early childhood education' is implemented in '*day cares*' and thus is included in search words and 'natural environment' as well as 'green space' refer to '*nature*'. Finnish keywords, 'luonto' (nature), 'päiväkoti' (day care), 'terveys' (health) and 'luonnon hyvinvointivaikutukset' (impacts nature has on well-being), were translated from English keywords apart from 'luonnon hyvinvointivaikutukset' (impacts nature has on well-being) since the term alone covers both aspects of 'well-being' and 'nature'. 'Finland' was excluded from the Finnish search assuming that results in Finnish would cover Finnish studies as well.

The initial data collection was executed by forming different combinations of keywords (Table 2). Data collection made on the databases of Google Scholar, HELDA and Laurea Finna was executed by using the custom range '2000-2020' and using keywords "early childhood education"/"day care" together with "Finland" or "Finnish day care" in combination with "health" or "well-being" as well as "natural environment", "green space" or "nature". Keywords were thus divided into three groups: 'nature', 'natural environment' and 'green space' forming the first (green) group, 'day care', 'Finland', 'early childhood education' and 'Finnish day care' the second (blue) group and 'health' and 'well-being' the third (red) group. The data collection was executed by using quotation marks with keywords and 'AND' between the words. Bachelor's and Master's theses were excluded from the search ('-thesis'). Tables 3 & 4 show how by combining different keywords the number of hits varied in databases of Google Scholar and HELDA. Tables 3 & 4 compare the number of hits of keyword combinations including the term 'health' with the number of hits of keyword combinations including the term 'well-being'.

<u>Health</u>	<u>Well-Being</u>
AND	AND
nature OR natural environment OR green space	nature OR natural environment OR green space
AND	AND
Finland day care OR Finland early childhood education OR Finnish day care	Finland day care OR Finland early childhood education OR Finnish day care

Table 2: Keyword combinations

nature	natural environment	green space	day care	Finland	early childhood education	Finnish day care	results with health	results with well-being
x			x	x			11 800	5820
x				x	x		6700	4090
	x		x	x			606	381
	x			x	x		487	340
x						x	203	151
		x	x	x			141	95
		x		x	x		83	65
	x					x	13	8
		x				x	0	0

Table 3: Search results in Google Scholar 07.11.2020

nature	natural environment	green space	day care	Finland	early childhood education	Finnish day care	results with health	results with well-being
x			x	x			159	176
x				x	x		962	1019
	x		x	x			121	131
	x			x	x		169	722
x						x	134	152
		x	x	x			40	45
		x		x	x		136	153
	x					x	101	112
		x				x	32	37

Table 4: Search results in HELDA 07.11.2020

6.5 Data Analysis

Despite the broadness of the topic ‘nature in health promotion’ it was rather difficult to find studies responding to every aspect of the research question. Relatively strict inclusion and exclusion criteria limited the amount of usable studies. It appeared that studies implemented in daycare centers rarely examined nature’s effects on children’s health but instead topics such as gender, language, nutrition and physical activity occurred multiple times in the resulted studies. Also, studies considering early childhood education other than early childhood education implemented in daycare centers occurred in results despite the aspect of daycare environment was included in the initial search. Regardless theses were excluded from the search many Bachelor’s and Master’s theses still occurred in the search results.

Numerous search results did not guarantee that the content of the results was in line with the research question of the thesis. The nature of the terms ‘nature’ and ‘environment’ is complex since they can be understood in multiple ways. As mentioned before besides natural environment ‘nature’ can refer to characteristics of a person or a thing. The term ‘nature of’ (e.g. nature of the activities) occurred multiple times in the search results. Therefore, the terms ‘natural environment’ and ‘green space’ were included in the data collection process. Also, the term ‘environment’ was challenging since ‘environment’ can refer to i.a. social, physical and cultural environments and not only natural environment. Consequently, analysing data was a challenging process. The selected studies are presented in the Table 5 (below) including the title and author of the publication and information about what was done in the

study, who participated the study and what were the results. The more detailed descriptions of the studies can be found from 'Appendices' (Appendix 2, 3, 4, 5, 6 & 7).

Study	What?	Participants	Results
“Endocrine disruption and commensal bacteria alteration associated with gaseous and soil PAH contamination among daycare children” (Roslund et al. 2019)	The study group evaluated health risks of PHA (environmental pollutant) on children by measuring PAHs from soil and air in daycare centers.	Eleven urban daycare centres in Finland including 53 children, aged 3-5 years old.	PAHs in the air may affect children's endocrine signaling pathways in urban areas. PAHs in daycare yards' soil change the bacterial communities in soil and children's skin which may lead to imbalanced human microbiota.
“Luonto lähelle ja terveydeksi! (Nature close and for health) - Survey for Finnish Daycare Centers 2014” (Saarinen 2014)	A national survey study aimed to find out what kind of settings nature provides to a daycare center; how nearby environment is utilized in daycare center activities and how different nature methods are perceived.	768 answers from daycare centers across Finland majority of them being public daycare centers (93%).	Nature was used in various ways in daycare center activities.
“Biodiversity intervention enhances immune regulation and health-associated commensal microbiota among daycare children” (The ADELE Research Group 2020)	A 28-day intervention study aimed to test the biodiversity hypothesis by enriching the environmental biodiversity of urban daycare centers.	Eleven daycare centers including 75 children aged 3-5 years.	It is possible to modulate children's immune system and decrease the risk of immune-mediated diseases in urban environments by modifying the surroundings so that children are exposed to nature's biodiversity.
“Luontoaskel hyvinvointiin” (Natural steps to well-being) (THL, SYKE & Luke 2019)	The pilot programme encouraged children to increase their daily interaction with nature, to eat a more plant-based diet, consider the impact of food waste, and learn about environmental responsibility (YLE 2019).	Nine daycare centers participating children aged 4-5 years.	Early childhood education personnel's approach to children's eating, nearby environment, hand hygiene, contact with soil, and playing in dirt changed. Children's nature contacts increased.
“Greening of Daycare Yards with Biodiverse Materials Affords Well-Being, Play and Environmental Relationships” (Puhakka et al. 2019)	“Whether simultaneously increasing biodiversity exposure and greening urban daycare yards affects -- children's physical activity and play, their environmental relationships, and their perceived well-being in the urban environment in Finland.”	13 groups in six daycare centers located in urban areas in southern Finland.	Green yards inspired children's play, increased physical activity and well-being, offered embodied experiences, provided multi-sensory exploration and diverse learning situations and promoted the development of environmental relationships.
“Preschool group practices and preschool children's sedentary time: a cross-sectional study in Finland” (Määttä et al. 2019)	The connection between weekly routines/more regular visits in places encouraging to physical activity and children's sedentary time in daycare centers	159 preschool groups including 864 children aged 3-6 years old.	More often implemented nature trips lowered children's sedentary time in daycare center.

Table 5: Selected studies

Laurea Finna

When using 'Laurea Finna' as a database for data collection the results were weak; only two theses and one book about aging were resulted when combining English keywords in multiple ways. Finnish keyword combination "luonto" (nature) AND "päiväkoti" (day care) AND "terveys" (health) resulted 24 hits consisting of 13 theses, 5 books and 6 notes. Search with keywords "Luonnon hyvinvointivaikutukset" (impacts nature has on well-being) AND "päiväkoti" (day care) resulted the same books which were not relevant for this thesis. I determined not to use Laurea Finna as a database.

HELDA

HELDA (digital repository of University of Helsinki) as a database gained more results than Laurea Finna. First when entering "nature" AND "Finland" AND "day care" AND "health" into the search field, combination resulted 9037 hits. After modifying the search field by spelling 'daycare' together the hits narrowed down to 416 and after excluding theses from the search the total amount of the hits was 159. Finnish search in HELDA excluding theses and combining keywords "luonto" (nature) AND "päiväkoti" (day care) AND "terveys" (health) resulted 56 hits. Search which excluded theses and included "luonnon hyvinvointivaikutukset" (impacts nature has on well-being) AND "päiväkoti" (day care) resulted four publications none of them being relevant for the thesis.

I determined to begin the data selection from database of HELDA and then move on to go Google Scholar if needed. On HELDA I started the data selection by going through the Finnish results and then moved on to English results starting from the least results gaining keyword combinations thus they were the most accurate search terms. After going through the Finnish search results and few of the least results gaining English searches I found three suitable studies. Additionally, one more study was found indirectly through HELDA's results. When scanning the results on HELDA, it became obvious that many of the resulted studies were irrelevant for the thesis already based on the title and I decided not to continue to process other keyword combinations.

Google Scholar

After scanning the results on HELDA I continued to process results on Google Scholar. Since the English search on the database gained numerous results I decided to execute a Finnish search on the platform. The Finnish combination of "luonto" (nature) AND "päiväkoti" (day care) AND "terveys" (health) resulted 858 hits in Google Scholar and "luonnon hyvinvointivaikutukset" (impacts nature has on well-being) AND "päiväkoti" (day care) 36 within time frame of 2000-2020. Both searches consisted mainly of Bachelor's and Master's theses but resulted three same publications considering development of green care services in Kainuu, how nature promotes

children's and youth's well-being and green care gardening. The publication about nature promoting children's well-being was selected as possible research material but in the end I determined not to use the study. The search with Finnish terms required narrowing and I excluded theses from the search. Now the search resulted 300 hits. After quick scanning I ended up selecting study around allergies as one of the studies in the thesis.

Finnish Institute for Health and Welfare

When looking for information for theoretical framework I visited the database of Finnish Institute for Health and Welfare and found the research and projects implemented by the Institute. Under subheading 'Children, youth and families- research and projects' I was able to find a study corresponding to inclusion and exclusion criteria of the thesis.

6.6 Analysis Method: Qualitative Content Analysis

Qualitative content analysis is a method aiming to analyse different documents in a systematic and objective manner and create a clear picture of studied phenomenon. Qualitative content analysis creates conclusions and not only summarize the data and can have so called evidence-based, theory directed or theory-based approach. This thesis uses evidence-based approach when analyzing selected data. Previous studies or knowledge should not affect the results of evidence-based qualitative content analysis. Units of analysis (such as words or ideas) arise from the data and the research question can be answered in the evidence-based qualitative content analysis by combining concepts. The challenge of evidence-based approach is in staying objective since already the chosen research question and methods are claimed to affect the research results. (Tuomi & Sarajärvi 2018.)

Qualitative content analysis can have either inductive or deductive approach. The organisation phase of the analysis differs in approaches; inductive approach includes open coding, creating categories and abstraction (Figure 6) whereas deductive approach includes 'categorization matrix development' in which data is reviewed and coded after already existing categories. (Elo, Kääriäinen, Kanste, Pölkki, Utriainen & Kyngäs 2014.) This thesis uses the inductive approach in the analysis. Inductive qualitative content analysis consists of three phases *preparation*, *organization* and *reporting*. Analysis begins by *preparing* the data; original relevant expressions selected from the data are modified into plain expressions and listed. In *organization* phase, the plain expressions are analysed in order to find similarities and differences within the expressions. Expressions are divided into groups based on the phenomenon they deal with and these groups are combined in order to form subcategories. Subcategories are named after their contents and are divided further into other categories (e.g. main categories) and in the end into all-encompassing integrative category. The amount of the categories between subcategories and integrative category depends on the data. In *reporting* (conceptualisation) phase relevant information is separated from the data and is used in

forming theoretical concepts and conclusions. *Organisation* is considered to be a part of *reporting* phase. (Tuomi & Sarajärvi 2018.)

