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Outdoor Education as an Alternative and Complementary Pedagogy – Acknowledging the nature of children

Thesis for the degree of Philosophiae Doctor

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To Lars Magnus, Ingunn Anita, Maria Kristine and Arne Kristian

Abstract

The aim of this study was to explore whether outdoor education as an alternative and complementary pedagogy could contribute to holistic learning and safeguard healthy development for the children involved. The main focus has been on behavioral regulation, physical activity, communication and the emotional state of the pupils, but additional variables such as increased learning in academic situations, pupils' well-being, and experiences with different school activities have also been taken into account.

One study was conducted at a single school. The participants were 31 fifth graders who were accustomed to outdoor education. Data collection involved both quantifiable and qualitative observations from indoor and outdoor educational settings, as well as both open-ended and structured interviews with the children.

The results from the open-ended interviews revealed that outdoor education created possibilities for new types of behavior, decreasing the demand for action regulation. The experiences gained from outdoor education also gave children practical knowledge, which they could then apply to a variety of topics in their academic curriculum. Results from the observation study showed that all children received some positive effects from outdoor education, and that it had a greater affect on the children with more frequently agitating behavior than on the children who demonstrated only a small amount or none of this behavior.

The differences in behavior during indoor and outdoor education were most apparent when comparing teaching time; during their leisure time the differences were not as clear. The results of the structured interviews indicated a high degree of well-being occurred both during indoor and outdoor education. In looking at high and reduced well-being, the children with reading disabilities differed from the rest of the pupils in that they were more likely to feel a lack of mastering during indoor education. Even though this study was conducted in only one school, the findings and the theoretical descriptions give some indications of the positive outcomes that are possible when using outdoor education as an alternative and complementary method in schools. The results are mostly focused on the healthy development of children and providing access to more holistic learning; therefore there is no conclusive data on the benefits of outdoor education on academic achievement. Nevertheless, the positive results found in this study suggest that offering both indoor and outdoor education may also affect academic learning.

Norsk sammendrag

Hensikten med denne studien har vært å studere og belyse hvorvidt uteskole som en alternativ og komplementerende pedagogikk kan bidra til å gi elevene en helhetlig læring og en positiv utvikling. Hovedfokuset har vært på adferdsregulering, fysisk aktivitet, kommunikasjon og emosjon, som i denne sammenhengen er sett som en del av en helhetlig læring og en sunn utvikling. Det har også blitt fokusert litt på andre variabler, slik som oppnåelse av kunnskap innenfor akademiske emner, elevenes velvære og elevenes erfaringer fra ulike situasjoner i skolen.

Det ble gjennomført en studie på en skole. De 31 femteklassingene som deltok i studien var vant til å ha uteskole. Datainnsamlinga innebar både kvantifiserbare og kvalitative observasjoner fra uteskole og fra tradisjonell undervisning i skolebygget. Det ble også gjennomført både strukturerte og åpne intervjuer med elevene.

Resultatene fra de åpne intervjuene viser at uteskole gir muligheter til allsidig aktivitet, noe som minsker kravene til adferdsregulering. Erfaringene fra uteskolen gir også elevene kunnskap på mange områder, noe som kan relateres til akademiske læremål. Resultatene fra observasjonene viser at alle elvene har noen positive effekter av uteskole, og at de elevene som ofte viser agiterende adferd, har større effekt av uteskole sammenlignet med de elevene som i utgangspunktet har ubetydelige mengder av slik adferd. Adferdsforskjellene er mest framtredende når undervisningstiden sammenlignes. Når observasjonene fra fritida på uteskole og tradisjonell skole sammenlignes, er ikke forskjellene så fremtredende. De strukturerte intervjuene viser en høy grad av trivsel i både uteskole og tradisjonell skole. Når elevene skal forklare hvorfor de trives eller hvorfor de opplever en reduksjon i trivselen, så skiller elevene med ulike former for lesevansker seg ut. De føler oftere en mangel på mestring i løpet av dagene med tradisjonell skoleundervisning.

Selv om vi må være bevisst på at denne studien bare er utført på en skole, så kan disse funnene sammen med den teoretiske utredningen gi noen indikasjoner om at uteskole som en alternativ og komplementerende pedagogikk, kan ha noen fordeler. Effektene er størst med hensyn til elevenes positive utvikling og helhetlige utvikling, mens det ikke er mulig å gjøre konklusjoner med hensyn til fordeler innenfor akademisk læring. En positiv utvikling og en helhetlig læring, vil imidlertid kunne ha en indirekte effekt på akademisk læring.

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The paper upon which this thesis is based:

Article 1: Fiskum, Tove Anita & Jacobsen, Karl (2012): Outdoor education gives fewer demands for action regulation and an increased variability of affordances. *Journal of Adventure Education & Outdoor Learning,* 1-24

Article 2: Fiskum, Tove Anita & Jacobsen, Karl (2012): Individual Differences and Possible Effects from Outdoor Education: Long Time and Short Time Benefits. *World Journal of Education*, 2(4), 20-33

Article 3: Fiskum, Tove Anita & Jacobsen, Karl (2012): Relation Between the School Environment and the Children's Behaviour. *The Open Education Journal*, 5, 39-51

Article 4: Fiskum, Tove Anita & Jacobsen, Karl (submitted): How Outdoor Education Affects Children with Reading Disabilities.

Introduction

> Nature has not adapted the young animal to the narrow desk, the crowded curriculum, the silent absorption of complicated facts. His very life and growth depend upon motion, yet the school forces him into a cramped position for hours at a time, so that the teacher may be sure he is listening or studying books. (Dewey & Dewey, 1915, page 18 and 19)

This citation represents a school that is not based on children's inherent needs or natures. When John Dewey wrote this with his daughter, Evelyn, about one hundred years ago, he could not have been aware that society would develop in the opposite direction, increasing the time spent in cramped positions in schools that had not developed in the way he suggested. How is it possible for schools to let all children develop their potential within academic topics, social skills, emotional skills, practical skills, motor skills and cultivate a positive self-image, while at the same time being aware of the human dignity in every child? There is no single answer to this question and researchers, pedagogues, and psychologists, will probably never be able to come to an agreement about what is most important. Although the possible ways of approaching this question are many, outdoor education is one of the potential ways of dealing with the challenge.

In this thesis, outdoor education is explored as an alternative and complementary method for acknowledging the nature of children. It is important to highlight that outdoor education is not discussed as the only teaching method in schools, but as a method used occasionally, for example, once or twice a week or once every second week. In this thesis I am not going to describe how to teach in outdoor educational settings, but as a result of my findings I hope the reader will see the potential in using cross-curricular topics, both during teaching time and during free activities. I also hope the reader will gain new insights about ways to acknowledge the whole child, recognizing that outdoor education is a possible method to meet every child's inherent needs, thereby contributing to positive development in his or her childhood.

The main question for this thesis will be:

May outdoor education as an alternative and complementary pedagogy together with classroom teaching contribute to a holistic learning and safeguard a healthy education and development for the children?

The questions for the sub-project in the thesis are:

Article 1: Outdoor education gives fewer demands for action regulation and an increased variability of affordances.

Children have a lot of action instigator during the day. Sitting in the classroom demands a lot of action regulation. The questions in article 1 are:

1: Do the children experience fewer demands for action regulation as well as an increased variability of affordances in outdoor education?

2: Do the children's activities in outdoor education give them useful experiences that produce more effective academic learning?

When learning in this way, the outdoor education experiences can have a direct impact on learning. A reduction in the demands of action regulation can contribute to a healthy education and development while at the same time having an indirect impact on academic learning.

Article 2: Individual Differences and Possible Effects from Outdoor Education: Long Time and Short Time Benefits.

Learning can also be indirectly affected by altering the learning environment and the learning conditions. Better learning conditions, more activity and engagement, and less misbehavior to correct can contribute to a well-rounded education and healthy physical, emotional, and social development for everyone. The question in article 2 is:

Do the variations in learning conditions have general positive effects for most children, for only a small group of children at risk, or for no one?

Article 3: Relationship Between the School Environment and the Children's Behavior.

To ensure a good learning environment, a holistic approach to learning, and healthy development for the children at school, the situations or environments that increase wanted and decrease unwanted behavior should be identified.

1: Are there any differences between the days designated for outdoor education vs. those designated for indoor education in terms of children's behavior, such as physical activity, verbal and motor agitation, communication or emotions?

2: Is the observed behavior of the children during indoor and outdoor education most influenced by the environment the children are in or whether or not it is teaching time or

free time?

Article 4: How Outdoor Education Affects Children with Reading Disabilities.

Children are more likely to learn when they do not have feelings of dislike and inadequacy, which better insures healthy development.

1: Do the children with reading disabilities possess different patterns in their reporting of well-being in different school situations?

2: What differences do the children with reading disabilities display when going from indoor education to outdoor education?

Defining outdoor education

> Outdoor education is a way of teaching where parts of the day are spent in the local environment. Outdoor education involves regular activities outside the classroom, giving pupils the chance to use all their senses and to create personal experiences in the real world. This way of working provides new opportunities for academic activities, spontaneous display and play, curiosity, fantasy, experiences and social activities. (Jordet, 1998, page 24, my translation)

Outdoor education can take place anywhere, and offers children a variety of possibilities to meet the real world. In this thesis, however, the main focus is on outdoor education in the local natural environment. Naturally, the theories and research that explore the benefits of meeting the real world, hands-on learning, and experimental learning in different locations are the foundation upon which my project was built. In addition, direct contact with nature and how the natural environment might have a specific impact on behavior, thoughts, and feelings was taken into consideration.

Research on outdoor education is not new. In Norway the school curriculum has stressed the importance of this idea about using the local environment in teaching almost since the first Norwegian curriculum guidelines were created in 1939 (Jordet, 2010, page 13). Still, there is not much research about this form of teaching in Norway (for example these doctoral thesis; Jordet, 2007; Munkebye, 2012) or in other Scandinavian countries (for example these doctoral thesis; Bentsen, 2010; Hyllested, 2007; Mygind, 2005). Even though we in the Scandinavian countries have the benefit of public right of access, bringing the pupils outside the school buildings is not a Scandinavian phenomenon. There is an older tradition for both outdoor education and research in Great Britain, and in an article Cooper writes that Britain, in 1999, had the most extensive systems of outdoor education centers in the world (Cooper, 1999)provided by local authorities, voluntary organizations or commercial organizations. He states that in 1999 Britain had more than 1200 day and residential centers, and estimated that 2-3 million young people took part in programs at those centers each year. In the UK outdoor education grew substantially after the Second World War through the end of the 1960s. The postwar society represented a rich seedbed for sowing new ideas about education (Nicol, 2002a, 2002b). There is research in other countries, indicating a tradition with outdoor education as well. In the USA (Alexander, North, & Hendren, 1995; Bixler, Carlisle, Hammitt, & Floyd, 1994), Canada (Bixler et al., 1994; Dyment, 2005), New Zealand (Davidson, 2001), and Australia *(Ballantyne & Packer, 2009).* In the USA, Canada, New Zealand, and Australia, outdoor education has blossomed. Spain's involvement in outdoor education began in 1950 with the

phenomenon they call Environmental learning (Aleixandre & Rodriguez, 2001). However, the actual amount of research directly related to outdoor education is neither excessive nor impressive, and there are many additional variables that need consideration including the affect on academic learning, personality, physical and psychological health, and social skills. The impact of the teaching methods used in outdoor education should also be explored.

Identifying the need for an alternative and complementary way of working at school

Both at school and in society children's learning has gradually changed from practical learning in a situation, to a condition where there is an increasing distance between the topic they are supposed to learn and their real lives. This learning out-of-context can reduce motivation, especially in children who have not personally experienced the positive results of reading and writing, e.g. having been read to (Bjorklund & Bering, 2002).

The school condition has traditionally demanded that children stay physically inactive, learning by listening and reading. This is not anything new. What is new is the increased time spent in school; children are getting fewer real-life experiences because of less time spent outside playing and less time spent working on practical tasks with the family or in the neighborhood (Jordet, 1998, chapter 3; Tiller & Tiller, 2002).

Another change in childhood today is that the children are more and more segregated from the life and work of adults, even during time away from school (Zeiher, 2001). Playing outdoors in the local environment near their homes is no longer normal behavior. Children instead are staying indoors in before and after school care, participating in organized activities and/or with computer or internet usage in the late afternoons and evenings (Skar & Krogh, 2009). This makes children less familiar with the local outdoor environment. No longer do they play with siblings in their local neighborhoods or, when older, gaining familiarity with a wider environment on a bicycle. Today children are transported from one activity to another by car. Zeiher (2001) calls this an insularization of childhood. With this insularization, although children are less familiar with the nearby environment and the life there, they may be perfectly familiar with the social life, and the structure of the environment where they are practicing a sport or playing an instrument. This gives children a lack of wholeness their world. Their knowledge about their local environment and its life is not as a whole but as isolated islands. The same can be said about the social life; they choose leisure time activities and friends that share their interests (ibid) regardless of where they are. The children are, as a consequence staying in

relatively homogenous groups in their leisure time, compared to children playing with other children in the neighborhood.

Children are also spending less of their leisure time outdoors(Skår et al., 2014), and the concept of Nature-Deficit-Disorder (a lack of connections and relationships to the nature around us) (Driessnack, 2009; Louv, 2006) is an increasing problem. When we are raising a generation of children without meaningful contact with the natural world (Louv, 2006) the academic topics in school will be far removed from their real life or their personal experiences. This is not the way children have always learned, nor the way the evolved child learns and concentrates best (Bjorklund & Bering, 2002), and research has shown non-beneficial results from this lack of contact with nature, for example, children who are afraid of meeting movie-monsters in the forest (Bixler et al., 1994). An Argentinean study exploring children's familiarity with different species (C. M. Campos et al., 2012), discovered that they were most familiar with exotic animals and plants, as well as those found in the rest of the world such as pets, ornamental plants, and fascinating mammals. They were much less familiar with their local plants and animals. A study from England and USA illustrated that children's knowledge about plants and animals varies. It also found that children are in touch with their home environment to a varying extent, and that rich experiences might contribute to better overall knowledge (Patrick & Tunnicliffe, 2011). A study from Finland also showed that Finish children are in danger of losing their direct contact with the natural environment (Laaksoharju & Rappe, 2010). The authors suggest that a horticultural intervention could be an effective starting point for increasing their knowledge, affection for and interests about plants and nature: they also highlight the positive affect of outdoor learning. Finally, a Norwegian study with adults found that fear and insecurity were two factors that influenced whether or not they were comfortable in the forest (Skar, 2010).