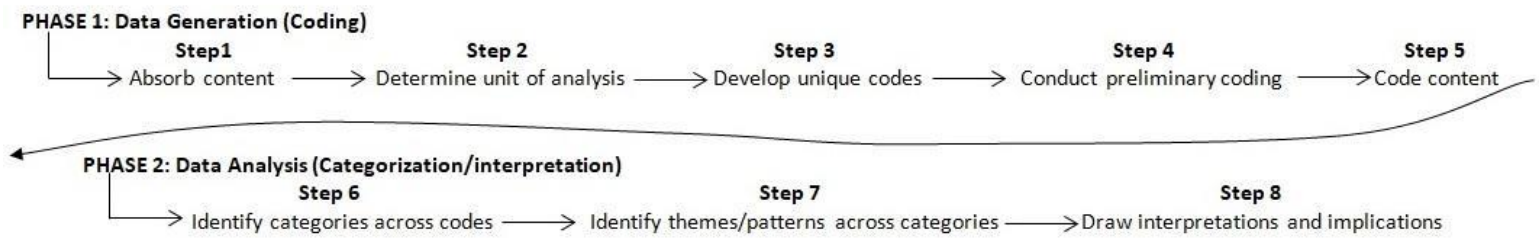


Figure 6: Process of qualitative content analysis (Roller 2019)

6.7 Qualitative Content Analysis of Selected Studies

The collected data consisting of six national studies was analysed according to the evidence-based qualitative content analysis. Individual sentences from the data were used as the units of analysis. In preparation phase 30 original quotations were picked from the studies and turned into simpler form. Table 6 demonstrates the process of the preparation phase including some of the original quotations and their simple forms. In this thesis 'plain quotation' refers to the plain expression of the original quotation. All the original quotations and their simple forms can be found in Appendix 1.

Original Quotation	Plain Quotation
“Finding leads to a provocative hypothesis that PAHs found from the living environment may alter both environmental and commensal bacterial communities.” (Roslund et al. 2019)	Pollutants in environment affect human bacterial communities.
“It is possible to design green yards in a way that increases the diversity and abundance of safe health-associated environmental microbiota.” (Puhakka et al. 2019)	Green yard planning, improved health
“Biodiverse materials may be suitable for daycare yards to balance human-induced disturbances in urban environments.” (Roslund et al. 2019)	Natural materials improving urban daycare environments
“Daycare environments have the potential to affect health.” (Roslund et al. 2019)	Daycare centers improving health
By “modifying the living environment of children with microbiologically diverse natural materials might provide a feasible approach for decreasing the risk of immune-mediated diseases in urban populations.” (the ADELE Research group 2020)	Living environments of children decreasing the risk of immune system diseases.
“The results of the present intervention study support the biodiversity hypothesis” (the ADELE Research group 2020)	Biodiversity hypothesis
Daycare centers have the possibility to maintain and develop children’s relationship with nature since based on the performed survey daycare centers have already good framework for nature-based action. (Saarinen 2014)	Daycare centers support children’s nature relationships
Since forest was preferred over day are yard as a place for play the saving of nearby forests of daycare centers has a growing part in urban planning. (Saarinen 2014)	Urban planning, nearby forests
“Consequently, developing public health strategies that increase nature visits at an early age is relevant.” (Määttä et al. 2019)	Public health strategies including nature visits.

Table 6: Preparation Phase

After preparation phase followed the organisation phase in which these quotations were divided into groups based on their content. These groups formed nine subcategories. Table 7 indicates how the division into subcategories was executed by using the plain quotations formed in the Table 6 as an example.

Plain Quotation	Subcategory
<ul style="list-style-type: none"> • Green yard planning, improved health • Daycare centers improving health • Daycare centers support children's nature relationships 	Daycare centers supporting child's health
<ul style="list-style-type: none"> • Biodiversity hypothesis • Living environments of children decreasing the risk of immune system diseases. 	Biodiversity hypothesis
<ul style="list-style-type: none"> • Public health strategies including nature visits. • Natural materials improving urban daycare environments • Urban planning, nearby forests • Pollutants in environment affect human bacterial communities. 	Urban planning and public health development

Table 7: Organization Phase

From nine subcategories it was possible to identify two different approaches to nature's role in health promotion. Firstly, nature promoting children's health and secondly, natural daycare environments compared with urban daycare environments. Subcategories *Daycare centers supporting child's health*, *Biodiversity Hypothesis*, *Learning Environment*, *Basic needs*, *Positive emotions and improved well-being* as well as *Improved and diversified play and physical activity* all focused on nature's beneficial impacts on children's health whereas subcategories *Increased nature contact*, *Urban planning and public health development* and *Disadvantages of urban daycare environments* compared natural environments with urban environments. Two main categories *Nature promoting human health and overall well-being* and *Natural daycare environments versus urban daycare environments* were formed. When comparing the two main categories with each other nature's role as health promoting was present in both approaches. When combining the categories into one integrated category the joint dimension of health promotion and the aspects of human health and natural environments compared with urban environments were noted. As a result, an integrative category *Nature contacts promote children's health in urban daycare environments* was formed (Table 8). In other words, the shared finding in all the selected studies was that nature has the ability to promote children's health especially in urban daycare environments. All the results gained through the qualitative content analysis are presented in the chapter 7.

Plain Quotation	Subcategory	Main Category	Integrative Category
<ul style="list-style-type: none"> • Skin bacterial diversity enrichment • Eagerness to play with natural materials led to microbial exposure • Exposure to nature's biodiversity, health benefits. • Natural materials increased nature contacts. 	Increased nature contact	Natural daycare environments versus urban daycare environments	Nature contacts promote children's health in urban daycare environments
<ul style="list-style-type: none"> • Public health strategies including nature visits. • Natural materials improving urban daycare environments • Urban planning, nearby forests • Pollutants in environment affect human bacterial communities. 	Urban planning and public health development		
<ul style="list-style-type: none"> • Urban daycare environments unhealthier than more natural daycare environments. • Houseplants don't affect health. • Children lacking nature contact in a daycare yard. • Pollutants in soil affect children's skin bacteria. • Increased risk of diseases caused by PAHs. 	Disadvantages of urban daycare environments		
<ul style="list-style-type: none"> • Engagement with nature promotes well-being. • Imagination, creative play and enhanced well-being. • Positive mood, energy and motivation. 	Positive emotions and improved well-being	Nature promoting human health and overall well-being	
<ul style="list-style-type: none"> • Green yard planning, improved health • Daycare centers improving health • Daycare centers support children's nature relationships 	Daycare centers supporting child's health		
<ul style="list-style-type: none"> • Biodiversity hypothesis • Living environments of children decreasing the risk of immune system diseases. 	Biodiversity hypothesis		
<ul style="list-style-type: none"> • Good appetite and deep sleep. • Rest and relaxation • Gardening promotes healthy eating. 	Basic needs		

<ul style="list-style-type: none"> • Increased and diversified physical activity. • Engagement with nature promotes imaginary play and physical activity. • Nature trips lowered children’s sedentary time. • Safe green yards promoted and diversified plays, activities and physical activity. 	Improved and diversified play and physical activity		
<ul style="list-style-type: none"> • Green yards as learning environments provide multi-sensory exploration. • Positive learning experiences improved the mood. 	Learning environment		

Table 8: Different Steps of Qualitative Content Analysis

7 Results

The selected studies indicated multiple similarities in their results and conclusions. Firstly, all the studies acknowledged nature’s potential as a suitable place to promote children’s health. Secondly, all the studies named nature-based methods and the use of natural materials in daycare centers as tools to implement health promotion work. Indeed, nature’s benefits on children’s health were valued and nature-oriented approach was considered as possible solution to the health risks of modern society. The easy accessibility to nature and exposure to nature’s diverse microbiota were considered important in early childhood education. Studies recognised that through national decision-making it is possible to ensure that daycare centers have the adequate resources to implement early childhood education which offers children with sufficient nature contacts. *Nature contacts promote children’s health in urban daycare environments* was the shared finding in all the selected studies and the title of the all-encompassing integrative category gained in the qualitative content analysis process. Although the studies shared the same result the ways to gain the result differed and multiple factors led to the parallel conclusion of nature’s health promoting features in the urban environments.

In early childhood education and care ‘care’ refers to nursing the physical basic needs of a child. Finnish early childhood education aims to guide children towards healthy diet and notice relaxation and rest in daycare environments. (Finnish National Agency for Education 2018.) The studies resulted that nature-based approach has the potential to enable the successful implementation of healthy lifestyle in a daycare environment. Nature has the ability to promote the fulfillment of these basic needs such as healthy nutrition and rest in a daycare environment.

Puhakka et al. (2019) resulted that “when the children spent active, inspiring time outdoors, they had a good appetite at lunchtime, and slept more deeply during their naps.” Also, THL et al. (2019) found a connection between enjoyment of gardening and children’s appetite and improved vegetable eating habits. With the help of natural and inspiring daycare yards including pleasant activities children can improve their appetite. Through nature-based methods such as gardening it is possible to familiarize children with new vegetables and thus guide them towards healthier eating habits. Puhakka et al. noticed that the green daycare yards enabled better possibilities for rest and relaxation for children outdoors. When daycare yards provide possibilities to rest outdoors besides napping time it is possible for children to listen their bodies and physical needs.

Sufficient physical activity is named as an important factor for children’s healthy development, growth, learning and well-being in the National Core Curriculum for ECEC (Finnish National Agency for Education 2018). Puhakka et al. (2019) resulted that “the natural materials increased and diversified the children’s physical activity in the daycare yards.” Correspondingly Määttä et al. (2019) found a connection between regular nature trips and reduced sedentary time of children. Määttä et al. suggested as a potential explanation to the phenomenon that nature challenges children differently than a standard daycare yard. According to Määttä et al. nature encouraged all children to creativity and spontaneous exploration regardless children’s personal background. Puhakka et al. resulted that children’s involvement with the green daycare yards were connected with their ability to use a natural environment as a platform for imaginary play and physical activities. Nature and natural environments increased children’s physical activity and thus reduced their sedentary time. In safe nature environments children were encouraged to try new plays and activities. When green daycare yards offered the feeling of safety they were able to support and inspire children’s play and physical activity.

The subcategory ‘Positive emotions and improved well-being’ resulted that the green daycare yards promoted creative play as well as children’s mood, energy, motivation and overall well-being (Puhakka et al. 2019). Dynamic and emotional ways of engaging with the natural environment were named as enhancing well-being. Natural materials inspired children to more creative play. (Puhakka et al. 2019.) Play is known to have a positive impact on child’s all-encompassing development and well-being. The experiences of curiosity and interest encourage children to play. (Finnish National Agency for Education 2018.) Natural materials evoked such feelings in children and thus promoted children’s play to become more creative. In other words, nature supports children’s creativity and use of imagination and hence enhances their overall well-being. The subcategory ‘Positive emotions and improved well-being’ was based on results gained from the same study. Hence the one-sided results can be insufficient to prove the positive impacts nature has on mental well-being. Still, results gained from Puhakka et al. (2019) are in line with the previous studies demonstrating the connection between natural environments and improved mental well-being.

Natural environments also improved children's mood through positive learning experiences. Nature's abilities as a learning environment are introduced in the chapter 2.2 'Nature in Early Childhood Education'. Regardless nature acts an excellent learning environment this feature of nature is pretty much ignored in this thesis due to its irrelevancy to health promotion. Still, positive learning experiences may promote mental well-being. Puhakka et al. (2019) noticed that green daycare yards offered multi-sensory exploration and different learning situations. As a result, Puhakka et al. suggested that positive learning experiences gained from nature improved children's moods. Roslund et al. (2019) point out that green daycare yards offered embodied experiences of nature in form of diverse learning situations, meaning that children in greener daycare yards had more physical nature contacts during learning than children in more urban daycare yards. Increased nature contacts in turn affect children's well-being.

Urbanization was correlated more with negative meanings than positive. Urban daycare environments were considered to have more negative impacts on children's health than natural daycare environments. Saarinen (2014) emphasized that especially people living in *urban* environments should be encouraged towards health and immune system promoting lifestyle and to strengthen human-nature relationship. Study implemented by the ADELE Research group (2020) compared children in standard *urban* and children in nature-oriented daycare centers assuming based on the biodiversity hypothesis that children in nature-oriented daycare centers had richer skin bacterial diversity. Puhakka et al. (2019) examined how the greening of daycare yards affected children's physical activity, play, environmental relationships and well-being in the *urban* daycare environment. The pilot programme 'Luontoaskel hyvinvointiin' (Natural steps to well-being) aimed to decrease health and well-being threats caused by *urbanization* through changing human approaches and behaviour (THL et al. 2019). Study estimating the risk of endocrine disruption in daycare children caused by environmental pollutants was implemented in eleven *urban* daycare centers (Roslund et al. 2019).

Only one of the selected studies did not emphasize the downsides of urban environments. Study implemented by Määttä et al. (2019) explored the connection between children's sedentary time and different weekly routines and regular visits to different places implemented in daycare centers. Both urban and countryside environments were included in the study. Study from Määttä et al. was the only one which did not originally focus on nature's effects on children's health in urban environments but rather resulted the connection between nature trips and children's lowered sedentary time and hence children's health. Whereas other studies already had formed assumptions and hypothesis around health issues caused by urban environments and nature's role as possible solution to them. It is worth noticing that the ADELE research group was involved in three of the six selected studies. Therefore, the original hypotheses, results and conclusions of the studies may indicate similarities which in turn reflect in the results of this Bachelor's thesis.

Only two out of six studies stressed the negative impacts caused by the environment. First this seemed to contradict the evidence of nature's health enhancing impacts. However, in this case the 'environment' referred to urban environment affected by human instead of natural environment. Both Saarinen and Roslund et al. acknowledged the possible risks of urban environment on children's health. Based on the survey answered by early childhood education personnel nation-wide Saarinen (2014) resulted that children in more urban daycare center environments were sick a bit more often than children in more natural daycare center environments. In same survey Saarinen resulted that about every fourth child was lacking a weekly contact with dirt and soil. When comparing daycare centers with and without houseplants Saarinen (2014) found no difference in children's morbidity. Houseplants are natural elements and known to improve health and mood (see e.g. Kobayashi et al. 2007). Still, results gained by Saarinen indicated other. Saarinen acknowledged that due to a little number of houseplants in daycare centers it may not be possible to demonstrate the health benefits caused by houseplants. Regardless houseplants are not necessarily a part of urban environment they were included under the subcategory due to the fact that they are located indoors which can be considered as an urban environment.

In their study about PAHs ('Polycyclic aromatic hydrocarbons', environmental pollutants known to cause different health issues by changing the diversity of environmental bacteria) Roslund et al. (2019) resulted that "PAHs accumulating in daycare yard soils induce shifts both in soil and on children's skin bacterial communities." Also, PAHs in the daycare yards' air were identified as risk factors since they increased the risk of many diseases by affecting hormonally mediated processes (Roslund et al. 2019). As a result, Roslund et al. suggested that biodiverse materials could be used in daycare yards in order to balance human-related disturbances in urban environments. Roslund et al. identified the risks caused by human behaviour in urban daycare environment. According to the Act on Early Childhood Education and Care (540/2018, 2, 10) the environment of early childhood education needs to be healthy and safe. Many children spend multiple hours a day in a daycare center and thus acting in as healthy daycare environment as possible is essential.

The ADELE Research group (2020) and THL, SYKE & Luke (2019) resulted that children's nature contacts increased due to play with natural materials. The ADELE research group recognised the connection between the green intervention yard and children's willingness to play with natural materials. Natural environment invited children to play and thus increased contacts with nature. In other words, more natural daycare yard encouraged children to physical contact with surrounding environment more than a so-called standard daycare yard. Both the ADELE Research group and THL et al. identified soil and natural materials as targets of children's play. The ADELE Research group also noticed that the skin bacterial diversity of children in the intervention yards became similar with children in nature-oriented daycare centers due to increased nature contacts. The ADELE Research group (2020) concluded that the biodiversity

hypothesis is accurate and that by executing a so-called 'biodiversity intervention' and bringing natural materials with diverse microbe into children's living environment it might be possible to decrease the risk of immune system diseases in urban environments. Saarinen (2014) mentioned nature's biodiversity as a new approach to allergy prevention. Puhakka et al. (2019) recognised that natural materials promoted children's exposure to nature's rich microbiota and hence to health benefits and stressed the importance of planning green daycare centers. Studies connected nature's biodiversity together with decreasing the risk of immune system diseases. By acknowledging the accuracy of biodiversity hypothesis, it is possible to design greener daycare yards in the future.

In their study Roslund et al. (2019) concluded that "daycare environments have the potential to affect health." Other studies shared similar conclusions: Puhakka et al. (2019) suggested that by designing green daycare yards it possible to influence human health via environmental microbiota. Also, Saarinen (2014) acknowledged that daycare centers have the possibility to maintain and develop children's relationship with nature since daycare centers already have an appropriate framework for nature-based action. The relationship between human and nature is recently connected more and more with health impacts (Seymour 2016). Indeed, urban daycare yards can be children's main sources of nature contacts (Puhakka et al. 2019). Regardless the conclusion made by Roslund et al. is more comprehensive than the ones gained in other studies they all share the common understanding of daycare centers' potential in health promotion. Whereas it is through promoting human-nature relationship or by creating greener daycare yards, daycare centers were considered as essential in children's health promotion since besides home children usually spend most of their time in a daycare center.

Daycare yards' importance in promotion of healthy habits of children can be considered notable in urban environments due to child's dependency on family when it comes to spending time in natural environment (Puhakka et al. 2019). Nature's role in daycare centers as a tool in health promotion was acknowledged and emphasized in the selected studies. Daycare centers were considered to be in the key position in the future when it came to supporting and promoting children's health and well-being. The studies concluded that in order to ensure children's sufficient nature contacts in early childhood education in the future national decision-making (e.g. public health strategies and urban planning) regarding nature's role in daycare centers is needed. When the importance of nature-oriented approach is understood on the municipal level it facilitates the work of early childhood education personnel (THL et al. 2019). Indeed, nature can be considered as an under-utilized public resource in terms of human health and well-being (Maller et al. 2006).

Child has the right to visit nature and easily accessible natural areas near daycare centers enable the achievement of this goal. In Finland it is recommended that the distance to the nearest green area of a daycare center should not be further than 300 meters (Finnish

Environment Institute 2018). Määtä et al. (2019) as well as Saarinen (2014) acknowledged the importance of the accessibility to nature in early childhood education. Määtä et al. emphasized the importance of developing public health strategies which increase nature visits in early childhood. Saarinen concluded that since forest was preferred over daycare yard as a place for play the saving of nearby forests of daycare centers in urban planning is important. Saarinen highlighted adults' both guardians' as well as early childhood education personnel's role as enabling children's access to nature. Both concluded that in order to ensure nature contacts in daycare centers national decision-making around the topic is required. Public health strategies as well as urban planning should respond to the existing need of nature contact in early childhood.

8 Conclusions and Discussion

The answer to the research question 'What is known about daycare centers supporting children's health and well-being using nature as a method in Finland?' is 'nature is known to promote health in urban daycare environments.' Interestingly, the studies did not emphasize any particular nature-based methods in health promotion but merely nature's presence in daycare centers. And in urban daycare centers to be precise. Terms such as 'urbanization', 'urban/urbanized environments/societies', 'urban dweller', 'urban lifestyles', 'urban daycare center' as well as 'urban countries' were mentioned in selected data multiple times. Urbanization and the decrease of green areas were considered as threats to children's health especially in form of immune system diseases. Instead of asking 'What is known about daycare centers supporting children's health and well-being using nature as a method in Finland?' more appropriate research question would have been 'What is known about *urban* daycare centers supporting children's health and well-being using nature as a method in Finland?'

The aspect of urbanization causing health issues and nature responding to them is remarkable. Could it be that the research on health benefits gained from nature is so recent simply because the importance of nature's effects on human health is realized after the green areas are decreasing simultaneously with the increase of urban living environments? People learn to appreciate nature when they are losing natural environments in the middle of urbanization. Based on the study survey commissioned by the Ministry of the Environment over 90% of Finnish people finds nature important and considers clean nature to be part of national identity (MDI 2018). The traditional practical exercises, such as hunting, fishing and picking berries or edible mushrooms reflect the close relationship Finnish people have with nature (Hallikainen 1998). Still, the motives behind the traditional activities have changed from the past and in the modern urban society people search for the experience of peace or togetherness, scenery and physical activity instead of surviving (Hallikainen 1998). The same study survey indicated that 83 % of the answerers (about 1000) is worried about the state of nature in Finland. The biggest

concerns were littering and climate change, but already on the third place was the concern of disintegration and the decrease of nature areas. (MDI 2018.)

When examining more closely the same survey study the majority of the answerers (97 %) considered nature to promote human health and well-being and (95 %) thought that nature's value cannot be measured in money. 86 % of the answerers recognised urbanization as a threat to the preservation of natural values and 95 % thought that nature should be considered better in the middle of urbanization. Still, the understanding of the importance of nature's diversity was complex; the majority (87 %) considered the promotion of nature's diversity to be economical and (94 %) valued the protection of nature's diversity as one of the main principles of society. Simultaneously the promotion of nature's diversity was considered to limit the regional development (52 %). (MDI 2018.) Again, human approach to nature is complex; nature has intrinsic value which cannot be measured. Nature enhances human well-being and provides a platform for relaxation, recreation, empowerment, physical activity and sometimes participation. Still, the external value nature provides in form of a source of ingredients and as an empty space to build on is hard for human to ignore. When something could be utilized in order to create material benefit it is easy to "forget" the long-term consequences the maximum utilization creates.

According to Laine, Jokela, Lehtovuori, Leino, Nieminen & Taylor (2020) urbanization and ecological sustainability are not separate phenomena but connected; urbanization does not affect only on national level, but the effects are global wide. A major challenge with urbanization is the disintegration of green areas since urban living environments are more and more densely built (Laine et al. 2020). Laine et al. (2020) suggest nature-based solutions as an answer to the challenges caused by urbanization and mention saving large green areas as well as greening daycare yards possible solutions to the current problem. Roslund et al. (2019) suggested that daycare yards should be planned so that they offer possibility for daily exposure to natural materials with high biodiversity and hence balance human-induced disturbances in urban environments. Also, multidisciplinary ADELE (Autoimmune Defense and Living Environment) project acknowledges the potential of nature-based solutions and aims to create consumer products which provide daily exposure to nature and hence prevent immune system disorders (Sinkkonen 2018).

Urbanization is a global phenomenon and causes many challenges for modern societies. When the loss of green areas and hence nature's biodiversity are acknowledged as modern problems it opens a space for new solutions. When the importance of natural areas to human health and well-being is truly acknowledged it should be included in both national and international decision-making. Indeed, green spaces have the potential in health promotion in many different fields e.g. hospitals, rehabilitation work and elderly care. According to Lehtimäki et al. (2017) "the first years of life are most critical for immune system development in cross-talk with

microbiota.” Hence, it is even more important for children to have the possibilities to exposure to rich environmental microbiota already in their early childhood. As concluded before daycare centers have the potential to provide sufficient nature contacts to children. Puhakka et al. (2019) state that the greening of playgrounds should be considered as an investment in children’s health. When nature-based solutions are included in the national decision-making it creates possibilities to daycare centers to implement more nature-oriented early childhood education which utilizes nature’s abilities not only in health promotion but also as a learning environment and a platform for physical activity and creativity.

In daycare centers nature creates both direct and indirect health benefits. Stress reduction and the changes in children’s immune systems are examples of direct health benefits. Nature in its diversity creates a place for relaxation, physical activity, exploring, learning and creative play. All of them promote children’s health and well-being indirectly. Indeed, besides health promotion, the greening of daycare yards have the potential to promote many goals Finnish early childhood education strives for. Nature as an environment promotes children’s learning and provides a setting for healthy and safe early childhood education environment. As its best, nature can be used as a tool which enables children’s participation and equality. According to the Ministry of the Education and Culture (2016a) nature has the potential to implement more equal early childhood education since nature and forest as play environments compensate the age and gender differences related with physical movement. Also, the child-oriented approach is easy to include in early childhood education when using nature-oriented approach. Children are known to be naturally curious and active, use senses and imagination when practicing movements and trying new ways to move (Ministry of the Education and Culture 2016b). Nature as a physical environment enables this kind of learning which is natural for children.