This increasing gap between real life and the academic curriculum as well as the lack of a well-rounded childhood, may be two of the causes for the increasing amount of dropouts from Upper Secondary Education, which is quite high in Norway (Statistisk Sentralbyrå, 2012), although other earlier factors may play a role (The Royal Ministry of Education Research and Church Affairs, 2007/2008).

The structural and functional nature of children

Biologically, we are not supposed to sit, listen, and learn during an entire day in school, only to be followed by more sitting to watch television or videos, use personal computers, play digital games for a variable amount of time, and maybe do some homework (D. Bailey, 2000; Bjorklund & Bering, 2002). Setting out to change trends in society may be an overly optimistic goal, so changing learning

conditions in schools to benefit to our children may be a better place to start. There is a lack of evolutionary perspective when we assume that a child has some neurological disease because he or she is not able to be attentive in the modern classroom for a considerable amount of time: our Stone Age bodies are not well suited to modern schooling. Short attention spans and high levels of activity may have promoted survival in the many generations where we were hunters, gatherers and needed to avoid predators (Carey, 1992). Our inherent human need for physical activity and schools' discouragement of it can could be a simple explanation for disruptive behavior in school (Bjorklund & Bering, 2002).

Some studies highlight the fact that laughter, mirth and play, especially rough and tumble play, are things all mammals need. Perhaps, therefore, they might also prevent troubled behavior in the classroom (Panksepp, 1998, 2007; Panksepp & Burgdorf, 2003; Panksepp, Burgdorf, Turner, & Gordon, 2003). During play, especially the rough-and-tumble play, our emotions cause us to act in instinctual ways, and our actions have to be regulated by the frontal cortex. Since activities like rough.-and-tumble play instigate a lot of instinctual actions, this type of activity therefore contribute to the development of the executive function in the brain, a function which is deficient in all children, and perhaps even more deficient for a group of children at risk, e.g. the children liable for getting an ADHD diagnosis (Panksepp, 1998; Panksepp et al., 2003). This is not only important for reducing troubled behavior, but also important for the children's health and happiness, since there it is both an innate biological need and part of our ancient tradition(Panksepp, 1998; Panksepp & Burgdorf, 2003). Returning to the children what they had and what they need for their development has also been explored through looking at children's risky play; children need a challenging place to play i.e. to prevent anxiety later in life (Sandseter & Kennair, 2011). The natural environment gives different affordances towards risky play compared with a man-made environment (Sandseter, 2009). From an evolutionary developmental psychology perspective, the child will learn better in a "natural" environment, because their intellectual abilities are well suited for problem solving, a trait juveniles have had since the early days of our species. Their cognitive systems are therefore poorly adapted to the formal classroom and especially teacher directed instruction (Bjorklund & Bering, 2002).

Individuality in school

Everyone is unique. We each have a physical body and we each have our own unique experiences that form how we think, how we react in different situations, and our varied interests. Pupils also learn in different ways and have different background knowledge that contributes to that learning. Some pupils have learning difficulties in one or more subjects, which may impacts their learning,

well-being and behavior at school. The four categories, gender, the occurrence or non occurrence of learning disabilities, temperamental theory, and Apter`s Reversal Theory are the focus of this thesis.

Gender

There are a lot of psychological, sociological and physiological differences between boys and girls. This thesis, however, is most concerned with whether or not there are differences in preferred activities, something that in turn can have an impact on the amount of action regulation needed to adjust behavior to become suitable in each situation at school. Many studies found a higher level of physical activity among boys (Harten, Olds, & Dollman, 2008; Haug, Torsheim, Sallis, & Samdal, 2008; Lopes, Vasques, & de Oliveira Pereira, 2006; Nyberg, Nordenfelt, Ekelund, & Marcus, 2009; Waring, Warburton, & Coy, 2007), or gender differences in type of activities chosen. For example, Harten, Olds and Dollmann (2008) found that boys were more likely to participate in games involving gross motor skills and that the girls were more likely to play in smaller places. The boys also tended to be more competitive and aggressive than girls, and the girls tended to cooperate and take turns. Blatchford, Baines and Pellegrini (2003) concluded that boys spent more time in ball-games, while girls rather spent more time in conversations, sedentary play, as well as jump-skipping, and verbal games. This study also revealed a difference in the children's fantasy-play: boys' involved rough-and-tumble activities, while the girls' was more sedentary. The authors suggest this difference is caused by the boys' primary focus on the activity and the girls' primary focus on coming together and to socialize.

This difference in activity preferences may lead to different outcomes in outdoor education. A Swedish study was able to conclude that boys had a significantly higher effect from outdoor education related to their mental health (Gustafsson, Szczepanski, Nelson, & Gustafsson, 2012) than girls.

Researchers view the differences between boys and girls in many different ways but whether these differences are mostly inherent or as result of socialization is not a topic explored in this thesis.

Learning disabilities

Learning disability may occur in different forms and have impact on learning in one or more academic subjects in school. Different kinds of learning disabilities and their causes are not discussed or described in this thesis. The focus of this thesis is on children's well-being and feelings of mastery, or the stress of not mastering in school situations, as well as the observational behavioral pattern related to well-being. The children with learning disabilities in this study all receive special education

lessons in reading. Since each kind of learning disability lends itself to shortcomings in some academic areas in school, this group of children's responses and behavior also includes examination of unfavorable feelings of self-worth (Harter, Whitesell, & Junkin, 1998), or whether they think of themselves as different, inferior or stupid (Ingesson, 2007). Studies have shown that children with learning disabilities are more likely to show internalized problem behavior (Arnold et al., 2005; Casey, Levy, Brown, & Brooksgunn, 1992; Heiervang, Stevenson, Lund, & Hugdahl, 2001; Moilanen, Shaw, & Maxwell, 2010; Mugnaini, Lassi, La Malfa, & Albertini, 2009; Nelson & Harwood, 2011; Yu, Buka, McCormick, Fitzmaurice, & Indurkhya, 2006) and externalizing problem behavior (Heiervang et al., 2001; Moilanen et al., 2010). This group of children can also be at risk for developing social maladjustments (Bauminger & Kimhi-Kind, 2008; Mavroveli & Sanchez-Ruiz, 2011).

Temperament

Temperament is a concept used to explore, investigate or understand individual differences, for example, looking at various interventions in schools (Keogh, 1982a, 1982b). There are several different theories about temperament, all of which embrace the same concepts. Thomas and Chess' theory is the first to use temperament traits as a concept of individuality (Shiner, 1998), defined after a longitudinal study of 100 children and their families in New York. They needed a way to explain the inherent individuality of the children for some of the parents. They described nine dimensions; activity level, adaptability, approach/withdrawal, distractibility, intensity of response, persistence, quality of mood, rhythmicity, and threshold of response. When combining these dimensions they found three main groups of personalities; the easy temperament, the difficult temperament, and the slow-to-warm-up child (Chess & Thomas, 1996; A. Thomas & Chess, 1977). Later, a fourth group of children that did not fit exactly into one of the three main groups was defined as the group with mixed temperament (Hirshfeld-Becker et al., 2003). The theory of temperament can be used as a tool to assess different needs for adaptations in school, and the nine different dimensions as a tool to understand different ways to insure healthy development.

For children at school the trait of rhythmicity is less visible and less important. This trait is therefore excluded in the Teacher Temperament Questionnaire (Keogh, Pullis, & Cadwell, 1982).

The eight dimensions as applied to school children

There are eight dimensions from the Temperamental theory, which have impact on the behavior for children at school; *activity, mood, persistence, distractibility, approach, adaptability, threshold* and *intensity*. The *activity* dimension says something about whether the child can sit still, easily gets

restless and/or leaves his or her seat. When compared with other children, the child's ability to sit quite for a reasonable amount of time, says something about the *activity* dimension. A child with a high score in the *mood* dimension would likely feel comfortable with other children. This child is also seldom arguing when playing with other children and is able to avoid getting upset if he cannot get what he wants. A child with a high degree of *persistence* will usually be able to retain the same activity if being interrupted; he will also in most situations be able to work for a long time with one activity and finish the activity he has started. If the child has a high degree of *distractibility* he is easily drawn away from his work. If there is excess noise in the classroom, he will also easily get distracted (A. Thomas & Chess, 1977).

The dimension of *approach* tells us something about how the child responds to a new activity. Does he try the activity, avoid it, or just watch in the beginning. How does he behave when meeting new children? Closely related to the *approach* dimension is the dimension of *adaptability.* This dimension says something about how the child responds to new environment and new situations, and if the child hesitates, how long he hesitates. The *threshold* dimension says something about the child's sensitivity to temperatures, brightness, and dimness in the environment, while the *intensity* dimension says something about how the child reacts when confronted with positive or negative emotions (A. Thomas & Chess, 1977).

Goodness of fit

> Goodness of fit results when the properties of the environment and its expectations and demands are in accord with the organism`s own capacities, characteristics, and style of behaving. When this consonance between organism and environment is present, optimal development in a progressive direction is possible. … Goodness of fit is never an abstraction, but is always goodness of fit in terms of the values and demands of a given culture or socioeconomic group. (A. Thomas & Chess, 1977, pp. 11-12)

If we are not able to help a child into the state of *goodness of fit*, then a discrepancy and dissonance between the demands and opportunities of a child's environment, and a child's own capacities will occur. If that occurs, we are bringing the child into a condition of *poorness of fit*, which is not beneficial for the child's development (A. Thomas & Chess, 1977). If we increase the probability of bringing a child into a *goodness of fit* condition, we need to not only understand the general psychological development stage for the age of the child but also something about the individual; their behavior, motivation, temperament, cognitive level, and special talents (Chess & Thomas,

1999). This *goodness of fit* concept is therefore a reminder that not only the variations within temperament are important in a school environment, but also the individuality of each pupil.

In their book about clinical implications on *goodness of fit*, Chess and Thomas (1999) highlight the importance of bringing people into the *goodness of fit* condition, thereby give them a positive outlook on life. They look at *poorness of fit* not only as the opposite of *goodness of fit*, but also as a condition which has the potential for pathogenic consequences.

The Reversal Theory

The Reversal Theory (Apter, 1984, 1989, 1997, 2001; Apter, Cowles, & Kerr, 1988) is both a theory that explains *intraindividual differences*, or differences within an individual, and *interindividual differences*, or differences between individuals. This theory is dealing with metamotivation, motivation and human experiences. Changes might occur in metamotivation as well as in motivation, but changes in the metamotivational level are often more abrupt. A change in metamotivational states results in different motivation behind the action as well as different satisfaction from the experience. As the reversal process is affected by the situations we experience, the metamotivational states should be unstable. To remain in the same state for a long time when situations changes, is seen as unhealthy.

The Reversal Theory consists of four metamotivational states and each state consists of a metamotivational pair. The first state, which is the most important for this thesis, is about how we look at the means and ends of our actions. In this state we can be either in the *telic state* or in the *paratelic state* of mind. If we are in the *telic state*, the end result of an action is the main goal. In this state we are motivated by our actions because they will affect a goal that may be far into the future. In the *paratelic state*, we are more playful and our actions must have meaning while we are doing them (Apter, 2001).

The second metamotivational state, *the conformist-negativist pair*, deals with how we interpret the rules and expectations that are applied to each of us. In the third state, *the mastery-sympathy pair*, we are dealing with the world in one of two ways, either as a form of competition, with a need to master people, objects or tasks, or as a place full of possibilities for cooperation, sensibility, and tenderness. In the fourth state, *the autic-alloic pair*, we experience relationships to other people, objects, or situations. In the *autic state*, we are self-oriented, while we are other-oriented in the *alloic state* of mind (Apter, 2001).

Contingent events, frustration, and satiation can cause a shift from one side of a metamotivational pair to the other. The possibility of responding differently in different situations makes this theory suitable when exploring intraindividual differences. We have, for example, different areas that are likely to frustrate us and different situations we are more easily satiated within. Some people switch back and forth from one side of a metamotivational pair to another more frequently, while others might often experience the same state over longer periods of time (Apter, 2001). The probability for reversal is unique to each person. This shifting in a metamotivational pair makes this theory also suitable for examining interindividual differences, or the individuality of each individual, and allows for 16 different combinations of dominant states, which can then be assigned different personality categories. Even though it is normal for a healthy person to switch from one side of a metamotivational pair to the other during the day, there is a tendency that each person will spend more time on one side of the pair (Apter, 2001; Boekaerts, Hendriksen, & Michels, 1988). This is their dominant side.

Mastering and motivation

Motivation can be seen as a force that energizes and directs behavior (Deci & Ryan, 1985, chapter 1), such as the basic human need to achieve. When this happens, we feel a sense of mastering (Maslow, 1987).

The school is the primary unfamiliar socializing agent for children, contributing to the shaping of their self-esteem, coping capacities, social development, and personal values. The motivational strategies at school therefore need to have a positive impact on these broader and perhaps even more important areas of development, and not strategies focused on improving academic subjects (Deci & Ryan, 1985, chapter 9).

Pupil's learning in school relies both on intrinsic and extrinsic motivation, intrinsic motivation being the most important.

> Intrinsic motivation is based in the innate, organismic needs for competence and self-determination. It energizes a wide variety of behaviors and psychological processes for which the primary rewards are the experiences of effectance and autonomy. … The intrinsic needs for competence and self-determination motivate an ongoing process of seeking and attempting to conquer optimal challenges. (Deci & Ryan, 1985, page 32)

Extrinsic motivation is motivation coming from outside the individual. The positive or negative rewards energize the work or regulate the behavior, for example, getting good results, receiving a

prize, or avoiding punishment (Deci & Ryan, 1985, chapter 3 and 9). Extrinsic motivation is sometimes a necessity at school, and is positive complementary motivation to intrinsic motivation (Deci & Ryan, 1985, chapter 9).

Perceived competence and degree of motivation are also interconnected (Harter & Jackson, 1992). These connections are supported by the research of Deci and Ryan (1985, chapter 9) which indicates that people seek challenges that are suited to their competencies: when people find optimal challenges, they work persistently to solve them. As a consequence Deci and Ryan (ibid.) state that both the need for competence and the need for self-determination are important when we will strive to involve successfully problem solving and working with optimal challenges. In this motivational state, a person is within the phase of flow, which is the optimal type of motivation, and is intrinsically motivated. In this state, a person is not bored nor feeling the stress of not mastering and the challenges are suitable for the person's skills (Csikszentmihalyi, 2000; Csikszentmihalyi & Csikszentmihalyi, 1975). A feeling of flow means that a person understands clearly what should be done and usually gets some immediate positive feedback about their performance. There is also a greater chance of success because the task is appropriate for the person's skill level. Being in the flow means the person is in a state-of-mind where irrelevant stimuli and concerns do not affect the performance of the task (Csikszentmihalyi & Rathunde, 1993).