Selected studies were not the only national studies resulting nature’s positive impacts on children. Especially children’s physical activity was as target of many research and the studies often resulted that nature has the potential to increase the level of physical activity of children. A study executed by Jämsen, Villberg, Mehtälä, Soini, Sääkslahti, & Poskiparta (2013) aimed to investigate whether the season have an influence on the physical activity intensity of 3-4-year-old pre-school children. Jämsen et al. concluded that the season affected children’s physical activity since children were remarkably more active during the summer months when compared with winter months. For the future Jämsen et al. suggested that the seasonal changes could be utilized better in daycare centers in order to increase the physical activity of children throughout the year. The level of physical activity intensity was significantly higher outdoors than indoors and also, the level of physical activity was higher outdoors. Correspondingly the sedentary activity was notably more common indoors in all seasons. Jämsen et.al concluded that nature should be utilized in order to increase children’s physical activity. Daycare centers could diversify children’s play environment by visiting different nearby operational

environments such as playgrounds and forests. Jämsen et al. mention increased time spent outdoors as a possible way increase children's physical activity in daycare centers.

Only 10-20% of preschool-aged children reach the recommended minimum of three hours of daily physical activity in Finland (Ministry of the Education and Culture 2016b). According to the Ministry of the Education and Culture (2016b) approximately "50 % of children spend time in outdoor activities after their day in daycare" and some children do not get any possibility to outdoor playing in the evening. Ministry of the Education and Culture (2016b) reminds that adults enable the opportunities for children to self-expression, searching, exploring, diversifying their movements as well as practicing body control. By utilizing nature's potential, daycare centers have the possibility to create more equal platform of physical activity for children. Since children from families with good socioeconomic backgrounds have better chances to use diverse sport equipment and join sports clubs than children with lower socioeconomic status can daycare centers even these differences (Ministry of the Education and Culture 2016a). Natural environments could be used as tools supporting children's physical activity. Nearby forests and other corresponding green spaces are a free resource that could and should be utilized in a more goal-oriented way in early childhood education.

Urban gardening is another effective way to bring nature closer to children in daycare centers. For example, 12 daycares in the city of Kouvola started a successful experiment called urban agriculture in 2018. The experiment aimed to improve children's active participation, nature knowledge and the relationship with nature. The experiment included i.a. building a worm compost. Children in the daycare center fed the worms with coffee grounds, apple peels, porridge etc. and learnt about recycling at the same time. Worms were transferred to plantation boxes that were built by the parents and decorated by the children of the daycare center. The daycare center personnel were pleased with the experiment and described how children were passionate about gardening and learnt a lot about responsibility. Urban gardening offered many imagination filled moments and plays to children and aesthetic beauty to the adults of the daycare. Also, children who had been picky with food were more eager to try new vegetables since they grew the products themselves. (Tillaeus 2018.)

The greening of daycare yards and visits to nearby green areas are concrete ways to provide nature contacts to children and support their human-nature relationship in Finnish daycare centers. Indeed, after familiarizing myself with diverse health benefits nature creates and the importance of green spaces for people living in urban environments I am more eager to implement nature-oriented approach in my own working in the future as a professional of early childhood education. I acknowledge the huge potential nature has not only in health promotion but also as a learning environment in daycare environments. I hope to see greener daycare yards in the future and believe that urban gardening supports the greening of the daycare yards. While gardening children put their hands in the soil and dirt and gain precious touch with

nature. Children learn not only about gardening and different plants and vegetables but about nature's cycles, recycling, ecological sustainability, responsibility and co-operation. While gardening children are working in a team. When aiming for common good children learn co-operation and interaction skills. This kind of pedagogy has the potential to support children's participation and hence the experiences of empowerment, participation and success.

All in all, the topic is current and further research about nature's health supportive features is needed. The study implemented by the ADELE Research group was the first of a kind manipulating urban environmental biodiversity in order to examine the effects on children. Partonen (2014) acknowledges that since nature is still unused resource in health related services the knowledge of possible placebo effect and nature's health promoting effects is needed. Tourula & Rautio (2014) concluded that both subjectively experienced as well as objectively measured research around the topic is required. Tourula & Rautio claim that with multidisciplinary research projects it is possible to respond to the need of information regarding nature's role in health promotion. Tourula & Rautio noticed that the research around the topic emphasizes a specific, middle-aged group of the population and they suggested that more research about different age groups and their nature related experiences are needed. I noticed the same phenomenon; while nature is known to have a positive impact on human well-being it is still challenging to find information about nature's impacts on children's health and well-being.

More research is needed about the importance of nature contacts in early childhood. The long-term study comparing the health benefits of children in urban daycare centers and children in nature-oriented daycare centers could provide valuable information. In this thesis nature-oriented daycare centers were included in few of the selected studies as comparisons. It would be interesting to examine if the health issues caused by urban environments occurred also in nature-oriented daycare centers. Also, the possible long-term health benefits gained in early childhood from nature-oriented daycare centers passing on to adulthood would be an interesting long-term research target. The lack of precise number of nature-oriented daycare centers in Finland and their distinguish features (Honka 2015) challenge the implementation of this kind of studies. The topic is more and more current and research about nature's potential in health promotion enables the development of nature-based solutions and ecosystem services in the future.

References

Electronic

Abbey, E. 1987. 22. Freedom and Wilderness, Wilderness and Freedom, p.235. Freedom and Wilderness. Accessed 30.10.2020.

http://wildernesswatch.org/pdf/Abbey_Wilderness_Freedom.pdf

Act on Early Childhood Education and Care (540/2018). 13.07.2018. Finlex. Accessed 01.10.2020. <https://www.finlex.fi/fi/laki/alkup/2018/20180540#Pidp448031744>

Barrable, A. 2019. The Case for Nature Connectedness as a Distinct Goal of Early Childhood Education. The International Journal of Early Childhood Environmental Education, 6(2), p.59. Published 2019. Accessed 21.11.2020. <https://files.eric.ed.gov/fulltext/EJ1225651.pdf>

Baumeister, R. & Leary, M. 1997. Writing Narrative Literature Reviews. Review of General Psychology 1997, Vol. 1, No. 3, 311-320. Accessed 13.10.2020.

https://endoexperience.com/documents/literature_reviews_researched.pdf

Behm, J. 06.10.2017. "Metsään mennään säällä kuin säällä" - metsäeskarissa lasten suhde luontoon muuttuu. Aarre. Accessed 11.11.2020.

<https://www.aarrelehti.fi/jutut/mets%C3%A4%C3%A4n-menn%C3%A4%C3%A4n-s%C3%A4%C3%A4ll%C3%A4-kuin-s%C3%A4%C3%A4ll%C3%A4-mets%C3%A4eskarissa-lasten-suhde-luontoon-muuttuu-1.208567>

Berto, R. 2014. The Role of Nature in Coping with Psycho-Physiological stress: A Literature Review on Restorativeness. Behavioral sciences (Basel, Switzerland), 4(4), 394-409. Accessed 17.11.2020. <https://doi.org/10.3390/bs4040394>

Cambridge Dictionary. 2020. Nature. Accessed 29.10.2020.

<https://dictionary.cambridge.org/dictionary/english/nature>

City of Vantaa. 2020. Asukaspuistot ja avoimet päiväkodit. Accessed 17.11.2020.

https://www.vantaa.fi/varhaiskasvatus_ja_koulutus/varhaiskasvatus/palvelut/asukaspuistot_ja_avoimet_paivakodit

Crinson, I. 2007. Section 3: Concepts of Health and Wellbeing. Concepts of Health, Wellbeing and Illness, and the Aetiology of Illness Index. Revised by Martino, L. 2017. Public Health Textbook. Health Knowledge. Accessed 29.10.2020.

<https://www.healthknowledge.org.uk/public-health-textbook/medical-sociology-policy-economics/4a-concepts-health-illness/section2/activity3>

Eckersley, R. 2001. 4. Culture, Health and Well-being. The social origins of health and well-being. Eckersley, R., Dixon, J. & Douglas, B. (Ed.). Cambridge ; Melbourne : Cambridge University Press. Accessed 03.11.2020.

https://www.richardeckersley.com.au/attachments/Social_Origins_chap_04.pdf

Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K. & Kyngäs, H. 2014. Qualitative Content Analysis: A Focus on Trustworthiness. Research Article. SAGE Open Vol.4, Is. 1. First Published February 11, 2014. Accessed 18.11.2020.

<https://doi.org/10.1177/2158244014522633>

Faber Taylor, A., & Kuo, F. E. 2009. Children With Attention Deficits Concentrate Better After Walk in the Park. Journal of Attention Disorders, 12(5), 402-409. Accessed 17.11.2020.

<https://doi.org/10.1177/1087054708323000>

Finnish Advisory Board on Research Integrity. 2012. Responsible conduct of research and procedures for handling allegations of misconduct in Finland. Helsinki. Accessed 01.10.2020. https://www.tenk.fi/sites/tenk.fi/files/HTK_ohje_2012.pdf

Finnish Environment Institute. 11.09.2018. Nature relationship of day care centers and schools. Accessed 11.11.2020. https://www.syke.fi/en-US/Finland_and_sustainable_wellbeing/Nature_relationship_of_day_care_centres_and_schools

Finnish Environment Institute. 16.11.2020. Kaupunkiluonnon turvaaminen edistää asukkaiden terveyttä ja hyvinvointia. Accessed 02.12.2020. [https://www.syke.fi/fi-FI/Tutkimus_kehittaminen/Kaupungistuminen/Kaupunkiluonnon_turvaaminen_edistaa_asuk\(59151\)](https://www.syke.fi/fi-FI/Tutkimus_kehittaminen/Kaupungistuminen/Kaupunkiluonnon_turvaaminen_edistaa_asuk(59151))

Finnish National Agency for Education. 2018. National Core Curriculum for Early Childhood Education and Care. Accessed 01.10.2020. https://www.oph.fi/sites/default/files/documents/varhaiskasvatussuunnitelman_perusteet.pdf

Green, B., Johnson, C. & Adams, A. 2001. Writing narrative literature reviews for peer-reviewed journals: secrets of the trade. *J Sports Chiropr Rehabil* 2001;15:5-19. Accessed 21.11.2020. https://familymedicine.med.wayne.edu/mpH/project/green_2006_narrative_literature_reviews.pdf

Haahtela, T. 05.03.2019. A biodiversity hypothesis. *Allergy*. 2019; 74: 1445- 1456. Accessed 21.11.2020. <https://doi.org/10.1111/all.13763>

Haahtela, T., Herten, L., Antó, J., Bai, C., Baigenzhin, A., Bateman, E., Behera, D., Bennoor, K., Chavannes, N., Sousa, J., Cruz, A., Teixeira, M., Erhola, M., Furman, E., Gemicioğlu, B., Diaz, S., Hellings, P., Jousilahti, P. & Billo, N. 2019. Helsinki by nature: The Nature Step to Respiratory Health. *Clinical and Translational Allergy*. 9. 57. 10.1186/s13601-019-0295-2. Accessed 08.11.2020. https://www.researchgate.net/publication/336922001_Helsinki_by_nature_The_Nature_Step_to_Respiratory_Health

Hallikainen, V. 1998. The Finnish wilderness experience. *Metsäntutkimuslaitoksen tiedonantoja 711*. Finnish Forest Research Institute. Research Papers 711, 1998. 288 p. Accessed 08.12.2020. <http://urn.fi/URN:ISBN:951-40-1656-4>

Health Promotion Glossary. 1998. WHO. Accessed 04.11.2020. <https://www.who.int/healthpromotion/about/HPR%20Glossary%201998.pdf>

Heerwagen, J. 01/2009. Biophilia, Health and Well-being. *Restorative Commons: Creating Health and Well-being through Urban landscapes*. Campbell, L. & Wiesen, A. (ed.). Accessed 11.11.2020. https://books.google.fi/books?hl=en&lr=&id=cXi5k773X8oC&oi=fnd&pg=PA39&dq=What+is+known+about+day+care+centers+supporting+health+and+well-being+using+nature+as+a+method+in+Finland%3F&ots=451qegbvJ-&sig=9C_GkUwS0IX7XDmxYTDuTEF_5vY&redir_esc=y#v=onepage&q&f=false

Honka, N. 28.01.2015. Metsässä oleskelu lapsen kannattaa- voi jopa vähentää allergista herkistymistä. *YLE*. Updated 28.01.2015, 15:15. Accessed 21.11.2020. <https://yle.fi/uutiset/3-7765421>

Huber, M., Knottnerus, J.A. & Green, L. 2011. Health: How should we define it?. *BMJ*. 343. 235-237. Accessed 01.11.2020. <https://openresearch->

repository.anu.edu.au/bitstream/1885/17067/1/01_Huber_How_should_we_define_he_2011.pdf

Institute for the Languages of Finland. 2020. Kielitoimiston sanakirja. Luonto. Accessed 20.10.2020. <https://www.kielitoimistonsanakirja.fi/#/luonto>

IUCN. 2020. Wilderness Area. Accessed 29.10.2020. <https://www.iucn.org/theme/protected-areas/about/protected-area-categories/category-ib-wilderness-area>

Jämsen, A., Villberg, J., Mehtälä, A., Soini, A., Sääkslahti, A., & Poskiparta, M. 2013. 3-4-vuotiaiden lasten fyysinen aktiivisuus päiväkodissa eri vuodenaikoina sekä varhaiskasvattajan kannustuksen yhteys lasten fyysiseen aktiivisuuteen. *Journal of Early Childhood Education Research*, 2013 (2(1)), 63-82. Accessed 20.10.2020. <https://jyx.jyu.fi/bitstream/handle/123456789/48922/jamsenetalissue24.pdf?sequence=1&isAllowed=y>

Jäppinen, J.-P., Tyrväinen, L., Reinikainen, M. & Ojala, A. 2014. Luonto lähelle ja terveydeksi. Ekosysteempipalvelut ja ihmisen terveys Argumenta-hankkeen (2013-2014) tulokset ja toimenpidesuosituksset. Suomen ympäristökeskus. Helsinki. Accessed 14.10.2020. <http://hdl.handle.net/10138/153461>

Kobayashi, K., Kaufman, A., Griffis, J. & McConnell J. 12/2007. Using Houseplants To Clean Indoor Air. *Ornamentals and Flowers* Dec.2007, OF-39. Accessed 20.11.2020. <https://scholarspace.manoa.hawaii.edu/bitstream/10125/2960/OF-39.pdf>

Korpela, K. 2007. Luontoympäristöt ja hyvinvointi. *Psykologia*, 42, 364-376. Accessed 28.10.2020. https://www.researchgate.net/publication/262066113_Korpela_K_2007_Luontoymparistot_ja_hyvinvointi_Psykologia_42_364-376

Korpela, K. 2010. 8.4. Ympäristöpsykologia. *Psykologin ammattikäytännöt*, p. 338-344. P. Nieminen, V. Nevalainen & J. Holma (toim.) (2010). Helsinki: Edita. Accessed 28.10.2020. https://www.researchgate.net/publication/312490913_Ymparistopsykologia

Laine, M., Jokela, S., Lehtovuori, P., Leino, H., Nieminen, J. & Taylor, J. 2020. Slideshow: Onko kaupungistuminen ekologisesti kestävä? - Suositukset kunnille uusimman tutkimuskirjallisuuden valossa. Kuntaliitto & Tampereen yliopisto. Accessed 01.12.2020. https://www.kuntaliitto.fi/sites/default/files/media/file/Onko%20kaupungistuminen%C2%A0ekologisesti%20kest%C3%A4v%C3%A4%C3%A4_Tay_Kes%C3%A4kuu%202020.pdf

Lehtimäki, J., Karkman, A., Laatikainen, T., Paalanen, L., von Hertzen, L., Haahtela, T., Hanski, I. & Ruokolainen, L. 2017. Patterns in the skin microbiota differ in children and teenagers between rural and urban environments. *Sci Rep* 7, 45651. Pub. 31.03.2017. Accessed 21.11.2020. <https://doi.org/10.1038/srep45651>

Lund, I., Granerud, A & Eriksson, B. 2015. Green Care From the Provider's Perspective: An Insecure Position Facing Different Social Worlds. *SAGE Open*. Accessed 31.10.2020. https://www.researchgate.net/profile/Arild_Granerud/publication/272362600/figure/fig2/AS:669018780344339@1536517915876/the-green-care-umbrella.png

Maller, C., Townsend, M., Pryor, A., Brown, P. & St. Leger, L. 2006. Healthy Nature Healthy People: 'Contact with Nature' as an Upstream Health Promotion Intervention for Populations. *Health promotion international*. 21. 45-54. Accessed 20.11.2020. https://www.researchgate.net/publication/7398569_Healthy_Nature_Healthy_People_%27Contact_with_Nature%27_as_an_Upstream_Health_Promotion_Intervention_for_Populations

MDI. 21.06.2018. Kysely suomalaisten luontosuhteesta. Kyselyn tulosten koonti. Accessed 02.12.2020. <https://www.syke.fi/download/noname/%7BF7BEF468-4840-44FF-B3CA-B324134DC460%7D/138519>

Ministry of Social Affairs and Health. 2019. Health Promotion. Updated 16.9.2019. Accessed 29.10.2020. <https://stm.fi/en/health-promotion>

Ministry of the Education and Culture. 07.09.2016a. Scientific justification for the recommendations for physical activity in early childhood. Sääkslahti, A. (Ed.). Publications of the Ministry on Education and Culture, Finland 2016:22. Accessed 01.12.2020. <https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/75406/OKM22.pdf#page=46>

Ministry of the Education and Culture. 11/2016b. Joy, play and doing together - Recommendations for physical activity in early childhood. Sääkslahti, A. & Korhonen, N. Publications of the Ministry on Education and Culture, Finland 2016:35. Accessed 01.12.2020. <https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/78924/OKM35.pdf?sequence=1&isAllowed=y>

Ministry of the Education and Culture. 13.07.2018. Translation of the Act on Early Childhood Education and Care (540/2018). Finland. Accessed 22.11.2020. <https://www.finlex.fi/en/laki/kaannokset/2018/en20180540.pdf>

Moll-Willard, E. 28.02.2019. Steps of a literature review. Slaying the (literature review) beast: Part 2. Accessed 08.12.2020. <https://blogs.sun.ac.za/libraryresearchnews/2019/02/28/slaying-the-literature-review-beast-part-2/>

Määttä, S., Lehto, R., Konttinen, H., Ray, C., Sajaniemi, N., Erkkola, M. & Roos, E. 2019. Preschool group practices and preschool children's sedentary time: a cross-sectional study in Finland. *BMJ Open* 2019;9:e032210. Accessed 15.11.2020. <https://bmjopen.bmj.com/content/bmjopen/9/12/e032210.full.pdf>

Natural Resources Institute Finland. 2016. Luonnon hyvinvointivaikutukset. Accessed 20.10.2020. <https://www.luke.fi/tietoa-luonnonvaroista/virkistyskaytto/luonnon-hyvinvointivaikutukset/>

NEF. 2012. Michaelson, J., Mahony, S. & Schifferes, J. 07/2012. Measuring wellbeing: A short handbook for voluntary organisations and community groups. Accessed 29.10.2020. <https://neweconomics.org/uploads/files/measuring-wellbeing.pdf>

NEF. 2014. Abdallah, S. & Jeffrey, K. 11/2014. Hands on communities: The community and well-being benefits of learning and sharing practical skills. Accessed 01.12.2020. https://neweconomics.org/uploads/files/fea0db02c5bc026584_kxm6i29hf.pdf

Närhi, K. 2001. Social impact assessment. New challenges for social work?, p.54-83. *Eco-social Approach in Social Work*. Matthies, A-L., Närhi, K. & Ward, D. (Ed.). University of Jyväskylä. Accessed 31.10.2020. https://jyx.jyu.fi/bitstream/handle/123456789/48562/SoPhi58_978-951-39-6497-9.pdf?sequence=1

Närhi, K. & Matthies, A-L. 2001. What is the ecological (self-)consciousness of social work? Perspectives on the relationship between social work and ecology, p. 16-53. *Eco-social Approach in Social Work*. Matthies, A-L., Närhi, K. & Ward, D. (Ed.). University of Jyväskylä. Accessed 31.10.2020. https://jyx.jyu.fi/bitstream/handle/123456789/48562/SoPhi58_978-951-39-6497-9.pdf?sequence=1

Ohly, H., White, M. P., Wheeler, B.W., Bethel, A., Ukoumunne, O.C., Nikolaou, V. & Garside, R. 2016. Attention Restoration Theory: A systematic review of the attention restoration potential of exposure to natural environments. *Journal of Toxicology and Environmental*

Health, Part B, 19:7, 305-343. Accessed 17.11.2020.

<https://www.tandfonline.com/doi/full/10.1080/10937404.2016.1196155?scroll=top&needAccess=true>

Oleribe, O. O., Ukwedeh, O., Burstow, N. J., Gomaa, A. I., Sonderup, M. W., Cook, N., Waked, I., Spearman, W., & Taylor-Robinson, S. D. 2018. Health: redefined. *The Pan African medical journal*, 30, 292. Accessed 17.11.2020.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6320447/>

Onwuegbuzie, A. & Frels, R. 2016. Chapter 3: Methodology of the Literature Review. *Seven Steps to a Comprehensive Literature Review*, p. 48-64. 2016. Accessed 21.11.2020.

<https://study.sagepub.com/sites/default/files/Onwuegbuzie%20%26%20Frels.pdf>

Partonen, T. 2014. 2.5 Miten luontoa voidaan hyödyntää terveystalouksissa? Jäppinen, J-P., Tyrväinen, L., Reinikainen, M. & Ojala, A. 2014. Luonto lähelle ja terveydeksi.

Ekosysteemipalvelut ja ihmisen terveys Argumenta-hankkeen (2013-2014) tulokset ja toimenpidesuosituksukset. Suomen ympäristökeskus. Helsinki. Accessed 14.10.2020.

<http://hdl.handle.net/10138/153461>

Pasanen, T., Tyrväinen, L. & Korpela, K. 2014. The Relationship between Perceived Health and Physical Activity Indoors, Outdoors in Built Environments, and Outdoors in Nature. Published online 09.06.2014. Accessed 01.10.2020.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4233975/>

Polvinen, K., Pihlajamaa, J. & Berg, P. 2012. Luonnosta hyvinvointia lapsille ja nuorille: Kuvauksia luonnon hyvinvointivaikutuksista, palveluista ja malleista palveluiden kehittämiseen. Sitra & Kansallinen hyvinvointiverkosto. Accessed 11.11.2020.

<https://media.sitra.fi/2017/02/27174148/Luonnosta hyvinvointia lapsille ja nuorille-2.pdf>

Puhakka, R., Rantala, O., Roslund, M. I., Rajaniemi, J., Laitinen, O. H., Sinkkonen, A., & ADELE Research Group. 2019. Greening of Daycare Yards with Biodiverse Materials Affords Well-Being, Play and Environmental Relationships. *International journal of environmental research and public health*, 16(16), 2948. Accessed 16.11.2020.

<https://helda.helsinki.fi/bitstream/handle/10138/304845/ijerph-16-02948.pdf?sequence=1&isAllowed=y>

Rappe, E. 2014. 2.8 Viherympäristön psykososiaaliset palvelut. Jäppinen, J-P., Tyrväinen, L., Reinikainen, M. & Ojala, A. 2014. Luonto lähelle ja terveydeksi. Ekosysteemipalvelut ja ihmisen terveys Argumenta-hankkeen (2013-2014) tulokset ja toimenpidesuosituksukset. Suomen ympäristökeskus. Helsinki. Accessed 14.10.2020. <http://hdl.handle.net/10138/153461>

Roller, M. R. 2019. A Quality Approach to Qualitative Content Analysis: Similarities and Differences Compared to Other Qualitative Methods [46 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 20(3), Art. 3. Accessed 17.11.2020.