A metamotivational theory such as the Reversal Theory (for example Apter, 2001), is more than just the motivation itself. If, for example, a pupil shows motivation to work with exercises in mathematics, we can see that there is motivation there. What the Reversal Theory then does is to explore what is behind the motivation. If the child is motivated to do the exercises because they are really inspiring him or bringing him into some kind of flow, then he is in a state of mind which the Reversal Theory calls the *paratelic state,* which is compatible with intrinsic motivation. If the child is instead motivated because he knows it is important to understand this concept in mathematics, believing that if he gets good grades it may later lead to a good job he is, according to the Reversal Theory, in the telic state of mind, which can be compared to extrinsic motivation.

Learning in outdoor education

We must fulfill three criteria if we are to call a process learning: behavioral change or change in the capacity for behavior, endurance over time, and that the process occurs through practice or other forms of experience, and is not merely caused by maturation or aging (Schunk, 1996).

The criterion *behavioral change or a change in the capacity for behavior* (for example, the adapting of knowledge or beliefs), means that we learn to do something differently from the way we have

done it before, developing new actions or modifying our existing behavior. The second criterion, endurance over time, is debatable, because learning can be forgotten after a short period of time. It also excludes a change that is brought about by a temporary factor such as illness or fatigue. The third criterion means that the changes which occur shall be caused through practice or an experience and not by physical changes, for example, maturing in children or aging in older people (Schunk, 1996).

The activities at school can lead directly to learning. They can have a positive impact, thereby indirectly affecting the process or experience, which can then lead to curiosity or a desire to learn more about a topic (for example Canaris, 1995; Dewey, 1966; Dewey & Dewey, 1915; Krathwohl, Bloom, & Masia, 1964). An alternative approach such as outdoor education used to compliment a typical learning experience may lead to better behavior from the pupils (Dyment, 2005; Fox & Avramidis, 2003), better learning conditions because of physical activity (for example Chaddock et al., 2012; Etnier et al., 1997; Hillman, Buck, Themanson, Pontifex, & Castelli, 2009; Hillman, Erickson, & Kramer, 2008; Hillman, Pontifex, et al., 2009; Raine et al., 2013; Sibley & Etnier, 2003), or better self-image because of mastering in some conditions (Harter, 1982, 1985). This has an indirect impact on academic learning.

Learning through outdoor education can be both formal and informal. Formal education can be defined as structured activities the teacher has decided to use with the children while informal learning can happen when formal learning is absent, for example, in the playing time, during lunch, or during the walk to the outdoor education area.

While formal teaching takes a *top-down approach*, telling pupils what they are supposed to learn and how to learn it, informal learning takes *a bottom-up approach*, starting with their engagement and curiosity and moving towards the learning. Formal teaching is usually more focused on extrinsic motivation, while informal education recognizes intrinsic motivation as more important (Fallik, Rosenfeld, & Eylon, 2013).

Learning can occur within communication, social skills, motor skills and so on. Nevertheless in schools, we are more focused on the learning and achievement within the curriculum subjects. During the fifties and sixties Bloom and his collages developed a taxonomy which was helpful in classifying pupils' achievements in schools (Bloom, 1956; Krathwohl et al., 1964). This taxonomy involved *a cognitive dimension*, *an affective dimension* and a *psychomotor dimension*. The *psychomotor dimension* involved practical skills, for example, skills in physical education and practical skills in everyday life. The *cognitive dimension* and the *affective dimension* are further differentiated into different levels, useful tools for examining all levels of learning.

Bloom's cognitive dimension

The cognitive dimension, which is the most important when evaluating direct learning, was later revised in a new version (Krathwohl, 2002). The revised version has two dimensions rather than one. The two dimensions are the *knowledge* (the noun) and the *process* (the verb).

The cognitive dimensions two-dimensionality as well as how this could be applied to the learning outcomes from outdoor education is best explain by using Krathwohl's Cognitive Domain table (2002).

Table 1: Table of the revised version of Cognitive Domain

The Knowledge Dimension (The Noun)	**The Cognitive Process Dimension (The Verb)**					
	1: Remember	**2: Understand**	**3: Apply**	**4: Analyze**	**5: Evaluate**	**6: Create**
A: Factual Knowledge						
B: Conceptual Knowledge						
C: Procedural Knowledge						
D: Metacognitive Knowledge						

Table 1: This table is based on the table in Kratwohl's (2002) overview of the revised version of the Cognitive Domain of the Taxonomy.

Bloom's affective dimension

The affective dimension (Krathwohl et al., 1964) is more important when considering indirect learning outcomes. In this dimension the categories are subdivided into *receiving, responding, valuing, organizing* and *characterization by a value* or *value complex* based on how the topic is internalized.

The level called *receiving* indicates some kind of willingness to learn, a basis for learning. The *receiving* level is broken down further into the subcategories *awareness, willingness to receive* and *controlled or selected attention*. These are on a continuum from low to high according to how much stimuli is received by the learner while learning. In the first step we are aware of the topic. In the next step we are willing to receive, which means that we are not abandoning the topic. During the

third step we decide what we will give our attention to; we favor some stimuli over others. This is crucial for the basis of learning (Krathwohl et al., 1964).

The *responding level* deals with a willingness and ability to respond (Krathwohl et al., 1964). The subcategories within this level are on a continuum from low to high in regards to intrinsic motivation (Deci & Ryan, 1985). On the low end is *acquiescence in responding*, or responding to a stimulus even though we do not necessarily find it important. Next is *responding with more willingness*, and at the high end of the scale is *satisfaction* (Krathwohl et al., 1964).

The third level is *valuing*. At this level one appreciates the topic; it has some kind of value for us. The degrees of *valuing* are *acceptance of a value*, *preference for a value*, and *commitment to* or *conviction for a value* (Krathwohl et al., 1964). For example, a child who accepts that one should not throw garbage in nature will be at the first level, while a child who feels it is wrong to throw the garbage in nature will be at the next level, and a child who is not able to throw garbage in nature will be at the last level.

When topics are internalized they, along with values, need to be organized and compared to other topics and values; this is the fourth level. At this level the values are both internalized and organized, influencing an individual's character. In this step a person's behavior can either appear to have those values or the person can actually have them. The highest step is when the values characterize a person and the way he looks at the world (Krathwohl et al., 1964). When this is the case, the experience with nature or the local environment has had a holistic influence on the development and education of that person.

Emotions

Emotions have a biological foundation, developed through evolution, and affect all feelings and behavior. Emotions are natural instincts that determine our actions in all situations, especially when a quick response is required (Goleman, 2006; LeDoux, 1996). Although this instinct insures the survival of our species, it can also lead to actions that are not always the smartest choice in certain situations. Regulation of these impulses, or instigators, come from cognitive processes. This function of regulating behavior is an *executive function*, a function related to a set of underlying goal-directed behavior such as planning, inhibitory control, attention selection, flexibility, and working memory (Hughes, 2002a, 2002b). Emotions and actions are regulated in the same way (J. J. Campos, Frankel, & Camras, 2004; Jacobsen, Bjerkan, & Sørlie, 2009).

The affective dimension developed by Bloom and his colleagues (Krathwohl et al., 1964), as well as the concepts of *flow* (Csikszentmihalyi, 2000; Csikszentmihalyi & Csikszentmihalyi, 1975) and *intrinsic motivation* (Deci & Ryan, 1985) are also a part of our emotions because they deal with degrees of attention regulation.

Mood is an emotion that can manifest itself in a variety of ways. Sadness, happiness, and even laughter are found in humans and animals alike, and can therefore be seen as something our species had before we developed our brain cortex and the ability to think and reason (Panksepp, 1998, 2007; Panksepp & Burgdorf, 2003). As a consequence, the concept of emotion is complex; the expression of mood and our inherent emotional self cannot be divided from each other.

This thesis examines emotion in two ways; both with a theoretical basis which explores inherent emotions that affect total behavior, as well as looking at the expressions of mood that reflect levels of comfort and well-being in different situations.

School environment and children's behavior

The school environment may have an impact on the behavior of children in different ways, for example, a less crowded classroom could have positive impact on behavior problems such as reducing aggression (Maxwell, 1996; Murray, 1974). However in this thesis, the theory of affordances in a school environment as well a functional approach to that theory are the focus.

The concept of affordances

The *concept of affordances* is something we perceive directly or intuitively know (Gibson, 1986). For example, we know that a chair is something we can sit on the instant we see that chair; we do not consider all its possible forms before concluding it is a chair. This perception is intuitive and can therefore be connected to the emotions (Goleman, 2006).

An *affordance* (Gibson, 1986) is a relationship between an environment and the action we perform in that environment, whether for better or worse. A large animal in front of us might provoke fear and make us start running, while seeing a chair means only a place to sit or recognizing a red apple as something edible therefore affording us to opportunity to eat. These perceived affordances can be compared to the functions of a verb; the threatening person or animal is 'run-away-from–able' or 'hide-away-from-able, the plants may be 'manufacture-able', the cliff is 'climb-on-able' or 'fall-off-able'.

When Gibson came up with this *concept of affordances*, which is a theory of direct perception, it contradicted the more popular cognitive approach of *perceiving* which viewed the brain more like a computer, indirectly perceiving the environment (Marr, 1976, 1982).

In Gibson`s theory, affordances were not connected to subjective values nor based on the observer's experiences or needs. Instead, he looked at affordances as something we intuitively know are there, even if we cannot see them at the time. We know where the postbox in the neighborhood is, even if we cannot see it. It has earlier and still does afford us the opportunity to post letters, but we only grasp this affordance when we have a letter to post (Gibson, 1986). The ground as a substance gives us different types of support upon which to stand; a softer surface with heath or swamp does not afford running fast to the same degree gravel does, but is perhaps a better surface to fall on, and might provide more affordances for rumble-and-tumble-play.

On a horizontal surface, even considering gravity, we can stand upright without too much effort and is easier for a child to run and play on, providing affordances for locomotion and manipulation. In contrast, a vertical, flat and extended rigid surface will give other affordances. It may be a barrier stopping movement in a certain direction. If it has feet and handholds, it may be 'climb-up-able'. If the vertical surface is not too steep it may afford a child the opportunity to walk or slide on it. A steep vertical surface might also be 'jump-from-able' as well as 'fall-from-able'. Water does not afford us those same options but instead provides different types of affordances like drinking, swimming or being poured into something (Gibson, 1986).

Affordances from objects vary a great deal, and Gibson mentioned qualities that may affect this variety of affordances. First, attached versus detached objects give different affordances. While attached objects may give affordances like hiding, finding shelters, or perhaps being 'sit-on-able', the amount of affordances given by detached objects is more varied, especially for humans equipped with hands. Depending on the human's size, ability, and the size and qualities of the object, the object may be grasp-able, manufacture-able, portable or trace-making-able (Gibson, 1986). A grasp-able object may afford throwing or use as a tool for different purposes such as a cup for drinking, a knife for whittling, or a saw for cutting. A manufacture-able object may afford activities like whittling or building shelters, while portable objects may afford collecting or building activities. The most used and common trace-making object is probably a pencil, but outside we might grasp the affordance of other trace-making-able objects like chalk or a sharp stone to draw on the gravel, make a hopscotch course or the borders needed in play or a game.

Animals, especially humans, provide the richest and most elaborate affordances. We are not only detached objects able to change form and surface. Instead, we interact with whatever we encounter.

Behavior affords behavior, affected by our perceptions or misperceptions, and varies from individual to individual (Gibson, 1986). For some children this may mean taking on animal-like affordances such as exploring or hunting, while for others this may mean more focus on cooperation, comfort, and helping, or feeling threatened when hit or teased.

Bringing the concept of affordances into a functional approach in order to understand children's use of the environment

Since the theory of affordances is a general theory involving both humans and animals, there is a need to narrow it down in order to apply it to children's use of the environment, and Heft (1988) has done just that. He argues that affordances are a functional description of the environment, unlike the traditional description that focuses mostly on forms. He used this affordance perspective to review several studies of children's outdoor activities, which resulted in a functional taxonomy of children's environments. He suggests that it is more realistic to think about children's environments as more psychologically meaningful than the traditional form-based classification.

In his taxonomy, Heft introduced ten superordinate classifications with several examples of subordinate classification in each classification. The superordinate classifications are: (1) flat, relatively smooth surfaces such as surfaces which afford walking, running, cycling or skating; (2) relatively smooth slopes such as slopes which afford coasting, rolling, sliding, running, or rolling objects down); (3) graspable/detached objects such as objects which afford drawing, scratching, throwing, hammering, battling, spearing, skewering, digging, cutting, tearing, crumpling, squashing, or building; (4) attached objects such as objects that afford sitting-on, jumping-on, jumping-over, or jumping-down-from; (5) non-rigid, attached objects such as objects that afford swinging on; (6) climbable features such as features that afford exercise or mastery, looking out from, or passages from one place to another like stairs or ladders; (7) apertures or an environment that affords locomotion from one place to another, or looking or listening into an adjacent place; (8) shelters that afford a microclimate, refuge, or opportunity for privacy; (9) moldable materials such as a material which affords construction of objects, pouring, modification, and sculpting; and (10) water which offers the affordance of splashing, pouring, floating objects, swimming, diving, boating, fishing, or mixing with other materials.

Kytta (Kytta, 2002) used Heft's taxonomy in her study about affordances for children in different environments in Finland and Belarus. In her analysis she excluded one of Heft`s super ordinate classifications, the classification of aperture, because it was too difficult to apply to her study. Instead, Kytta added another category, *the affordance for sociality*. Her *affordance for sociality*

included the possibility to play rule and role-plays, playing house or war, being noisy, or sharing in or mirroring the adults' work. Heft's taxonomy in addition to the affordance for sociality, provides a tool for analyzing the experiences and activities of pupils participating in outdoor education. In my study, rule-plays or games, plays with roles, rumble and tumble play and talking are examples of affordances placed in the category of sociality. Since outdoor education takes place outside in nature, encounters with or knowledge about animals (including insects and ants) should be considered as well.

Using the concept to shape a special type of behavior

Gaver (Gaver, 1996) used the concept of affordances to describe how properties in the environment might influence the social interactions between people. Architecture affects the way people encounter each other. The way tables are laid out in restaurants creates different affordances depending on whether the layout is conducive to quiet conversations in small groups or more robust conversations in larger groups. The physical properties of a child's environment may create different affordances for social interactions as well. Small spaces between bushes and trees may afford interaction and cooperation in small groups while big open spaces may afford interaction in larger groups playing games which require a lot of space.

Additionally Gaver (1996) argued that cultural choices also influence our behavior, e.g., how we use different tools, interpret symbols, or which side of the road we drive on. These affordances and limitations are both innate and cultural and may influence the behavior of children during outdoor education vs. in a traditional indoor school setting; for example, using loud voices during play is usually more acceptable outside than inside.

Why should we consider outdoor education as an alternative and complementary pedagogy?

It is not only the lack of hands-on learning which makes the learning situation in school difficult for many children; children also need to move. That is a biological need essential for healthy development (D. Bailey, 2000; Bjorklund & Bering, 2002).

The concern about lack of physical activity among children and youth, the physical problems this causes, and possible ways to handle this decrease in physical activity is a global issue in today's world (see i.e. D. Bailey, 2000; D. P. Bailey, Boddy, Savory, Denton, & Kerr, 2012; Dencker et al., 2008; Guinhouya, 2012; Guthold, Ono, Strong, Chatterji, & Morabia, 2008; Haug, Torsheim, Sallis, et al.,

2008; Haug, Torsheim, & Samdal, 2008; Katzmarzyk et al., 2008; Kulinna, Brusseau, Cothran, & Tudor-Locke, 2012; McKenzie et al., 2004; Nyberg et al., 2009; Ridgers, Fairclough, & Stratton, 2010; Zhang, Seo, Kolbe, Middlestadt, & Zhao, 2012). Physical activity can be increased in a natural environment (see i. e. A. C. Bell & Dyment, 2008; J. F. Bell, Wilson, & Liu, 2008; Boldemann et al., 2006; Mygind, 2007), which might be due to more affordances and an increased area per student (Cradock, Melly, Allen, Morris, & Gortmaker, 2007; Ozdemir & Yilmaz, 2008; Zask, van Beurden, Barnett, Brooks, & Dietrich, 2001). An increase in the amount of facilities affords physical activity, which in turn increases levels of physical activity (Haug, Torsheim, Sallis, et al., 2008; Haug, Torsheim, & Samdal, 2008; Sallis et al., 2001). Supportive caregivers, those who are facilitating an activity, can also have an impact on increasing levels of physical activity (Sallis et al., 2001). If we apply Gaver's theory of learning and socializing into affordances (Gaver, 1996), we can see that the environment gives a variety of affordances, and the children may learn to see a wider variability of use, for example, how different playground equipment is used.

The physical education lessons do not necessarily increase children's physical activity (Waring et al., 2007), but nevertheless it is important to give the children possibilities to be physically active during the days at school, since this may give a double effect with an increased amount of activity after school (D. Dale, Corbin, & Dale, 2000)

There are studies in outdoor education in schools and kindergartens that prove there are motivational benefits (Dismore & Bailey, 2005; Dyment, 2005), for communication and cooperation (Dyment, 2005), enhancement of self-concept (Davidson, 2001), individual growth and growth of social skills (Rickinson et al., 2004), benefits to learning (Alexander et al., 1995; Canaris, 1995; Dismore & Bailey, 2005; Dyment, 2005; Rahm, 2002), better attention (Grahn, 1997; Martensson et al., 2009), and improved behavior (Grahn, 1997).

Therefore, based on all the research mention above, there is ample evidence that bringing children out of the school building into an outdoor environment can provide a variety of benefits.

Physical activity as an outcome and an instigator

Since physical activities provide health benefits (D. Bailey, 2000; D. P. Bailey et al., 2012; R. Bailey, Hillman, Arent, & Petitpas, 2013; Martikainen et al., 2013; Parfitt & Eston, 2005; Sund, Larsson, & Wichstrom, 2011), the goal should be to increase the amount of physical activity in school. Increased physical activity may therefore be a variable we want to address within outdoor education. If we consider that physical activity can also be an independent variable, and that it is a strong presupposition that it will increase during outdoor education: An increase in physical activity may be

the catalyst that leads to changes in other dependent variables, for example, influencing the emotions (Russell & Newton, 2008; Sanchez-Lopez et al., 2009; Sund et al., 2011) which in turn may broaden the scope of attention (Fredrickson, 2004). Physical activity is also important for children's overall learning in school. An intervention study from Turkey (Ahamed et al., 2007) shows that adding 10 additional minutes per day of more physical activity, time usually intended for academic subjects, did not reduce the academic learning in any way. Instead, it increased the learning. Before the intervention the control group had significantly better academic results than the intervention group, but after the intervention the differences were no longer significant. About 300 children aged 9-11 years old participated in this study. A review study (Trudeau & Shephard, 2008) concluded that physical activity executed by competent providers can be added to the school curriculum without risking any reduction in academic learning, even though it decreases the time used on academic subjects.

A meta-analysis in 1997 (Etnier et al.) found that exercise has a small effect on cognition when the exercise is given over time with the aim of improving fitness or when the exercise has been adopted as a lifestyle for the subject. Six years later another meta-analysis (Sibley & Etnier, 2003) found there was a greater effect between physical activity and cognitive functioning in children. The authors assumed the increased effect was caused because physical activity was more beneficial for children. Other studies link aerobic fitness to cognitive functioning as well to executive function (Chaddock et al., 2012; Hillman, Buck, et al., 2009; Hillman et al., 2008; Raine et al., 2013). Moreover, a review of the effects of exercise on the mental functions of children also found exercise to be the most effective on tasks that involve executive functions (Tomporowski, Davis, Miller, & Naglieri, 2008). Keeping in mind the above research, this thesis study qualifies physical activity as both a dependent variable and an independent variable.

Presenting John Dewey

Several pedagogues including Vygotsky, Piaget, Lave and Wenger could have been used to shed more light on the topics in this thesis. However, I chose to look more closely at the thoughts of John Dewey (1859-1952).

Dewey was a pedagogue, a psychologist and a philosopher. His biology oriented psychology appealed to me as I felt it could be useful in shedding more light on the nature of children. His emphasis on emotion and the emotional impact on interests (Dewey, 1894, 1895, 1972) as well as his emphasis on children's interests in education (Dewey, 1972) were also appealing. His awareness of a child's biological liability for activity and exhaustion during behavior regulation (Dewey, 1966) also makes his theories relevant to this thesis.

Another important reason for bringing Dewey into this thesis is his emphasis on experiences and understanding how those experiences can affect education. Two principles are very important in the pedagogical definition of experience, continuity and interaction. To be educative, the experience needs to be connected to the academics topics, and often the child needs assistance in understanding the relationship between the two (Dewey, 1997, chapter 3, 7 and 8). Dewey's belief that it was essential to lessen the increasing gap between the child's real life experiences and the curriculum, and the way formal education approaches learning (Dewey, 1966, chapter 1; Dewey & Dewey, 1915), also makes his thoughts relevant to the topics and themes in this thesis.

Dewey started to write when he was very young, and wrote almost until his death at age 93. The amount of literature he produced is incredible (Aasen, 2008) and this thesis in no way attempts to provide a total description of his pedagogy and philosophy. Instead, a sample of his ideology was selected in order to shed useful light over some of the topics in this thesis.

Implications for this study: Defining the variables and topics of interests

Learning and a healthy development are important variables in this thesis. Learning can be both direct and indirect. In this thesis, the indirect effects on learning have been in primary focus. The indirectly impacts on learning can be triggering of interests in topics, motivation to learn about a topic, the children's wellbeing and the learning environment. Considering the children's wellbeing, comfortableness and joy is important as well as mastering. Connected to wellbeing and mastering is also the concept of motivation. Considering the learning environment safety and a place filled with peace to work on academic topics is important, as well as children being able to give attention to the academic topic. All the implications for learning also have an impact for the children's healthy development, even though there are also variables which can be seen as more important for a healthy development, such as physical activity, positive self-image and social development.

Defining wanted and not wanted behavior in school

It is not possible to define precisely what wanted and not wanted behavior in school means. We want behavior that favors the learning process, making possible the learning of academic subjects in a holistic learning environment that contributes to healthy development in each child. As a consequence children should mainly be focused on tasks, not doing things that disturb the teachers or the other pupils in the classroom. That does not mean, however, that they should not have the opportunity to communicate or to move around. Communicating helps develop communication skills, a crucial factor in social development, and physical activity contributes to healthy development in a variety of ways. A behavior showing communicating, social activities and physical activity, but at the same time adapted to the situational demands probably gives the best opportunities for a holistic learning and a healthy development for the children.

What is even less clear is what the most optimal mood expressions really are. We want children to be happy and we want them to laugh, because laughing is an important part of our inherent nervous system (Panksepp, 1998, 1999, 2007; Panksepp & Burgdorf, 2003). It gives us special feelings, and can be looked upon as a culmination experience (Maslow, 1987). But we also have to look at the behavior that goes along with laughter. A lot of laughing in the classroom can, for example, be disruptive, creating less than optimal working conditions. A lack of emotion over a long period of time is not the state we wish a child to be in, because that might signal an inappropriate presence and a lack of emotional development (J. J. Campos et al., 2004; Sameroff & Fiese, 2000; Sroufe, 1996). Therefore, the most optimal mood expressions is a variability that in the same time is adapted and suitable to the surrounding demands.

Method

To explore whether outdoor education as an alternative and complementary pedagogy to classroom teaching might contribute to a holistic learning environment and safeguard the healthy development in children, a study was conducted at one school. The four articles in the thesis are based on this study. The study took place between October 1st, 2008 and the middle of January, 2009.

The data collection process was a mixed method study (Creswell, 2009, chapter 1), where one part used a qualitative approach (ibid.) and the rest was placed on a continuum between quantitative and qualitative approaches, more or less linked to one or the other (ibid.) This study also falls in the *pragmatic paradigm* (Creswell, 2007, chapter 2) because it focuses on research topics and the most practical methods derived from those topics. The *pragmatic approach* allows for a great deal of freedom in the design method, during data collection, and in the way the researcher analyzes the data at the end of the study, as well as permitting both qualitative and quantative data (Cherryholmes, 1992).

The study can also be considered *case study research* (Creswell, 2007, chapter 4) because it focuses on a single group of children at one school with the single objective of examining outdoor education as an alternative and complementary practice. Additionally, a combination of sources has been utilized, which is normal in a case study (Creswell, 2007, chapter 4; Yin, 1994, chapter 1).

Design

Exploring some of the possible effects of outdoor education was done by looking at outdoor education as an intervention, and with an intervention-study as a study tool. In an intervention study there must be a clear relationship between the intervention and the effect, which we cannot explain

by other variables. To explore the behavioral variables *a reversal design* was used. This design, similar to an *ABAB-design*, is a one-group study, which reveals the changes that occur when the intervention is happening and when it is not.

In the ABAB-design, (A) is the baseline condition and (B) is the treatment or intervention condition (J. R. Thomas, Silverman, & Nelson, 2005, chapter 18). The ABAB-design has an added benefit in that it is able to reveal increases and decreases in particular behavior which will, if the intervention works, correspond to the presence and absences of the intervention (Sarafino, 1996). This type of design is classified as a *quasi-experiment*. If the length of the phases is randomized to insure the phases are not following any natural pattern which could influence the other variables and therefore the results, it is even considered to be a valid experiment (Wagenaar, 1990). In this study, the design is considered to be *naturalistic* (Patton, 2002, chapter 2) because it has not interrupted any events in the children's schedules at school. Randomizing the phases was therefore not possible. Even though the length between the days of observations might have varied, the observation phases always lasted for one day. In addition to observations, both structured and open-ended interviews with the children were conducted in an attempt to discover what they were thinking and how outdoor education had influenced their experiences.

The data collection

Physical activity, motor agitation, verbal agitation, emotion or mood expressions, and verbal communication were quantitatively measured by observation. The degree of well-being and reasons for it were quantitatively measured through interviews. The qualitative data from the observations dealt with more wide descriptions of what was happening during the observations. What the children did during outdoor education, the learning topics, what they preferred in an outdoor education environment, and a more in-depth description of their feelings and expressions during the school days were qualitative features of the interviews.

Subjects

The subjects were recruited from two 5th grade primary school classes in Norway. From a total of 34 children, 31 were given permission from their parents to participate in this study. There were 14 girls and 17 boys in the group. Their mean age at the beginning of the study was 10 years and 2 months. The children were in the first semester of their fifth year at school when the study was carried out.

The children were divided into two different groups during their inside lessons. There were 16 pupils in one group and 18 in the other. The two groups had different teachers who cooperated when making their teaching plans. Six children, three from each group, were given special education

lessons in reading. Even though the pupils were divided between two different classrooms during indoor education, the classes sometimes worked together in smaller or larger groups. At the end of each day the children worked on their weekly plan, sitting in groups of three or more. The school day started at 08.30 and lasted until 14.00.

The children had outdoor education once a week during the four first years at school, and once every second week in the 5th grade. The school has four locations with shelters, a fireplace, a few pieces of equipment to play on, and a primitive toilet at each site. The days with outdoor education usually started with a lesson inside the classroom, followed by a walk to one of the locations; the two classes were always together. Once there, pupils usually had time to do what they wanted as well as participating in a lesson led by the teachers connected to an academic subject. The amount of time spent on each of the two activities varied from one day to another. Two of the days observed comprised of this standard outdoor education practice; the pupils walked to a location, had some time for free playing, ate lunch, and participated in an outdoor academic lesson led by the teachers. One of the observed days was a little bit different, however. The children were divided into mixed-age groups (pupils in the 5th, 6th, and 7th grades) and had teacher led activities both before and after lunch, with only small recesses in between.

Subjects in the observation

From this group of 31 children, 12 were randomly selected. Seven of those children were boys and five were girls. The mean age of the selected group at the beginning of the study was 10 years and 3 month. Three of these children, two boys and one girl, belonged to the group given a special education offer in reading.

Subjects in the open ended interviews

Nine participants, four girls and five boys, were randomly chosen among the 31 available children in the two classes. Mean age when the study started was 10 years and 4 months.

Subjects in the structured interviews

All 31 children participated in the structured interviews. Their mean age when the study started was 10 years and 2 months. One of the boys, who did not belong to the group given a special education offer in reading, made the choice not to participate and so did not.