<https://www.qualitative-research.net/index.php/fqs/article/view/3385/4485#gcit>

Roslund, M.I., Rantala, S., Oikarinen, S., Puhakka, R., Hui, N., Parajuli, A., Laitinen, O.H., Hyöty, H., Rantalainen, A-L., Sinkkonen, A. & ADELE team. 2019. Endocrine disruption and commensal bacteria alteration associated with gaseous and soil PAH contamination among daycare children. *Environment International*. 2019 Sep;130:104894. doi: 10.1016/j.envint.2019.06.004. Epub 2019 Jun 18. Accessed 16.11.2020.

<https://helda.helsinki.fi/bitstream/handle/10138/304306/Endocrinedisruptionandcommensalbacteria.pdf?sequence=1&isAllowed=y>

Saarinen, K. 2014. Luonto lähelle ja terveydeksi! Kysely Suomen päiväkodeille 2014. Etelä-Karjalan Allergia- ja Ympäristöinstituutti. Accessed 16.11.2020.

<http://www.allergiaterveys.fi/upload/valtakunnallinen-kysely-2014.pdf>

Sahi, V. 31.01.2014. Koulumetsät arvoonsa - yhteistyöllä suojelua ja ympäristökasvatusta 2012-2013. Loppuraportti. SLL. Accessed 11.11.2020.
<https://www.sll.fi/app/uploads/2018/09/Koulumetsa-LOPPURAPORTTI-2012-13-31.1.2014.pdf>

Salminen, A. 2011. Mikä kirjallisuuskatsaus? Johdatus kirjallisuuskatsauksen tyyppeihin ja hallintotieteellisiin sovelluksiin. Vaasan yliopiston julkaisuja. Vaasa. Accessed 13.10.2020.
https://www.univaasa.fi/materiaali/pdf/isbn_978-952-476-349-3.pdf

Seymour, V. 2016. The Human-Nature relationship and Its Impact on Health: A Critical Review. *Front. Public Health*, Vol. 4, p. 260, 18 November 2016. Accessed 20.11.2020.
<https://doi.org/10.3389/fpubh.2016.00260>

Sihvola, J. 1996. 1. Luonnon käsite Aristoteleen etiikassa ja poliittisessa teoriassa, p.11. Luonnon luonto: Filosofisia kirjoituksia luonnon käsitteestä ja kokemisesta. Kotkavirta, J. (Ed.). SoPhi. Jyväskylän Yliopisto. Accessed 29.10.2020.
<https://www.google.com/url?sa=t&rcct=j&q=&esrc=s&source=web&cd=&ved=2ahUKewiQstLv7NnsAhVFplskHWj4CakQFjAAegQIAhAC&url=https%3A%2F%2Fjyx.jyu.fi%2Fdspace%2Fbitstream%2Fhandle%2F123456789%2F44431%2FLuonnon-luonto.pdf&usg=AOvVaw2B3rEDIX1mKswafKBL7G-R>

Sinkkonen, A. 19.12.2018. Päivittäinen luontoaltistus tulevaisuudessa kuluttajatuotteissa. University of Helsinki. Accessed 22.11.2020.
<https://www.helsinki.fi/fi/uutiset/luonnontieteet/paivittainen-luontoaltistus-tulevaisuudessa-kuluttajatuotteista>

Soini, K., Ilmarinen, K., Yli-Viikari, A. & Kirveenummi, A. 2011. Green care sosiaalisena innovaationa suomalaisessa palvelujärjestelmässä. THL. Accessed 31.10.2020.
<https://www.julkari.fi/bitstream/handle/10024/102903/soini.pdf?sequence=1>

St. Leger, L. 2003. Health and Nature - New Challenges for Health Promotion. *Health promotion international*. 18. 173-5. Accessed 20.11.2020.
https://www.researchgate.net/publication/10612492_Health_and_Nature_-_New_Challenges_for_Health_Promotion

Statistics Finland. 2020. Environment. Concepts. Metadata. Accessed 29.10.2020.
http://www.stat.fi/meta/kas/ymparisto_en.html

Suomen Latu. 2020. Metsämörri. Accessed 21.11.2020.
<https://www.suomenlatu.fi/ulkoile/lastentoiminta/metsamorri.html>

Tapaninen, M. 2014. 2.10 Metsähallituksen luontopalvelut vastaa terveyshaasteeseen. Jäppinen, J-P., Tyrväinen, L., Reinikainen, M. & Ojala, A. 2014. Luonto lähelle ja terveydeksi. Ekosysteemipalvelut ja ihmisen terveys Argumenta-hankkeen (2013-2014) tulokset ja toimenpidesuosituksset. Suomen ympäristökeskus. Helsinki. Accessed 14.10.2020.
<http://hdl.handle.net/10138/153461>

Tehy. 2020. Henkilöstömitoitus varhaiskasvatuksessa. Accessed 17.11.2020.
<https://www.tehy.fi/fi/apua/tyosuojelu/henkilostomitoitus-varhaiskasvatuksessa>

The ADELE Research Group. 2020. Biodiversity intervention enhances immune regulation and health-associated commensal microbiota among daycare children. *Science Advances*, vol. 6, no. 42. 2578. Accessed 15.11.2020.
<https://helda.helsinki.fi/bitstream/handle/10138/320653/eaba2578.full.pdf?sequence=1&isAllowed=y>

THL. 25.03.2020a. Keskeisiä käsitteitä. Accessed 14.10.2020.
<https://thl.fi/fi/web/hyvinvointi-ja-terveyserot/eriarvoisuus/keskeisia-kasitteita>

THL. 04.09.2020b. Hyvinvointi. Eriarvoisuus. Hyvinvointi ja terveyserot. Accessed 29.10.2020. <https://thl.fi/fi/web/hyvinvointi-ja-terveyserot/eriarvoisuus/hyvinvointi>

THL. 29.09.2020c. Varhaiskasvatus 2019. Accessed 02.12.2020. <https://thl.fi/fi/tilastot-ja-data/tilastot-aiheittain/lapset-nuoret-ja-perheet/varhaiskasvatus>

THL, SYKE & Luke. 12/2019. Luontoaskel hyvinvointiin. Accessed 15.11.2020. https://www.julkari.fi/bitstream/handle/10024/138943/Luontoaskel_hyvinvointiin_raportti.pdf?sequence=1&isAllowed=y

Tillaeus, J. 30.08.2018. Päiväkodin yksinkertainen idea omasta kasvimaasta sai lapset syömään porkkanoita ja tomaatteja - ”Vihannekset maistuvat nyt niillekin lapsille, jotka yleensä jättävät ne syömättä”. Accessed 01.12.2020. <https://yle.fi/uutiset/3-10375720>

Tourula, M. & Rautio, A. 2014. Terveyttä luonnosta. Oulu. Accessed 18.10.2020. https://www oulu.fi/sites/default/files/content/Terveytt%C3%A4_luonnosta.pdf

Tuomi, J. & Sarajärvi, A. 2018. Laadullinen tutkimus ja sisällönanalyysi. Helsinki: Kustannusosakeyhtiö Tammi. E-book. Laurea Finna. Accessed 17.11.2020. <https://laurea.finna.fi/>

Tyrväinen, L. 2014. 2.1 Luontoalueilta terveyttä: onko ympäristön laadulla väliä? Jäppinen, J-P., Tyrväinen, L., Reinikainen, M. & Ojala, A. 2014. Luonto lähelle ja terveydeksi. Ekosysteemipalvelut ja ihmisen terveys Argumenta-hankkeen (2013-2014) tulokset ja toimenpidesuosituksat. Suomen ympäristökeskus. Helsinki. Accessed 14.10.2020. <http://hdl.handle.net/10138/153461>

Uwajeh, P. C., & Ezennia, I. S. 2019. Evaluating Staff Perceptions of Supportive Healing Environment in Healthcare Facilities. *Journal of Contemporary Urban Affairs*, 3(1), 13-25. Accessed 29.10.2020. <https://media.neliti.com/media/publications/264775-evaluating-staff-perceptions-of-supporti-5e695bf4.pdf>

Valkonen, J. 2016. 2. Ympäristösosiologinen luonto. *Ympäristösosiologia*. University of Jyväskylä. Accessed 30.10.2020. <https://jyx.jyu.fi/bitstream/handle/123456789/50593/978-951-39-6197-8.pdf?sequence=1>

Valkonen, J. & Litmanen, L. 2016. 7. Ympäristö, talous ja kulutus, p.145-146. Valkonen, J. (Ed.) 2016. *Ympäristösosiologia*. University of Jyväskylä. Accessed 30.10.2020. <https://jyx.jyu.fi/bitstream/handle/123456789/50593/978-951-39-6197-8.pdf?sequence=1>

Valkonen, J. & Saaristo, K. 2016. 1. Luonto ja yhteiskunta- ympäristösosiologian lähtökohdat. Valkonen, J. (Ed.) 2016. *Ympäristösosiologia*. University of Jyväskylä. Accessed 30.10.2020. <https://jyx.jyu.fi/bitstream/handle/123456789/50593/978-951-39-6197-8.pdf?sequence=1>

van den Berg, A. E., & van den Berg, C. G. 2011. A comparison of children with ADHD in a natural and built setting. *Child: care, health and development*, 37(3), 430-439. Accessed 08.12.2020. <https://pubmed.ncbi.nlm.nih.gov/21143265/>

Vehmasto, E. & Kettunen, M. 2018. *Suomalainen Green Care: LuontoHoivan LuontoVoiman laatutyökirja*. Luonnonvarakeskus Terveiden ja hyvinvoinnin laitos Green Care Finland ry 2018. Accessed 31.10.2020. <https://jukuri.luke.fi/bitstream/handle/10024/542460/green-care-tyokirja-2018.pdf?sequence=1&isAllowed=y>

Väyrynen, K. 1996. Kant ja luonnon kunnioitus. p.68. *Luonnon luonto: Filosofisia kirjoituksia luonnon käsitteestä ja kokemisesta*. Kotkavirta, J. (Ed.). SoPhi. Jyväskylän Yliopisto. Accessed 29.10.2020.