Observations

Using observation as a research method allows the researcher the opportunity to be open and inductive, and makes it possible to explore topics that have escaped from the subject's awareness, or topics the subject might find difficult to talk about (Patton, 2002, chapter 6). Physical activity, agitation, and communication are behavioral variables that may shed light on a child's holistic learning as well as their learning conditions. Emotion or mood expressions are not typical behavioral variables, but they too are variables that help better understand the holistic and healthy development of children at school as they can alter with changing conditions. The ABAB-design is used to measure these variables, but there is always a risk that the children will become bored when asked to repeat the same data collection procedures several times; Drabman and Lahey experienced this when asking pupils to fill in a form using the ABAB- design (1974). The advantage of using observation, then, is that students do not participate activitly in the data gathering process, therefore avoiding the problem of children becoming tired of the procedure; something that could result in misinformation.

In this study, daily observations were divided into sections, each being the responsibility of one of four trained observers, each of whom collected data for three children. Each section was comprised of 13 observations of one pupil for a 15 seconds interval, followed by two-minutes to write down more information about the situation. To help the observers with the time interval, each observer had an MP3-player which notified them of the passing time intervals; e.g. "start observation one now", 15 second silence, "start observation two now" etc…. This procedure was repeated for each of the three pupils the observer observed in each section.

For the indoor school condition the observation was planned four times during the day; 09.15-09.45 (two sections of observation for each pupil), 10.15-11.00 (three sections of observation for each pupil), 11.20-12.20 (four sections of observation for each pupil) and 12.30-13.00 (two sections of observations). Even though these observations times were not always exact, this time schedule insured that observations were done during both lessons and breaks. When observing outdoor education, the observation times were postponed because of the time needed for gathering at school and walking to the outdoor education area.

For each observation period, the observer made notes about the child's verbal and motor behavior, the child's degree of physical activity, the child's mood, and whether or not the child communicated with someone. If the child did speak to someone, there were notes taken of whether the communication was positive or negative. Between each observation period the observers had two minutes to write down a qualitative evaluation of the observation, as well as commenting on whether the activity observed was in accordance with the teacher's plans. The goal was to observe

each child in 11 different increments throughout a day. Since the pupils were not observed during the walking time before and after outdoor education, and since it sometimes took extra time to locate the child to be observed, some children did not have had 11 different observation periods.

The number of observations for each subject across conditions, observer and gender, is shown in table 2.

Table 2: Overview of observations

Subject	Sex	Observer	Number of observations		
			Outdoor	Indoor	Total
1	M	1	403	571	974
2	M	2	390	572	962
3	M	1	403	573	976
4	F	2	247	559	806
5	F	1	260	572	832
6	M	2	390	546	936
7	M	4	325	572	897
8	F	3	390	559	949
9	F	3	390	571	961
10	M	4	338	572	910
11	F	3	247	560	807
12	M	4	325	572	897
Total			4108	6799	10907

Table 2: Subjects, observer and the distribution of observations

Scales for behavior variables

Since there were a multitude of behaviors and situations, observations had to rely on a degree of subjectivity. To offer more continuity for each variable, observers were provided with observation scales as guidelines in making general classifications .

Observation of the degree of physical activity

A score of 1 was given when the child was sitting, standing, or doing some small activity like slowly walking. A score of 2 was given if the child was participating in a kind of activity, like fast walking. A score of 3 was given if the child was quite physically active and participating in activities which

demanded more physical activity than fast walking e.g. using the hands to throw and catch a ball, or if the child had an activity level which normally would create a sweat after a short time, like running a lot or climbing.

Observation of motor agitation

If no motor agitation was shown a score of 0 was given, while a score of 1-3 was given if there was motor agitation. If the child did not do what he or she was supposed in a specific setting, it was considered to be motor agitation. A low degree of motor agitation was given a score of 1, and a high degree a score of 3.

A score of 1 was given if a pupil was not doing what the situation required or if the pupil was distracted by other activities but did not directly disturb the others. A score of 2 was given if the pupil was disturbing the others with motor actions. A score of 3 was given if the pupil was taking things from other pupils, making an obvious racket with motor activity, showing aggression towards others, or was completely diverted from what the others were doing. Motor activities like teasing or treating others in a negative way were also be given a score of 3.

Observation of verbal agitation

A score of (0) indicated the pupil did not show any verbal agitation at all. A score of 1-3 rated the degree of verbal agitation; (1) indicating a low degree of verbal agitation; (2) a medium degree of verbal agitation; and (3) a high degree of verbal agitation.

Additional guidelines were provided for this category. A score of 1 was given when the child was talking about subjects other than the task, but not disturbing the others. A score of 2 was given when a child was talking about things other than the teaching to a such degree that it was disturbing the others, or if the child was bickering or showing some kind of aggression. A score of 3 was given if the child used a great deal of foul language that was intended to disturb the others, or if the child was yelling, making noises to disturb the others, hurting others, or quarrelling with others.

Observing the emotion

The emotion category is divided into a 5-point scale ranging from *obviously discouraged* (low end) to *joy and laughter* (high end). The lowest score on the scale (1) was assigned when the child was showing obvious signs of discouragement by crying, almost crying, or being angry. A rating of (2) indicated that the child was discouraged to a lesser extent, for example, showing obvious signs of boredom. A rating of (3) was the neutral level, indicating that the child was showing neither obvious discouragement nor obvious joy. If there appeared to be some kind of joy, a rating of 4 was given. A child who was really engaged in an activity, demonstrating enthusiastic eagerness as well as imagination and taking a role in their play, was also given rating of (4). A rating of (5) was given if the child's laughter was possible to hear.

Observing communication

Communication was quantified with registration of verbal communication, interpreted as either positive or negative communication. In this context, all communication not interpreted as negative, was judged to be positive.

The observation within the methodological field

Data collection based on observation is considered to be a quantitative approach and reflects *postpositivisme* . Both *positivstic* and *postpositivistic* approaches are concepts often used with the same intention, but the *postpositivistic* view is a way of thinking which challenges the *positivistic* view by questioning the absolute certainty about specific knowledge when we are studying human behavior (Creswell, 2009, chapter 1). Since the scoring of the behavior have to rely on the observers judgements, there is also a degree of qualitative judgment in this observation, called subjectivity. Since the observer places overt behavior within a category, this countable part of the observation process could be considered to be a *quantitative research method*. But still, testing of statistical significance is problematic with this type of data since all observations are dependent on each other and are interconnected (Russo, 2003). In this study, there were approximately one thousand observations for each child, each linked to the others. Since all the children belong to the same school and experience the same school traditions, each child is also linked to the others. The qualitative notes taken by each observer allowed for the versatile behavior in this group of children. Taking into account the discussion on the qualitative and quantitative aspects of observation, it is safe to say that when considering the observation procedure as a whole, it is a mixed method (Creswell, 2009, chapter 1).

Procedure for the open-ended interviews

To explore the variables in the children's activities, learning, and experiences in an outdoor education setting, open-ended interviews were used. These interviews were conducted like conversations and could be classified as *informal conversational interviews* (Patton, 2002, chapter 7). In this type of interview, questions emerge from the immediate context, and there are no predetermined questions at the starting point. There are many benefits for this type of interview including the opportunity to increase relevancy since the researcher is able to keep an open mind during the interview and match questions and conversation to the subjects. The weakness of informal conversational interviews is the vast amount of data collected, which can prove challenging in data analysis (Patton, 2002, chapter 7).

During the interviews children were permitted to take the conversation into new or unplanned directions. The only time the interviewer introduced a new theme into the conversation was when the previous topic seemed exhausted. New themes introduced by the interviewer included what the child thought about outdoor education, feelings as the child was preparing for the outdoor education experience, thoughts about what he or she was thinking when finished with the outdoor education experience, what the child did in their leisure time during outdoor education, whether or not he or she learned something, and what the child thought about the outdoor education locations. After completing all the interviews, there were a total of 394 responses of which 40 were the result of a new theme or topic being introduced into the conversation. The responses by the interviewer were only supportive responses, consenting responses, or follow-up questions.

One girl was interviewed alone, one interview was with one boy and one girl together, one interview was with two girls, and two interviews were with two boys in each group. The interviews were conducted in January, 2009, and were the last part of this study.

The open-ended interviews within the methodological field

This part of the data collection is qualitative, specifically phenomenological research (Creswell, 2007, chapter 1) since children were asked to share their own experiences.

Procedure for the structured interviews

Fixed-response interviews were used to explore patterns in experiences when comparing outdoor education to the indoor education condition. The strength of this type of interview is the ability to

ask many questions in a relatively short period of time; this also makes the analysis easier than with open-ended interviews. However, the limitation of response choices can distort what the subjects really mean (Patton, 2002, chapter 7). 69 structured interviews were conducted at the end of the school day. Things that had happened that same day, and sometimes from a recent day, were the themes for each interview. When discussing each activity the children were asked to choose one of five faces from a piece of paper; a big smile, a smaller smile, a neutral mouth, a small sad mouth, or a big sad mouth. Those faces were intended to be an expression of the child's degree of well-being in each situation. The next step was to examine the reason behind the high or reduced well-being by asking the child why he or she felt this way during that particular situation. For example, when specifically discussing high well-being, the boxes drawn on a piece of paper were: one box with *fun,* one box with *mostly fun,* one box with *the same amount of fun and mastering*, one box with *mostly mastering* and one box with *mastering*. When exploring reduced well-being, the child was asked to choose from different boxes on another piece of paper; a box with *because of boredom*, a box *mostly because of boredom*, a box with *the same amount of boredom and not mastering*, a box *mostly because of not mastering,* and a box *because of not mastering.* The categories were always widely discussed with the child at the beginning of each interview. The categories of *mastering/not mastering* were also explained as feelings of relaxed/not relaxed, feelings of not being afraid of failing in the situation/afraid of not mastering, or the situation was unpleasant for some reason. Different supplemental comments from the children, were also noted when interviews were transcribed afterwards. This could for example be statements of what they did like and what they did not like to work with, or it could be wider explanations of their feelings.

Placing the structured interview within the methodological field

This part of the study may be placed within the mixed method, because it is calling for both qualitative and quantitative data (Creswell, 2009, chapter 1). The data gathered during the interviews focused on the children's experiences and metamotivation. Those topics, were primarily based on Apter`s Reversal Theory (for example Apter, 2001), especially those measured by quantitative methods such as *mastering* and *fun*, or *not mastering* or *boredom*. This theory creates a theoretical lens for the questions in this study.

Typing temperament

In the attempt to put pupils into different temperaments or dimensions, a short version of the teacher temperament questionnaire was used (Keogh et al., 1982). This was based on the ordinary

questionnaire for teachers (A. Thomas & Chess, 1977) with fewer questions for each dimension. The questionnaire made 23 assertions, and the main teacher was asked to rate each claim for each pupil on a 7-point scale. This test was done at the end of the project to ensure that the observers had no bias towards pupils' temperaments during their observations.

Placing the typing of temperament within the methodological field

This part of the study is not a measure of outcome. It is rather a placing of an independent variable. Nevertheless this is only countable data, based on a structured schema, and can be seen as a kind of quantifying.

Article 1

The body of data

The data from the open interviews with nine children was analyzed in this article.

Analysis

Analysis through tables

Data regarding both the affordances and learning was placed into tables. Twelve categories were used for analysis, ten based on Heft`s taxonomy and two, *the affordance for sociality* and *the affordance connected to animals*, added for the sake of this study. All statements that contained elements of learning were analyzed using three different criteria: (1) Is it explicit or implicit? (2) Does the child show academic qualifications in the topic, yes, some or no? (3) What is the subject that can be bridged by this kind of learning?

Analyzing into narratives

The contents from the interviews were structured into two narratives; one for a boy and one for a girl. The purpose of the narratives was to use them as a tool for structuring the data (Kvale, 1996, chapter 9).

Article 2

The body of data

The quantitative observations and the test of temperament for the 12 children made up the body of data for this article. Variables like gender and whether or not the child was participating in the group given a special education offer in reading, were also taken into consideration.

Analysis

To explore the differences during outdoor and indoor education for the different groups of children, descriptive statistics in SPSS version 19 were used.

Article 3

The body of data

The quantified observations combined with the variables of teaching time and leisure time was the main data used for analysis in this article. In addition, all the data gathered during observations, quantified observations, as well as qualitative notes for one girl and one boy, were analyzed.

Analysis

Quantitative analyses

SPSS version 19 was used to create descriptive data based on the ABAB-design and to make t-test for an independent sample.

Qualitative analyzes

The data from the two pupils was systematically examined first as a long written text using both the qualitative and quantitative data from the entire observation period, then condensed into a text for each day.

Article 4

The body of data

The quantifiable parts of the structured interview make up the body of data in study 1 in this article, as well as the focus on the variable belonging to the group of special education in reading or not. In study 2, the quantitative and qualitative observations from the three pupils belonging to the group given a special education offer in reading are analyzed qualitatively. Their explanations for high and

low well-being, as well as other relevant comments from the interviews, were also used in this analysis.

Analysis

Study 1

In study 1 descriptive statistics in SPSS version 21 were used.

Study 2

In study 2 the observations (quantitative and qualitative) were first written as a text for each section of the observation, then examined to determine which factors led to positive or negative behavior. The negative behavior was then evaluated to see if it contained high or low intensity, and whether it was internalizing behavior, externalizing behavior, or a combination of both.

The qualitative comments behind the quantitative answers were written and condensed into one text for the girls and one for the boys.

Ethics

Since the process of collecting data involved treatment of personal data, the project was submitted to the Norwegian Social Science Data Services (NSD) and was approved (Appendix 1). The National Committee for research Ethics in Norway offers a number of guidelines for research projects (NESH, 2006); the most sensitive issues for this project are discussed in the following section.

The classification, *respect for individuals*, can be sorted into three main categories; *ensuring freedom and self-determination*, *safeguarding against harm and unreasonable suffering*, and *protecting the privacy and close relationships of the subject.* Those principles are discussed further under the headings *Children's safety in research*, *Consent and autonomy in research with children* and *Privacy and confidentiality.*

Children's safety in research

When we carrying out research with children, we should be particularly aware of the many ethical considerations. Beauchamp and Childress (2001) point out four ethical principles in biomedical sciences that apply to children's research. Those principles are (1) not to hurt or cause any harm (non-maleficence); (2) the aim of doing something well (beneficence); (3) justice or fairness; and (4)

autonomy. Those principles may also help in creating a framework for a methodological discussion in social science or any science that deals with children.

Ennew and Boyden (1997) point out that there are additional challenges in conducting research with children. They might misunderstand questions or information, or the researcher may simply introduce topics which are uncomfortable, perhaps topics the children have not been concerned about before. Even though it is possible to justify the design of a study with children, we have to be sensitive to the children's humanness and make judgments about what we say and do during the entire research process (Daniel-McKeigue, 2007). Finally, the risks have to be weighed against the utility of the knowledge to be gained (Hubbard, 2005) Since this project was designed with questions that were intended to not be uncomfortable, the risk factor was quite small.

Forming a good relationship with the subject being studied gives the researcher an additional ethical challenge; for example, the child may believe that the researcher is able to change some events in his or her life. A healthy balance in the relationship, as well as a clear definition about how the research information will be used, is essential (Matthews, Limb, & Taylor, 1998).

In this study, the other observers and I were at the school together several days before the official observations started. The children were told there were people there to take notes about their school day and to ignore the fact that we had notebooks in our hands and earplugs in our ears; they were to pretend we were not even there when there were earplugs in our ears. Even though the children believed we were not going to stop them if they did anything wrong they were told that didn't give them permission to misbehave, and we were supposed to intervene if we thought someone could be in danger.

Consent and autonomy in research with children

All participants in a study should give their consent. This is particularly challenging in research with children, because consent is usually given by the parents. In this study, the parents gave their permission in the form of a signed letter accompanied by information about the study (see Appendix 2). In addition, every child had permission to refuse when they were asked to come to another room for an interview (Ennew & Boyden, 1997; Matthews, Limb, & Taylor, 1998). In fact, one of the children did say no so did not participate, but the rest were very enthusiastic about coming and sharing their thoughts about their days at school.

Privacy and confidentiality

Privacy means we are supposed to protect the participants against unwanted interference and exposure (NESH, 2006). This is especially crucial when dealing with sensitive themes, and is less important for the topics addressed in this study. Nevertheless, we cannot know what children might feel is private, and sensitivity as a researcher is always important. In our study, the observers were very conscious of not singling out the child that was being observed, trying instead to observe from neutral positions. This relates to confidentiality; the researcher knows what kind of observation and stories are coming from each child, but will not reveal that in the reports of the study. Confidentiality is not the same as anonymity, because anonymity means the researcher also does not know from whom the information is coming (Patton, 2002, chapter 7). In this study, anonymity during the data collecting was not possible.

After finishing the study in the field, the list with names and codes was destroyed, and as a consequence the information itself gained a form of anonymity as well. Even though the considerable amount of data gathered from every child might mean the researcher did not remember the name of each child in the project, it is possible that others might. To avoid recognition, the name or location of the school was not included in the reports and analysis, nor was any information that could be connected to a single child, e.g. age or specific identifiable episodes. The only observation descriptions based on one child are the examples in article 3 (Fiskum & Jacobsen, 2012c), but those examples are also general for most of the children in the group.

Trustworthiness

There are several ways to deal with trustworthiness in qualitative studies (Creswell, 2007, chapter 10). Since I have chosen a pragmatic approach using both quantitative and qualitative data, I chose to divide trustworthiness into categories suggested by LeComte and Goertz (1982) and Yin (1994, chapter 2); *construct validity/objectivity, internal validity, external validity* and *reliability*.

Construct validity

Construct validity means establishing a precise operational measures for what has to be studied. A high degree of construct validity demands designing a set of measures which make it possible to collect data in an objective way (Yin, 1994, chapter 2). In the observation data referred to in this thesis, the observations are objective because the observers work in the same way. To make the subjectivity of each observer more insignificant, all the observational data were worked thorough afterwards.

The main part of this study is based on a structured way of collecting data. The methods are designed to maintain a high degree of trustworthiness. Naturally, subjectivity becomes an issue when an observer is asked to rank behavior on a scale of 1-5. More objectivity might have been possible if I had chosen specific behaviors to be placed in every agitation level which would have increased construct validity, but reduced internal validity. Another method would have been to measure physical activity with an instrument like an accelerometer, but that will have reduced the confidentiality because everyone would know which child was being observed. Internal validity would also have been decreased because the children would have been more aware of the measurement.

The structured interviews have a set format which remove most of the researchers' subjectivity during the interview phases, but interviewing children this way can present other challenges such as intern validity, extern validity, and reliability. The open-ended interviews are the most vulnerable part of the study, considering construct validity, so it was crucial to document all the procedures. During the analysis of the interviews, everything was counted; how many times I had a comment, how many times I brought new themes into the conversations, which themes I brought into the conversations. Honesty about one's own preconceptions is also a part of bringing more objectivity into the project and permits the reader to read the report with skeptical eyes.

Internal validity

Internal validity deals with the extent to which the effects measured in a study can be attributed to the variable which is supposed to be the cause of the effect (J. R. Thomas et al., 2005, chapter 1). It is only a concern in studies dealing with a cause and effect relationship (Yin, 1994, chapter 2) and is taken care of by creating observation categories that consider the variable itself. I could have chosen to count, for example, every time a child left his or her chair or spoke loudly. This would have strengthened the construct validity, but would have threatened the internal validity. A child leaving the chair might be the result of many things. Perhaps that child felt a high degree of agitation, or perhaps it did not depend on the agitation at all but on the situation. When all the observers discussed the observations with me afterwards, the qualitative notes were taken into consideration. This made it possible to evaluate whether things of this nature were agitation because of the situation or only behavior expected from the situation.

The structured interviews are the weakest point when considering the internal validity. The dichotomizing and categorizing of possible answers opens up the possibility that children can answer

without thinking through what they really want to say. The children may be likely to give one type of answer; perhaps one they think the researcher wants to hear. For example, many children either rapidly pointed at the big smile or loudly said "a big smile," quickly adding it was caused by the category of fun. The results in article 4 (Fiskum & Jacobsen, Submitted) also showed more the frequent answers receiving the highest well-being score and with the explanation of *fun*. The answers of reduced well-being and the reasons behind those answers seemed to have been made with more reflection, something the children used more time to think about. As the results in part 2 in article 4 (Fiskum & Jacobsen, 2012a, Submitted) show, there is often some explanation connected to those answers, which I then analyzed to see if they seemed reasonable. Open-ended questions are considered to be the more accepted method in interviewing children (Aldridge & Wood, 1998; Krahenbuhl & Blades, 2006; M. E. Lamb & Brown, 2006; Michael E. Lamb & Fauchier, 2001) in order to secure a high internal validity.

External validity

Whether the findings in the study can be generalized to others is called external validity (J. R. Thomas et al., 2005, chapter 1; Yin, 1994, chapter 2). This study is based on only one case in one school that has a single way of using outdoor education as an alternative and complementary way of teaching, and to make generalizations is therefore problematic. In addition, this study is supported by theories like the *Temperamental theory* (for example A. Thomas & Chess, 1977), theories of motivation (for example Deci & Ryan, 1985; Harter, Whitesell, & Kowalski, 1992) and *Apter`s Reversal Theory* (for example Apter, 2001). This contribute to strengthen the external validity.

Reliability

If another researcher has the ability to reproduce the study and come to the same conclusions, a study has a high reliability. This will demand a well-documented procedure of the research (Yin, 1994, chapter 2).

As a preparation for this study, the four observers were trained in a process that involved the following: introduction and exemplifications of the score-criteria, sharing parallel observations, and discussions until there was a common understanding. The observers underwent this process four times. Additionally, checkpoints were made to make sure that the inter-rater reliability was still high. In those checkpoints observers were in 97.9% agreement. Considering the relatively rough categories; this high percent of reliability was not surprising.

Both observation and interview procedures have been described as precisely as possible, which makes it possible to reproduce the study. The description of the preconceptions and the analyzing procedures in article 1 (Fiskum & Jacobsen, 2012b) is important to keep a high reliability in that part of the study.

Summary of results and discussions of the four papers

Article 1

Outdoor education gives fewer demands for action regulation and provides an increased variability of affordances (Fiskum & Jacobsen, 2012b, article 1).

This article focuses on the many things that instigate actions from children in school, and how these instigators, here called affordances, can activate children in different ways outside, and that the outdoor condition usually makes less demands on regulating the many instigators for action coming from the emotions.

This study shows that outdoor education gives children opportunities that are important for their welfare. It outlines a lot of different affordances which children might grasp like reducing the stress of action regulation by burn off some energy. Outdoor education also provides useful hands-on learning and gives children personal insights into curriculum related topics. Results show that children appreciate and look forward to the days with outdoor education, and that they know how to handle all the practical things required for staying outdoors for an entire day.

The affordances the boys have demonstrated, e.g., building small huts or shelters, observing ants, or throwing cones, twigs or decomposed cabbages, are more connected to the specific outdoor environment. These differ from the affordances the girls are grasping, such as playing, acting silly and being a bit rude, talking, being together with more pupils, having fun, creating new games with rules, or playing games. The girls also demonstrated many affordances which were connected to objects designed for them, for example, playing in an old boat, in created huts and shelters, playing on the swing, practicing balance on balance equipment, and staying in the lavvo. The boys, on the other hand, did not mention these things. They were more focused on building huts, and it appeared that the building process was more important for them than playing what they constructed afterward.

The analysis based on Heft's taxonomy (Heft, 1988) placed the affordances mentioned by the girls 12 times within *sociality*, four times within *graspable/detached objects*, three times within *non-rigid/attached objects*, three times within *shelter*, twice within *relatively smooth slope*, twice in the category of *flat, relatively smooth surface*, twice within *attached objects*, once within *climbable features*, once within *animal* and once within *moldable material*, while the categories of *water* and *aperture* were not mentioned by the girls. The affordances mentioned by the boys, revealed another pattern; 22 within *graspable/detached objects*, eight within *sociality*, eight within *animal*, four within *shelter*, three within *climbable features*, two within *flat, relatively smooth surface*, two within *attached objects* and two within *aperture*, once within *water*, while the categories of *relatively smooth slope and moldable material* were not mentioned at all.

While the girls seemed to spend time on equipment designed for them, the boys seemed more interested in objects with a variability of affordances (not designed for special purposes). It also appears that the boys were grasping a lot of affordances connected to the outdoor environment and affordances inviting them into vigorous physical activity. They were acting very different than in the traditional school setting, while the girls to a greater degree seemed to regulate their actions in the outdoor arena as well as indoors. Whether this is a result of gender difference based on activity or only on the way the activity is talked about is not explored in this study.

There are two ways of revealing learning; implicitly where the children show the knowledge, but do not say that they can it or have learned it, and explicitly where the children tell what they have learned. The results of the open interviews revealed that the girls demonstrated learning in zoology and outdoor life skills, and partially revealed learning in physics, ecology, outdoor life skills, construction, and geology. The results also show that they reveal learning implictly three times and they had 11 instances of some type of learning. It is interesting that the girls mentioned more learning topics explicitly, which might be interpreted as arguments for outdoor education. The boys implicitly revealed learning 28 times, demonstrating competence in five areas; outdoor skills, risk calculation, biology and zoology. In 23 statements they showed some kind of learning in the areas of physics, outdoor skills, zoology, biology, ecology, geophysics, physiology, microbiology, construction, geology, topography and practical skills in using tools. Most of this information provides insights into curriculum topics, and will need more work at school if it should be applied to actual academic learning situations. Nevertheless, if using Bloom's taxonomy (Krathwohl, 2002), much of what these children learned will perhaps stay with them than if the learning had been purely theoretical.

Article 2

Individual differences and possible effects from outdoor education; long term and short term benefits

This article focuses on how outdoor education influences different groups of pupils. In this study the 12 children observed were tested using the *Theory of Temperament* (A. Thomas & Chess, 1977) through a short form of the *Teacher Temperament Questionnaire* (Keogh et al., 1982). The children's average score within each temperament dimension is presented in the first part of the results. For each dimension, the children were divided into two groups; those with high scores and those with low scores. Those scores were then used to place the children into main categories, as well as to analyze the behavior differences and similarity within each dimension.

The main results show that the variables of physical activity, amount of neutral emotion, and positive communication are mostly predicted by the school conditions. The amount of verbal and motor agitation is predicted by the school condition as well, but only for the group of children who have a considerable amount of this behavior. The rest of the children registered minimal agitation and, as a consequence, there is no unwanted behavior to regulate. The amount of negative communication was not predicted by the school condition in any way, but was predicted by the personality of the child.

The six children placed within the group defined *with an easy temperament*, and the two children placed within the group *having withdrawal temperament*, were good at functioning both indoors and outdoors, but still positively favored outdoor education because that school setting increased their vitality. Those children therefore demonstrated the short time benefit of outdoor education. Four children had a *difficult or a mixed temperament*, and their behavior during indoor education was problematic and frequently corrected. Outdoors this unwanted behavior was absent. Therefore, this group probably also experienced the long term benefit of outdoor education.

The variable of physical activity was affected by the school condition, the temperamental dimension of *intensity* and gender. Boys demonstrated a wider variety of behavior between indoor and outdoor school conditions than the girls and children with a high score in *intensity* had more variety in behavior compared with children with a low score in *intensity.*

Motor and verbal agitation were affected by the school condition as well and by the temperamental dimensions of *activity, distractibility, approach, mood* and *persistence*. Considering agitation, the boys had an higher effect of outdoor education compared with the girls.

The variable which took into consideration the amount of neutral emotion had a different result. It was mostly affected by the school condition, which means outdoor education had an impact on all the children for this variable. For the temperamental dimensions only the *approach-dimension* had an impact. Gender had no impact, but the group of children given the special education offer in reading had a higher effect of outdoor education compared with the rest of the group. The amount of *positive communication* followed almost the same pattern, except that none of the temperamental dimensions had an impact on the results, only the children from the group giving a special education lessons in reading, was dividing from the rest of the group in this variable.

Outdoor education had no impact on the amount of negative communication while positive communication was affected by the school conditions to a much greater degree. This supports the argument that there is a difference in how the school conditions affect communication. Negative communication was, in fact, affected by almost all the temperamental dimensions, by gender (boys

higher than girls), and for the group who did not receive the special reading education lessons who had more negative communication than the three children belonging to that group.

The conclusion of this study is that even though outdoor education has a positive impact on all children, it has a greater affect on boys and for children at risk considering their temperament. For the children who belong to the group given a special reading education offer, the effects vary. There is different ways of dealing with this stress when they were supposed to do tasks which is especially difficult for them, and the three children in this study are among the quiet ones. These children showed a greater degree than the rest of the class of reducing the amount of neutral emotion during outdoor education, as well as in increasing the amount of positive communication. Other children with disabilities in reading might have created a different picture.