<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKewiQstLv7NnsAhVFplsKHWj4CakQFjAAegQIAhAC&url=https%3A%2F%2Fjyx.jyu.fi%2Fdspace%2Fbitstream%2Fhandle%2F123456789%2F44431%2Fluonnon-luonto.pdf&usg=AOvVaw2B3rEDIX1mKswafKBL7G-R>

Warburton, D., Nicol, C. & Bredin, S. 2006. Health benefits of physical activity: the evidence. CMAJ : Canadian Medical Association journal, 174(6), 801-809. Accessed 22.11.2020. <https://doi.org/10.1503/cmaj.051351>

WHO. 22.07.1946. Constitution of the World Health Organization. New York. Accessed 13.10.2020. <https://apps.who.int/gb/bd/PDF/bd47/EN/constitution-en.pdf?ua=1>

WHO. 2020a. "Defining" mental well-being. Promotion of mental well-being. Accessed 29.10.2020. http://origin.searo.who.int/entity/mental_health/promotion-of-mental-well-being/en/

WHO.2020b. Health Promotion. Accessed 04.11.2020. <https://www.who.int/teams/health-promotion/enhanced-wellbeing/first-global-conference>

YLE. 09.12.2019. New daycare pilot encourages more contact with nature. Accessed 15.11.2020. https://yle.fi/uutiset/osasto/news/new_daycare_pilot_encourages_more_contact_with_nature/11109676

Figures

Figure 1: “Relationship between Early Childhood Goals and Nature Connectedness.” (Barrable 2019)	8
Figure 2: The green care umbrella. (Lund, Granerud & Eriksson 2015).....	13
Figure 3: Biodiversity hypothesis (Haahtela 2019)	18
Figure 4: “Several non-communicable diseases have been suggested to share the same underlying risk factors such as microbial imbalance, long-term immune dysfunction and low-grade inflammation.” (Haahtela et al. 2019).....	19
Figure 5: Steps of a literature review (Moll-Willard 2019).....	23
Figure 6: Process of qualitative content analysis (Roller 2019)	33

Tables

Table 1: Inclusion and Exclusion criteria	26
Table 2: Keyword combinations	28
Table 3: Search results in Google Scholar 07.11.2020.....	28
Table 4: Search results in HELDA 07.11.2020.....	29
Table 5: Selected studies.....	30
Table 6: Preparation Phase	34
Table 7: Organization Phase	35
Table 8: Different Steps of Qualitative Content Analysis	37

Appendices

Appendix 1: Original and Plain Quotations.....	58
Appendix 2: “Endocrine disruption and commensal bacteria alteration associated with gaseous and soil PAH contamination among daycare children” (Roslund, Rantala, Oikarinen, Puhakka, Hui, Parajuli, Laitinen, Hyöty, Rantalainen, Sinkkonen & ADELE team 2019)	61
Appendix 3: ”Luonto lähelle ja terveydeksi! (Nature close and for health) - Survey for Finnish Daycare Centers 2014” (Saarinen 2014)	62
Appendix 4: “Biodiversity intervention enhances immune regulation and health-associated commensal microbiota among daycare children” (The ADELE Research Group 2020)	64
Appendix 5: “Luontoaskel hyvinvointiin (Natural steps to well-being)” (THL, SYKE & Luke 2019)	66
Appendix 6: “Greening of Daycare Yards with Biodiverse Materials Affords Well-Being, Play and Environmental Relationships” (Puhakka, Rantala, Roslund, Rajaniemi, Laitinen, Sinkkonen & ADELE Research Group 2019).....	67
Appendix 7: “Preschool group practices and preschool children’s sedentary time: a cross-sectional study in Finland” (Määttä, Lehto, Konttinen, Ray, Sajaniemi, Erkkola & Roos 2019).....	68

Appendix 1: Original and Plain Quotations

Original Quotation	Plain Quotation
<p>“Results demonstrate how the biodiversity intervention promoted or prevented the loss of skin bacterial diversity during the study period, leading to diversities comparable to those in nature-oriented day cares.” (the ADELE Research group 2020)</p>	<p>Skin bacterial diversity enrichment</p>
<p>“A parallel factor was the increased willingness to play with soil and plant materials in the intervention yards, leading to increased voluntary microbial exposure by children.” (the ADELE Research group 2020)</p>	<p>Eagerness to play with natural materials led to microbial exposure</p>
<p>“The dynamic and emotional ways of engaging with the natural environment enhanced the children’s well-being in the daycare centers.” (Puhakka et al. 2019)</p>	<p>Engagement with nature promotes well-being.</p>
<p>“These kinds of positive learning experiences (gained from nature) may have positive impacts on children’s moods.” (Puhakka et al. 2019)</p>	<p>Positive learning experiences improved the mood.</p>
<p>“When the children got used to playing with natural materials, they invented new ways in which to use them, which further expanded their opportunities for creative play and enhancing well-being.” (Puhakka et al. 2019)</p>	<p>Imagination, creative play and enhanced well-being.</p>
<p>“When the children spent active, inspiring time outdoors, they had a good appetite at lunchtime, and slept more deeply during their naps.” (Puhakka et al. 2019)</p>	<p>Good appetite and deep sleep.</p>
<p>“The greenery also increased opportunities for resting and relaxing in the yard.” (Puhakka et al. 2019)</p>	<p>Rest and relaxation.</p>
<p>“The greening of the yards had positive impacts on - the children’s - mood, energy, and motivation in the daycare centers.” (Puhakka et al. 2019)</p>	<p>Positive mood, energy and motivation.</p>
<p>“The natural materials increased and diversified the children’s physical activity in the daycare yards.” (Puhakka et al. 2019)</p>	<p>Increased and diversified physical activity.</p>
<p>“PPAR and adipocytokine signaling pathway decreased with a higher chrysene concentration in the air, which may increase the risk of several diseases by disrupting hormonally mediated processes.” (Roslund et al. 2019)</p>	<p>Increased risk of diseases caused by PAHs.</p>

<p>“The practical and emotional involvement with the green yards enabled the children to become skillful in using the natural environment as a play environment, in both imaginary play and physical activities.” (Puhakka et al. 2019)</p>	<p>Engagement with nature promotes imaginary play and physical activity.</p>
<p>“Results indicate that PAHs accumulating in daycare yard soils induce shifts both in soil and on children’s skin bacterial communities.” (Roslund et al. 2019)</p>	<p>Pollutants in soil affect children’s skin bacteria.</p>
<p>About every fourth child was lacking a weekly contact with dirt and soil. (Saarinen 2014)</p>	<p>Children lacking nature contact in a daycare yard.</p>
<p>When compared daycare centers with and without houseplants there was no difference in children’s morbidity. (Saarinen 2014)</p>	<p>Houseplants don’t affect health.</p>
<p>Children in more urban daycare center environments were sick a bit more often than children in more natural daycare center environments. (Saarinen 2014)</p>	<p>Urban daycare environments unhealthier than more natural daycare environments.</p>
<p>“Green, biodiverse yards were considered safe, and inspired children’s play, diversified their activities, and increased physical activity.” (Puhakka et al. 2019)</p>	<p>Safe green yards promoted and diversified plays, activities and physical activity.</p>
<p>“The greenery offered embodied experiences of nature and provided the children with multi-sensory exploration and diverse learning situations.” (Puhakka et al. 2019)</p>	<p>Green yards as learning environments provide multi-sensory exploration.</p>
<p>“Practical involvement with natural materials enhances children’s exposure to diverse environmental microbiota, which is associated with benefits to the immune system and health.” (Puhakka et al. 2019)</p>	<p>Exposure to nature’s biodiversity, health benefits.</p>
<p>“Only more frequently conducted nature trips were associated with lower children’s ST during preschool hours.” (Määttä et al. 2019)</p>	<p>Nature trips lowered children’s sedentary time.</p>
<p>Playing with natural materials, soil and water in a daycare yard increased children’s nature contacts. (THL et al. 2019)</p>	<p>Natural materials increased nature contacts.</p>
<p>Children enjoy gardening and it has had a positive impact on children’s appetite and eating vegetables. (THL et al. 2019)</p>	<p>Gardening promotes healthy eating.</p>
<p>“Finding leads to a provocative hypothesis that PAHs found from the living environment may alter both</p>	<p>Pollutants in environment affect human bacterial communities.</p>

environmental and commensal bacterial communities.” (Roslund et al. 2019)	
“It is possible to design green yards in a way that increases the diversity and abundance of safe health-associated environmental microbiota.” (Puhakka et al. 2019)	Green yard planning, improved health
“Biodiverse materials may be suitable for daycare yards to balance human-induced disturbances in urban environments.” (Roslund et al. 2019)	Natural materials improving urban daycare environments
“Daycare environments have the potential to affect health.” (Roslund et al. 2019)	Daycare centers improving health
By “modifying the living environment of children with microbiologically diverse natural materials might provide a feasible approach for decreasing the risk of immune-mediated diseases in urban populations.” (the ADELE Research group 2020)	Living environments of children decreasing the risk of immune system diseases.
“The results of the present intervention study support the biodiversity hypothesis” (the ADELE Research group 2020)	Biodiversity hypothesis
Daycare centers have the possibility to maintain and develop children’s relationship with nature since based on the performed survey daycare centers have already good framework for nature-based action. (Saarinen 2014)	Daycare centers support children’s nature relationships
Since forest was preferred over day are yard as a place for play the saving of nearby forests of daycare centers has a growing part in urban planning. (Saarinen 2014)	Urban planning, nearby forests
“Consequently, developing public health strategies that increase nature visits at an early age is relevant.” (Määttä et al. 2019)	Public health strategies including nature visits.

Appendix 2: “Endocrine disruption and commensal bacteria alteration associated with gaseous and soil PAH contamination among daycare children” (Roslund, Rantala, Oikarinen, Puhakka, Hui, Parajuli, Laitinen, Hyöty, Rantalainen, Sinkkonen & ADELE team 2019)

Study implemented by Roslund et al. (2019) examined the risk of endocrine disruption in children in daycare centers. The study group hypothesized that “environmental PAHs in daycare environment affect the relative abundance of health-associated commensal bacteria and alter endocrine signaling pathways” (Roslund et al. 2019). The study was implemented by measuring PAHs from soil and air in eleven urban daycare centres in Finland including 53 children, aged 3-5 years old. The study group evaluated health risks of PHA on children and “observed associations between signaling pathways in endocrine system and gaseous PAH levels in ambient air.”(Roslund et al. 2019) Polycyclic aromatic hydrocarbons (PAHs) are environmental pollutants known to cause different health issues. PAH pollution change the diversity of environmental bacteria which are linked with health outcomes especially in children.

The study concluded that there is a connection between gaseous PAHs and endocrine disruption. Even though Roslund et al. resulted that any direct health risks did not exist they reminded that PAHs can also cause indirect health risks by changing commensal bacteria, and thus the current risk assessments might be insufficient. The study resulted that “PPAR and adipocytokine signaling pathway decreased with a higher chrysene concentration in the air” (Roslund et al. 2019). The decrease can disrupt hormonally mediated processes and thus cause public health problems such as inflammatory disorders. Roslund et al. resulted that PAHs in the air may affect children's endocrine signaling pathways in urban areas and that PAHs in daycare yards' soil change the bacterial communities in soil and children's skin which may lead to imbalanced human microbiota. Roslund et al. concluded that since children spend many hours a day outdoors in daycare center “daycare environments have the potential to affect health.” Roslund et al. suggested that daycare yards should be planned so that they offer possibility for daily exposure to natural materials with high biodiversity and hence balance human-induced disturbances in urban environments.

Roslund, M.I., Rantala, S., Oikarinen, S., Puhakka, R., Hui, N., Parajuli, A., Laitinen, O.H., Hyöty, H., Rantalainen, A-L., Sinkkonen, A. & ADELE team. 2019. Endocrine disruption and commensal bacteria alteration associated with gaseous and soil PAH contamination among daycare children. *Environment International*. 2019 Sep;130:104894. doi: 10.1016/j.envint.2019.06.004. Epub 2019 Jun 18. PMID: 31220749. https://helda.helsinki.fi/bitstream/handle/10138/304306/Endocrinedisruptionandcommensal_bacteria.pdf?sequence=1&isAllowed=y

Appendix 3: "Luonto lähelle ja terveydeksi! (Nature close and for health) - Survey for Finnish Daycare Centers 2014" (Saarinen 2014)

'Luonto lähelle ja terveydeksi!' (Nature close and for health)- a national survey study aimed to find out what kind of settings nature provided to a daycare center, how nearby environment was utilized in daycare center activities and how different nature-based methods were perceived. The survey gained 768 answers from daycare centers across Finland majority of them being from public daycare centers (93 %). Nature was used in various ways in daycare center activities. 24 % of daycare centers had nature groups and the personnel in some daycare centers had received training regarding nature education. Over 90 % of the daycare centers had made trips to nature or collected natural materials. Only two daycare centers responded that they did not have any nature-related action. Most children were lacking the contact with the organic ground surface which is relevant from the perspective of allergy health. Nevertheless, no differences among children's morbidity rate were discovered when compared children who played with dirt or soil with children who did not.