Article 3

Relation between the school environment and the children's behavior (Fiskum & Jacobsen, 2012c)

This article focuses on how the children's environment and the school condition affects their behavior. The first step of analysis showed a significant correlation between most of the variables during the whole day, both during teaching time and leisure time. The only variable that did not show any correlation to the school setting was the amount of negative communication. Motor agitation, verbal agitation and positive communication were significantly connected to the school setting both during leisure time and teaching time, and also when looking at the whole day. Physical activity had a significant correlation to the school condition in both leisure time and teaching time, but during leisure time the highest amount of physical activity was in the indoor condition. This was still considerably less than the amount of teaching time, so in general the outdoor condition had a significant higher amount of physical activity during the whole day. The amount of neutral emotion was not affected by the school condition during leisure time.

Looking closely at the day-to-day curves of each variable gives a more detailed picture of outdoor education. For physical activity, it is possible to see the line is curving up when the school condition changes: there is a much higher amount of physical activity during the days with outdoor education. When we look at leisure time, observed to a lesser degree in this study, we see another picture; there is more physical activity during leisure time in the indoor setting, compared with the outdoor setting. This is in some way surprising, since due to the enormous possibilities for activity in a natural setting, as well as the wide area availability for those activities, one would predict a high amount of physical activity. This was not the case in this study. This school had an enormous outdoor schoolyard

around the school, which might have had a positive impact on the physical activity while at school. During the outdoor condition, the children were also observed during their eating time, which often lasted for a quite long time. Even though other research has shown that children are likely not to compensate for the lack of physical activity in schools during their own play in the afternoon (D. Dale et al., 2000), the results from how the children in this study spent their leisure time in school could indicate that they will begin vigorous activity during the school day once they have been given the permission to do so.

Motor and verbal agitation follow the same pattern: there is less agitation during the outdoor condition than when looking at the teaching time and the day as a whole. During leisure time the pattern is totally different, so for this condition it is difficult to see any pattern between the two school conditions.

The amount of neutral emotion is analyzed by looking at the emotions in this study. Here there is a clear curve showing the connection between neutral emotion and school condition. Outdoor education reduces the amount of neutral emotion during teaching time and for the whole day. The pattern for leisure time is totally different, follows another curve, and is not depend on the school conditions.

The amount of positive communication also shows a clear connection to the school conditions when looking at the observations of the teaching time and for the whole day. Observations for the leisure time do not follow the same curve, and the children's communication does not seem to be influenced by outdoor education environment. The amount of negative communication is also small and there does not appear to be a pattern between school conditions. However, positive communication is higher during outdoor education and consequently the negative communication constitute a lower percent of the total amount of communication during outdoor education.

The day-to-day descriptions of two of the observed pupils gives a picture of how the they might behave. It also shows a trend towards combined variables, like increased physical activity, positive emotions, positive communication and lack of negative behavior.

The article discusses the relationship between teaching time and leisure time during the two school settings. The positive and wanted changes in behavior are most apparent during the teaching time and less during the leisure time, but the pattern is not very clear. It could also be the teacher's way of

organizing the outdoor education, or the natural environment which impacts the children in a positive way; this article makes no conclusions on this topic.

Article 4

How Outdoor Education Affects Children with Reading Disabilities (Fiskum & Jacobsen, Submitted)

This article involves two minor studies that are analyzed and discussed both individually and together.

The main finding in study 1 are the differences in reduced well-being during indoor education. Whereas the children attending the group being given a special education offer in reading described their reduced well-being as influenced primarily by tasks that are too difficult for them, the responses from the rest of the class were the other way around; their reduced well-being during indoor education was mainly caused by boredom. This can be interpreted to mean that children with reading disabilities are forced into the *telic* state of mind (Apter, 2001) to a higher degree during indoor education compared with the rest of the class; the children with some kind of reading disabilities have more arousal in outdoor education than they experience during indoor education. There is also a difference in their feelings of high well-being during outdoor education. When comparing the boys in the two groups, the group offered special education lessons in reading was less likely to explain well-being by selecting *fun*. In this setting, the children belonging to the special reading education group might feel stress relief in accordance with Apter's Reversal Theory.

In the second study, the pattern of explanations from the children with reading disabilities is analyzed further. Here we can see that the boys mostly report a high degree of well-being, often citing *fun* and *joy* in both school conditions. When they talk about the lessons in special education, the answers differs from the rest of the situations. In this setting they are likely to report mastering as an explaination for high wellbeing. During outdoor education this boys are more likely to report *mastering* as an explanation for high well-being, and the boys are likely to credit their the well-being with *fun* and *joy*, but also express feelings *of mastering* in some academic work outside.

Compared to the boys, the girls in this special group more often report reduced well-being due to the *lack of mastering*. Examples of situations the girls see as difficult to master include fear of missing messages from the teacher, especially if it is noisy around them, not managing to write English words in their books, not managing to write the correct answer in English, not knowing where to start reading when they are called upon to read aloud in a language lesson, not understanding the CD in English lessons, and not managing the tasks in mathematics. During outdoor education the reduction in well-being is explained by boredom. Difficult situations in outside education were not connected

to the academic subjects, but rather to physical activity, except in one case. Running dictation, a combination of academic work and physical activity, was difficult for them but did not reduce well-being as the task was difficult for everybody, but funny. In this task, these girls were in the *paratelic* state (Apter, 2001) and the stress of *not mastering* was not important.

When looking at the visible negative and positive reversals, there appears to be fewer negative reversals during outside education. Inside, pupils have a tendency to give themselves small breaks during academic work. The boys often yawn and take both permitted and silent breaks, but the girls often experience agitation when taking breaks. The boys' small breaks are therefore seen as internalizing behavior, while the girls' breaks are externalizing behavior.

When looking at both studies together, this article can conclude that going outdoors offers stress relief for this group of children with special education lessons in reading. This stress relief can help to increase the quality of their learning and their motivation, as well as have a positive impact on their self-concept (in accordance with Harter, 1980; Harter, Waters, & Whitesell, 1998; Harter, Whitesell, et al., 1998).

Discussion

The main findings in this research are that outdoor education can decrease the demands of action regulation for children. This leads to a reduction in the problematic behavior that normally has to be corrected by the teachers. Some variables, like decreasing the amount of neutral emotion, or increasing communication and physical activity, appear for every child, but the amounts differ between groups of children. At school, the children are spending most of their time in neutral emotion, which might indicate a lack of presence in the situation as well as an ability to adapt to the situation. Nevertheless, healthy development should involve variability in the emotions, at least throughout parts of the day. Outdoor education can decrease the amount of neutral emotion, bringing a higher variability of emotions into the day. Communication, which is an important part of building the social abilities needed for healthy development, increases for everyone during outdoor education. Outdoor education also increases the amount of physical activity which is an important part of healthy development, as well as influencing other behavioral variables such as reducing the amount of neutral emotion and the amount of motor and verbal agitation. Being in an outdoor educational setting for groups of children who demonstrated behavior which during the indoor education had to be corrected, had a positive impact on motor and verbal agitation.

Some subgroups within the temperamental theory had a higher outcome in some of the behavior variables because of outdoor education. Boys had a higher outcome than girls, and the group of children with some kind of reading disability had a higher outcome compare with those not in this group. The group of children with reading disabilities also displayed a different outcome than the other pupils in feelings of mastering and not mastering in the school situations. The results also showed that outdoor education may contribute both directly and indirectly to learning outcomes, even though this is difficult to measure and is only a minor part in this study. The curiosity and foundation knowledge children gain during their free time activities during outdoor education is explored in the study, but not the teacher's application of these in the classroom later on.

Findings from article 1 show that outdoor education can reduce the stress of action regulation, as well as give children a way to burn off some energy. Boys and girls show different patterns in activities and in the affordances they grasp. The different environments seemed to have more impact on the boys' activities compared with the girls. This article also found that the environment can have a direct impact on the learning of academic topics by making children more aware of and curious about some events. This article does not reveal whether gender affects how children talk about their activities or if they behave differently during those activities.

The findings in article 2 reveal that boys and girls also behave in different ways during the different school conditions. The boys are more active and show more agitation during the indoor condition. Levels of physical activity increases when moving outdoors, and behavior that would normally need to be reprimanded, was noticeably absent. This study also argues that the variables of physical activity, neutral emotion, and positive communication are highly predicted by school condition. Both verbal and motor agitation are also predicted by school condition, but only for the group of children who have that kind of behavior. The amount of negative communication was not predicted by school condition but by the individual factors. Overall, this study shows that all the subgroups experienced positive effects from outdoor education: some of them were more vitalized during those days, while others reduced the unwanted behavior. For the children with special reading education needs, those days were also vitalizing.

Findings from article 3 show that outdoor education has a positive impact on verbal and motor agitation, physical activity, positive communication, and the amount of neutral emotion when looking at the day as a whole. If teaching time and leisure time are looked at separately, the result was different. During leisure time the variables of physical activity and amount of neutral emotion were not in favor of the outdoor condition. For the amount of neutral emotion there is no visible pattern between the school conditions during leisure time. For the physical activity, the results were in favor of the indoor condition during leisure time.

Article 4 shows that outdoor education can provide stress relief for the children with reading disabilities and that their experience of reduced well-being during the indoor school condition were most frequently explained by saying that the task had been too difficult for them. During the special education offer in reading, the boys were more likely to report mastering as an explanation of high well-being, while the high well-being outside was explain with both mastering and joy. The girls were more likely to report reduced well-being because of lack of mastering during the indoor conditions, while the reason for reduced well-being during the outside condition was frequently boredom. This study also showed that this group of children had less negative behavior during outdoor education, and that the boys showed more internalizing problem behavior and the girls higher amount of externalizing behavior inside.

Is outdoor education a step in the right direction to appeal to the nature of children?

> It is no wonder that pupils who have to sit in this way for several hours a day break out in bursts of immoderate noise and fooling as soon as restraining influences are removed.

> Since they do not have a normal outlet for their physical energy to spend itself, it is stored up, and when opportunity offers it breaks forth all the more impetuously because of the nervous irritation previously suffered in repressing the action of an imperfectly trained body. (Dewey & Dewey, 1915, page 136 and 137)

Dewey did not consider schools to be places that allowed children to be children. He describes classrooms as rooms with ugly desks, so full of those ugly desks that there was hardly room to move, a place designed to handle as many children as possible in a passive way. The children had only enough space to use their books and pencils. The only things they could do were listen, read and write (Dewey, 1956, chapter 2). Dewey reminded us that we should remember that the pupil has a physical body as well, something that needs to work in conjunction with his mind; they are mutually dependent upon each other (Dewey & Dewey, 1915, chapter 2). This physical body is full of energy and needs to stay in activity (Dewey, 1966, chapter 11).

When pupils' have to regulate their activity, sitting still when they are more naturally prone to movement, they become exhausted and their natural and native impulses are stiffled. Instead, they should be guided or directed (Dewey, 1966, chapter 8). This should not be done by physical compulsion, but rather by providing children with possibilities to gain experiences from social situations. In those situations children have to adapt their way of acting to the way others are acting and responding (Dewey, 1966, chapter 3; Jacobsen & Svendsen, 2010; Panksepp, 1999).

The findings in this study show that outdoor education can be a useful tool for increasing a pupil's level of physical activity, which is something children need for healthy development (for example D. Bailey, 2000; D. P. Bailey et al., 2012; R. Bailey et al., 2013; Bjorklund & Bering, 2002; Carey, 1992). Since physical activity is seen as a method for enhancing children's *executive function* (Tomporowski et al., 2008), outdoor education might also contribute to a healthy education and development for more areas than just physical health. In the last 30 years, *executive function* has been linked to developmental neuropsychology, and impairment in executive function has been linked to developmental disorders like Attention Deficit Hyperactive Disorder (ADHD) (Hughes, 2002b). The increasing extent of ADHD and problems associated with it has been the subject of many studies (for example Mueller & Tomblin, 2012; Ponde, Cruz-Freire, & Silveira, 2012), and alternative treatments such as physical activity (Barnard-Brak, Davis, Sulak, & Brak, 2011; Chang, Liu, Yu, & Lee, 2012; Verret, Guay, Berthiaume, Gardiner, & Beliveau, 2012) or staying in green outdoor settings (Kuo & Taylor, 2004) ways of treatment. In Norway, a study of 9430 children aged 7-9 years showed 5,2% rated with ADHD (Ullebo, Posserud, Heiervang, Obel, & Gillberg, 2012), while a study among 11 year old children showed that 2.9% were diagnosed ADHD, with a higher prevalence among boys (Suren

et al., 2012). Even though there is strong evidence for neurological causes for ADHD, there is also research that addresses the risk factors and the ways to lessen them. Pires et. al. (2012) connects ADHD to negative family relationships. Carey (Carey, 1992) offers the environment's poor accommodation of the individual temperaments as a possible explanation for the large number of diagnosed children, stating that an ADHD diagnosis might be a result of a normal variability in behavioral styles including persistence, attention span, distractibility, and activity. When this group of children is not receiving the stimulus they require, when they are not allowed to behave and respond in ways that are socially acceptable, they are diagnosed with a disorder when in fact, their behavior may only be caused by their inherent temperament. There is simply a group of children not being met by the goodness of fit-concept (for the goodness of fit-concept, see Chess & Thomas, 1999; A. Thomas & Chess, 1977). This study's results about the relatively low presence of agitation during both indoor and outdoor conditions, and a significantly lower amount during outdoor education (Fiskum & Jacobsen, 2012a, article 2; 2012c, article 3), is a way to bring all children into positive cycles of behavior and goodness of fit, which also meets their nature and inherent needs. This can even contribute to long term benefits for the group of children at risk for behavioral disorders.

A decreasing amount of neutral emotion during outdoor education indicates that it is possible to get training to help handle mood variations and to become more aware of the emotional self (J. J. Campos et al., 2004; Goleman, 2006; Sameroff & Fiese, 2000; Sroufe, 1996). Laughter is not measured in the analysis in article 2 and 3 (Fiskum & Jacobsen, 2012a, 2012c), but the reduced amount of neutral emotion can be linked to more frequent laughing, since the findings in article 1 and 4 (Fiskum & Jacobsen, 2012b, Submitted) also indicate a lot of fun and a high degree of well-being. Laughing is an ancient and inherent part of our nature (Panksepp, 1998, 2007; Panksepp & Burgdorf, 2003), and as a consequence laugher should be a natural part of children interacting together.

The stories the children share in articles 1 and 4 (Fiskum & Jacobsen, 2012b, Submitted) and the behavior studied in articles 2, 3, and 4 (Fiskum & Jacobsen, 2012a, 2012c, Submitted) give evidence for children's well-being and comfortableness in outdoor situations. They are being vitalized and at the same time more regulated, and they are saying they enjoy it. This way of learning in an outdoor educational setting is more similar to the evolved child, and the way human infants have learned throughout the centuries (Bjorklund & Bering, 2002). Children are not passive receivers. They like to stay in activity and are inherently curious. This curiosity is the motor behind their exploring and seeking, which they will do if given the opportunity (Dewey, 1910, chapter 3).