Many daycare centers (70 %) had living houseplants. Even though there was no health related differences between daycare centers with or without houseplants Saarinen concluded that houseplants did not cause health risks on children and that all daycare centers should have houseplants. Most daycare centers did planting but some (10 %) did not do planting at all. Planting was forbidden in one daycare center based on soil including mold. Saarinen claims that this kind of action is far from healthy nature relationship and sees planting as one of the simplest ways to promote children's allergy health. Daycare yards were mainly covered with gravel and only 4 % of the daycare centers did not have any gravel at yard at all. Daycare centers built before 1990 had more grass or natural vegetation in their yards than daycare centers built after 2009. Correspondingly, the newer daycare centers had more asphalt and gravel in their yards than the older daycare centers. The quality of the ground surface did not affect the amount of time children spent in the daycare yard. Children in urban daycare center environments were slightly more often sick. Saarinen concluded that the number of green elements in the daycare yard might affect the morbidity rate, but the overall difference was not remarkable.

In conclusion Saarinen states that there are strong health related reasons to promote children's connection with nature. According to Saarinen children's relationship with nature can be maintained and developed in daycare centers since they already have a good basis for nature-based activities. Saarinen suggests that the hinders of training personnel's nature related skills should be cut and the training should be supported. Also, unnecessary limitations should be removed. The adults' role in enabling children's access to nature is huge and thus, positive approach to nature is important. Since forest was experienced as more positive place to play than a daycare yard the saving of nearby forests in urban planning plays a growing role.

Saarinen, K. 2014. Luonto lähelle ja terveydeksi! Kysely Suomen päiväkodeille 2014. Etelä-Karjalan Allergia- ja Ympäristöinstituutti.
<http://www.allergiaterveys.fi/upload/valtakunnallinen-kysely-2014.pdf>

Appendix 4: “Biodiversity intervention enhances immune regulation and health-associated commensal microbiota among daycare children” (The ADELE Research Group 2020)

The ADELE research group implemented a 28-day intervention study in eleven daycare centers in May to June 2016 in order to test the biodiversity hypothesis. The study included 75 children aged 3-5 years and was implemented in three different kinds of daycare yards (three nonmodified standard yards, four intervention yards with biodiversity enriching elements and three nature-oriented daycare centers including regular visits to nature). The study enriched the environmental biodiversity of urban daycare centers by covering the daycare centers’ yards with forest floor and sod. In the intervention daycare centers children were guided to be in touch with the brought green elements. The intervention included guided activities such as planting plants in boxes, crafting with natural materials as well as playing games in the yard. Children’s gut and skin microbiota, plasma cytokine levels and blood T_{reg} frequencies¹ were measured before and after the intervention. The ADELE research group compared environmental microbiota between the standard and intervention yards. Base on the earlier studies the research group hypothesized that “the biodiversity intervention will affect the commensal microbiota of the children and that a positive change in skin microbial diversity would be associated with enhanced secretion of immunoregulatory cytokines and/or increase in T_{reg} cells after the trial”. The research group assumed the commensal microbiota and immune response of the intervention group to differ from the standard group at the end of the intervention.

¹ Cytokine conducts human immune system and “T_{reg} cells are essential regulators of immune system, with important roles in maintaining self-tolerance as well as tolerance to commensal microbiota, thus preventing autoimmune and chronic inflammatory diseases.” (the ADELE research group 2020.)

The research group compared the differences in the environmental microbial community between standard and intervention yard by collecting surface soil samples in all daycare centers before and after the intervention. The comparison showed that the environmental microbial community was higher and more diverse in the intervention than in standard yards after the intervention. The children in the intervention daycare centers experienced modifications in their gut bacterial community while children in the standard and nature oriented daycare centers had similar gut bacterial community before and after the intervention. Children in the intervention and standard daycare centers had similar bacterial communities in the beginning of the intervention but they slightly differed at the end of intervention. When compared some of the plasma cytokine levels, levels of intervention children increased while levels of children in standard or nature-oriented daycare centers stayed the same.

The research group concluded that the changes in children’s plasma cytokine levels or total T_{reg} cell frequencies were correlated with changes in the skin and gut microbiota which were affected by the enrichment of daycare yard. In conclusion, it is possible to modulate children’s

immune system and possibly decrease the risk of immune-mediated diseases in urban environments by modifying the living environments of urban surroundings so that children are exposed to the environmental biodiversity. The study results are in line with the biodiversity hypothesis as well as previous studies indicating the correlation between immune system markers, living environment, and commensal microbiota. The study group concluded that since the “biodiversity intervention offers embodied experiences of nature and provides multisensory exploration and diverse learning situations” it was possible that the children in intervention daycare centers had more direct contacts with green elements than children in standard daycare centers. The commensal microbiota of children in intervention daycare centers became more similar with the children in nature-oriented daycare centers. Study group suggested that by offering children the possibility to daily contact with green elements in safe surrounding such as daycare center it would be possible to improve children’s health by modifying the immune system. This kind of practice could decrease overactive immune responses which in turn decreases the risk of immune-mediated diseases. The study group named the inability to control the home environments of the children as one of the primary weaknesses of the study.

The ADELE Research Group. 2020. Biodiversity intervention enhances immune regulation and health-associated commensal microbiota among daycare children. *Science Advances*, vol. 6, no. 42, 2578. <https://helda.helsinki.fi/bitstream/handle/10138/320653/eaba2578.full.pdf?sequence=1&isAllowed=y>

Appendix 5: “Luontoaskel hyvinvointiin (Natural steps to well-being)” (THL, SYKE & Luke 2019)

The pilot programme 'Luontoaskel hyvinvointiin' (Natural steps to well-being) launched in cooperation with nine daycare centers, the Finnish Institute for Health and Welfare (THL), the Finnish Environment Institute and the Natural Resources Institute of Finland aimed to promote health and well-being through early childhood education by combining healthy nutrition, nature contacts and circular economy. The programme encouraged children to increase their daily interaction with nature, to eat a more plant-based diet, consider the impact of food waste, and learn about environmental responsibility and sustainability (YLE 2019). The project was executed in nine daycare centers (consisting of trial and comparison daycare centers) participating children aged 4-5 years. The project was implemented by creating an operating model for early childhood education personnel. Through changes in approaches and behaviour, the project aimed to decrease the risks on health and well-being caused by urbanization. The promotion of environmental knowledge in daycare centers and homes as well as the development of the municipal collaboration regarding the environmental work were targets of the project. Food waste was measured during the project. Electronic survey was implemented twice by parents, early childhood education personnel and food supply staff in order to gain understanding around behaviour, attitudes and observations during the project.

Early childhood education personnel's approach to children's eating, nearby environment, hand hygiene, contact with soil and dirt caused by natural material and playing in dirt changed. Still, some of the nature contacts were not taken into action due to lack of time, planning and collaboration between different stakeholders. For example, modern yard planning implemented in daycare centers hindered bringing natural green elements to daycare environment. Many daycare centers suggested that the future yard designing should promote children's health and well-being. Children's contact with nature were increased by gardening and enjoying the harvest. Some daycare centers increased the amount of forest visits and some succeeded in prolonging the visit with help of packed lunch. Children were encouraged to play with the natural material such as soil. Some daycare centers allowed pets visiting the daycare center or visited places with animals. According to trial daycare centers the nature steps were enjoyable both to children and staff. Children enjoyed especially cooking and gardening and nature steps had a positive impact on children eating more vegetables.

THL, SYKE & Luke. 12/2019. Luontoaskel hyvinvointiin.
https://www.julkari.fi/bitstream/handle/10024/138943/Luontoaskel_hyvinvointiin_raportti.pdf?sequence=1&isAllowed=y

Appendix 6: “Greening of Daycare Yards with Biodiverse Materials Affords Well-Being, Play and Environmental Relationships” (Puhakka, Rantala, Roslund, Rajaniemi, Laitinen, Sinkkonen & ADELE Research Group 2019)

Research implemented by Puhakka et.al. (2019) studied “whether simultaneously increasing biodiversity exposure and greening urban daycare yards affects 3-5 years-old children’s physical activity and play, their environmental relationships, and their perceived well-being in the urban environment in Finland”. The study was implemented in 13 groups in six daycare centers located in urban areas in southern Finland and included the greening of daycare yards as well as guided teacher-led activities and free play. Green yards inspired children’s play, increased and diversified their physical activity, provided embodied experiences and exposed children to nature’s biodiversity. Opportunities for resting and relaxing in the yard increased together with the greenery. Reading/multi-sensory sessions and picnics were organised outdoors. “The greening of the yards had positive impacts on both the children’s and adults’ mood, energy, and motivation in the daycare centers.” (Puhakka et al. 2019) A good appetite at lunchtime and the increased amount of deep sleep during the nap time were noticed during the study. The green materials activated the use of imagination and enabled more creative plays. Children did arts and crafts with natural materials and involved in gardening. Some employees experienced that the sense of community improved with the green yards

The green yards provided children a platform for exploration and diverse learning experiences. Children naturally observed the greenery. Children’s questions and observations acted as a starting points for learning and teaching situations including mathematics and the use of technology. For some children, the trips to forests organized in the daycare center were their only daily connection with nature. Puhakka et.al. resulted that “the dynamic and emotional ways of engaging with nature enhance children’s well-being in daycare centers”. Study resulted that green daycare yards can be used as working tools in early childhood education since by utilizing natural materials in different activities different pedagogical goals can be achieved. Diverse green space supported children’s free play. The increased feeling of safety was shown in increased courage to climb or swing in the green yards. Also, practical skills of acting and being in nature developed in the green yards. Puhakka et.al. concluded that microbial diversity should be taken into account in playground designing since play seemed to increase children’s nature contacts. Puhakka et.al recognised that the current safety regulations and factors such as budget influence the designing of daycare yards producing less challenging and interesting environments for children. The study resulted that According to Puhakka et al. the greening of playgrounds should be considered as an investment in children’s health.

Puhakka, R., Rantala, O., Roslund, M. I., Rajaniemi, J., Laitinen, O. H., Sinkkonen, A., & ADELE Research Group. 2019. Greening of Daycare Yards with Biodiverse Materials Affords Well-Being, Play and Environmental Relationships. *International journal of environmental research and public health*, 16(16), 2948. <https://helda.helsinki.fi/bitstream/handle/10138/304845/ijerph-16-02948.pdf?sequence=1&isAllowed=y>

Appendix 7: “Preschool group practices and preschool children’s sedentary time: a cross-sectional study in Finland” (Määttä, Lehto, Konttinen, Ray, Sajaniemi, Erkkola & Roos 2019)

A study implemented by Määttä et al. (2019) aimed to explore “if the weekly routines in preschool and if more frequent visits in places encouraging physical activity (PA) are associated with children’s ST (sedentary time) during preschool hours”. Sedentary behaviour (SB) refers to waking behaviour which requires only little energy such as a sitting, reclining or lying. Sedentary time (ST) refers to time spent in sedentary behaviours. The study was implemented in 66 daycare centers in Finland and included 159 daycare groups and participated 864 children aged 3-6 years old. The study was implemented by children wearing hip-worn accelerometer specific time periods during the preschool hours.

As a result, “only more frequently conducted nature trips were associated with lower children’s ST during preschool. No other significant associations were found between preschool group practices and children’s ST.” (Määttä et al. 2019.) Thus, the study group concluded that regular nature trips in daycare centers “may be important due to its association with lower preschool children’s ST.” According to Määttä et.al. the possible reason behind nature settings lowering ST levels is nature challenging children in different ways. Nature environments do not invite children to sit but rather encourages to open movement and flexibility. Correspondingly daycare yards may not challenge children enough and might become boring when visited often. Also, playground equipment only encourage specific kind of movement and in some cases rarely moving at all such as sandboxes and swings. Määttä et.al. noticed that nature encouraged all children to creativity and exploration regardless personal characteristics such as age. In conclusion Määttä et al. suggested that public health strategies should be developed to increase nature visits in early childhood.

Määttä, S., Lehto, R., Konttinen, H., Ray, C., Sajaniemi, N., Erkkola, M. & Roos, E. 2019. Preschool group practices and preschool children’s sedentary time: a cross-sectional study in Finland. *BMJ Open* 2019;9:e032210. <https://bmjopen.bmj.com/content/bmjopen/9/12/e032210.full.pdf>