The demands in school are unrealistic at times for children who are dividing their energies between what is expected in the classroom and what they innately feel compelled to do. In some way children are asked to reach beyond the experiences they already possess (Bjorklund & Bering, 2002; Dewey, 1997, chapter 1) and that are natural to childhood in favor of conforming to a rigid set of rules. Dewey looked at the teaching in schools as mechanical and influenced by dualism because it was reducing the physical activity in ways which create a separation between the body and the mind; between the body and that of recognizing the meaning (Dewey, 1966, chapter 11).

Outdoor education and holistic learning

Holistic learning is more than remembering facts. It involves everything we learn in a more or less holistic way, as well as how we approach the learning process. It is complete learning that utilizes the whole body, as we have the ability to learn with more senses than just sight and sound. Holistic learning also means learning about ourselves and other people, and how we connect together, as well as learning academic topics in depth and seeing how they relate to each other. Two studies from Denmark show that outdoor education was a positive contributor for children's social relationships (Bentsen, Mygind, & Randrup, 2009; Mygind, 2009), health, well-being (Bentsen et al., 2009), experiences from teaching, and self-perceived levels of physical activity (Mygind, 2009). A natural environment positively influences happiness and well-being (Kamitsis & Francis, 2013; Van Herzele & de Vries, 2012; Zelenski & Nisbet, 2014). It can also increase children's emotional affinity toward nature and their positive mental, emotional and social health outcomes like their sense of achieving, self-confidence, self-esteem, adaptation to different learning styles, sensory engagement, engagement in school, skills in caring and nurturing, connectedness to others, feelings of freedom and creativity, and feelings of stress relief (Maller, 2009). For children at risk, the natural environment can have a positive impact on unwanted behavior like that which is non-socially aggressive, inattentive, impulsive and hyperactive (van den Berg & van den Berg, 2011). Even though no children in this study were diagnosed as at risk for behavioral disorders, those with the most frequent occurrences of unwanted behavior experienced a similar positive effect during the outdoor education days (Fiskum & Jacobsen, 2012a, article 2). This is supported by a study of 11-years olds in the UK. During outdoor education all the children experienced emotional variables like energy, hedonic tone, stress and anger, and the group of children defined within that group as having poor behavior benefitted more than the group of children defined within that group as having good behavior (Roe & Aspinall, 2011).

Outdoor education gives permission for teachers and pupils to communicate with each other: the results from this study also show an increased amount of communication (Fiskum & Jacobsen, 2012a, article 2; 2012c, article 3; Submitted, article 4). A communicating child is an active child who has grasped the richest and most elaborate affordance, another human being (Gibson, 1986). Holistic learning demands good skills in communication, something also highlighted in the Norwegian Curriculum of Education (The Royal Ministry of Education Research and Church Affairs, 2005) and the newer framework for basic skills (Norwegian Directorate for Education, 2013). Practicing communication develops better communication skills, skills that are crucial when learning about each other, learning to understand each other, and learning to be social with others (Røkenes, 2006). Negative communication can lead to bad feelings, and can create a low self-esteem when children begin to see themselves as they think others see them (Mead & Morris, 1934). Negative communication is not affected by the school condition (Fiskum & Jacobsen, 2012a, article 2; 2012c, article 3), but rather by individuality (Fiskum & Jacobsen, 2012a, article 2). Nevertheless, negative communication represents a smaller percentage of the total communication during outdoor education, and as a consequence it might be less harmful. This means that there are more positive occurrences of communication overall. Outdoors children are given good opportunities to know and to understand each other, the teachers get to know the pupils in a different setting, and the *goodness-of-fit* concept is embraced (Chess & Thomas, 1999) for each pupil.

Reducing unwanted behavior and increasing wanted behavior during outdoor education, as shown in this study, can have a positive impact on the learning environment simply because it is less noisy and behavior which might scare some pupils is absent. The lessening of unwanted behavior gives children who might be at risk for unhealthy development a better chance of developing a positive self image when looking at themselves through the eyes of others (Mead & Morris, 1934). The increased potential for physical action may also help this group of children learn to regulate actions (Dewey & Dewey, 1915, chapter 6; Panksepp et al., 2003), a crucial skill at school and in society.

Being active in a natural environment and increasing the amount and variability of physical activity, as found in this study, provides opportunities for pupils to learn to know their bodies and has a positive impact on the development of their motor skills (Fiskum, 2004; Fjørtoft, 2000; Grahn, 1997). This in turn will have a positive impact on the development of the self (Harter, 1985).

Getting to know the local environment creates identification with the place they live. This, along with real life experiences, can contribute to holistic learning and decrease the amount of inzularisation (Zeiher, 2001). The results in this study, especially those found in article 1 (Fiskum & Jacobsen, 2012b), show a group of children who know the environment around their school well, which is a

step against inzularisation and toward a more holistic awareness of the nearby local environment. Learning this way will help bring the teaching of academic topics more to the right and further down in the table (see table 1) of Bloom's taxonomy (Bloom, 1956), which article 1 (Fiskum & Jacobsen, 2012b) validates.

The increased amount of communication (Fiskum & Jacobsen, 2012a, article 2; 2012c, article 3), the observation of the activities (Fiskum & Jacobsen, 2012c, article 3; Submitted, article 4), and the children's stories about staying together and playing during outdoor education indicate that there is an increased amount of cooperation during outdoor education (Fiskum & Jacobsen, 2012b, article 1; Submitted, article 4). According to Dewey, this is crucial if children are supposed to learn solidarity (Dewey, 1956, chapter 1; 1997, chapter 7). Practical tasks in a natural environment also seem to have positive influence on the learning of social skills (Laaksoharju, Rappe, & Kaivola, 2012).

Motivation and self-concept

Children's motivation when learning topics out of context can be seriously lacking (Bjorklund & Bering, 2002). Telling a child they have to do or learn something will not necessarily teach that child to train their will, but rather they learn to pretend to be working while the mind is 'doing other things' (Dewey, 1972). If the teacher is using his or her competence to heighten the pupils' interest in a topic, or to use the pupils' own natural instincts to learn or do the task, then it may be possible for the teacher and pupils to work together to cooperate in concrete tasks and work towards the goal of behavior regulation (Dewey, 1966, chapter 6). Since interests are constantly growing and changing, they are rich with both experience and energy (Dewey, 1972). This could be compared to extrinsic and intrinsic motivation (Deci & Ryan, 1985). Even though Deci, Ryan, and Dewey highlight the importance of intrinsic motivation, they also see some positive effects of extrinsic motivation. Deci and Ryan look at extrinsic motivation as a kind of motivation which can reverse itself to become intrinsic motivation (Deci & Ryan, 1985, chapter 9), and Dewey as something that might be needed to train the will to be more adapted to the demands around us (Dewey, 1972).

The children's stories in article 1 (Fiskum & Jacobsen, 2012b) are examples of intrinsic motivation for the activities they are doing during outdoor education. The reduced amount of agitation and neutral emotion as outlined in articles 2 and 3 (Fiskum & Jacobsen, 2012a, 2012c) might indicate more intrinsic motivation during outdoor education as well.

The feelings of mastering or a positive feeling of perceived competence within the theme or topic are important for intrinsic motivation (Deci & Ryan, 1985; Harter & Jackson, 1992; Harter et al., 1992); they bring the child into a positive circle of motivation and learning. Highly perceived competence

makes children intrinsicly motivated, which increases their activity and helps develop more competence. Giving children positive experiences of perceived competence is therefore crucial in the aim of bringing children into positive learning patterns and to reach the goodness-of-fit concept (Chess & Thomas, 1999; A. Thomas & Chess, 1977). Renick and Harter (1989) found that when children with learning disabilities compare themselves to other children with learning problems, they are more likely to have a high perception of their own competence. This is in accordance with the findings in article 4 (Fiskum & Jacobsen, Submitted) where children with reading disabilities report other feelings in the special education lessons than in the lessons in the classroom with the rest of their classmates.

The variety of activity during outdoor education is a way to create adapted teaching for everyone (Jordet, 2010). This can also help keep everyone within the field of flow (Csikszentmihalyi, 2000; Csikszentmihalyi & Csikszentmihalyi, 1975) because there will always be something to master and to be challenged with. This way of working might therefore be a step forward in attempting to bring everyone into positive patterns of learning. This is especially visible in article 4 (Fiskum & Jacobsen, Submitted) where the children with reading disabilities are reporting they had a feeling of mastering tasks in outdoor education that was higher than their classmates.

Even though Apter`s Reversal Theory (Apter, 2001; Apter et al., 1988) is mainly a theory about metamotivation, it is useful in shedding more light on the intrinsic and extrinsic motivation in school children. The paratelic state of mind has the impact of moving children toward intrinsic motivation. This is shown in article 4 (Fiskum & Jacobsen, Submitted) where the children are eagerly engaged in tasks they find funny even when the tasks are perceived as difficult. This provides useful insights into ways to approach tasks which are difficult, and thereby come into a good circle of motivation and learning (for the circle of positive motivation, see Harter et al., 1992) while still keeping people within the field of flow (Csikszentmihalyi, 2000; Csikszentmihalyi & Csikszentmihalyi, 1975). This is similar to Harter`s findings (1974) where the mastering motivation in children is greatest when they managed difficult tasks; the tasks can be mastered, but there are still some challenges to solve. Another way of starting to work with a theme is to take the bottom-up approach, which demands an informal start for the learning process allowing room for children to be intrinsically motivated (Fallik et al., 2013). In the analyses in article 1 (Fiskum & Jacobsen, 2012b), many academic topics are defined. If the teachers use those topics of interests, and brings them into the curriculum, they can be used to teach intrinsically motivated pupils who have some experience with the theme and therefore a greater opportunity to master something within that topic.

Adapted teaching

Adaptive teaching has been given a large emphasize in the Norwegian school system (E. L. Dale, 1996). Every child should be presented with the best alternatives for a positive development. A Norwegian researcher has argued that outdoor education is suitable for this type of adapted teaching for all children. He believes that creating a relationship between the activities of teaching inside the classroom and outside the classroom is the only way for adapted teaching to work (Jordet, 2010).

The findings in article 2 (Fiskum & Jacobsen, 2012a) present a variety of behavioral outcomes found during the outdoor education days. All children experienced the benefit of the vitalization that comes with more physical activity, as well as increased communication, and a broader repertoire of emotions. Boys and temperamental groups find even greater benefit in increasing physical activity thereby reducing the agitating behavior. When that happens for pupils with behavioral problems, the working conditions and learning environment can be better for every child in the class.

The findings for the subgroups of temperament in article 2 (Fiskum & Jacobsen, 2012a) are similar to theories which pronounce that children demonstrating disruptive behavior will probably benefit most from an alternative school condition (Chess & Thomas, 1996; A. Thomas & Chess, 1977). It also support the concept of Goodness-of-fit (Chess & Thomas, 1999) and how we might work to get the children into positive patterns regardless of temperamental styles.

Perhaps outdoor education also can deal with stress and behavioral problems connected to learning disabilities. The children with learning disabilities in study 2 (Fiskum & Jacobsen, 2012a) seem to have well regulated behavior, but they are among the quiet ones who demonstrate a greater change in vitalization. This can all be linked to the internalizing of problem behavior. Similarly, in a study with a group of 11-years old children demonstrating a lot of unwanted behavior, they benefitted more with an alternative and complementary outdoor education practice than the group of children not having this basis of behavioral problems (Roe & Aspinall, 2011). A theoretical study from 2013 (Fernandez-Vilar & Carranza, 2013) showed that temperamental factors are important in children's school performance. The authors specially highlight the relationship between self-regulation components (attentional control, inhibitory control, and activation control) and negative emotionality (fear and anger), and their impact on classroom behavior. This enforces s the need for functional adapted teaching and the Goodness-of-fit ideal.

Any new environment may produce negative behavior such as hyperactivity, increased affiliation, or lack of attention. However, in the beginning, this behavior may be an appropriate and necessary expression of a dialog between the child and the new environment (Martin, Falk, & Balling, 1981).

For example, children with a low score in *adaptability* have extra challenges with a new learning environment (Chess & Thomas, 1996; A. Thomas & Chess, 1977), including outdoor education which is an environment normally considered to be a positive element in adapted teaching. None of the variables for this group of children in this study (Fiskum & Jacobsen, 2012a, article 2) were affected, perhaps because they were already accustomed to outdoor education and felt no uncertainty about it.

Children with learning disabilities are at risk in several ways and are therefore in need of adapted teaching in order to ensure holistic and healthy development in general. Several studies have found relationships between internalizing problem behavior (withdrawal, somatic complaints, anxiety, and depression) and learning disabilities (Arnold et al., 2005; Casey et al., 1992; Heiervang et al., 2001; Moilanen et al., 2010; Mugnaini et al., 2009; Nelson & Harwood, 2011; Yu et al., 2006). Externalizing problem behavior (delinquent and aggressive behavior) has also been related to learning disabilities (Heiervang et al., 2001; Moilanen et al., 2010). Other studies have examined the different aspects of self-esteem among children and youth with learning disabilities (Casey et al., 1992). When interviewing Swedish youth and adults with dyslexia about their time in school, Ingesson (2007) found that a majority of the participants had experienced feelings of being different, inferior or stupid during their six first years in school. Harter, Whitesell and Junkin (1998) found that learning-disabled children reported themselves as lower within cognitive competency and peer likability, compared with their normally achieving peers. Studies have also shown children with learning disabilities at risk for social maladjustments, having problems with their emotion regulation (Bauminger & Kimhi-Kind, 2008), and scoring lower in emotional intelligence (Mavroveli & Sanchez-Ruiz, 2011). These at risk factors connected to learning disabilities highlight the need for those children to find mastery in other arenas in order to increase their self-esteem, which in turn will influence their global self-worth in a positive way (Harter, 1985). This lends extra credence to the findings in article 2 and 4 (Fiskum & Jacobsen, 2012a, Submitted) which shows that children with reading disabilities are more vitalized with more frequent mastering opportunities during outdoor education.

A study by Haug, Torsheim and Samdal (2008) found that more facilities in the school yard increased the amount of physical activity, but only for the group of children who had an interest in physical activity. Consequently, doing something with the schoolyard only activates the pupils who are most liable to increase their physical activity in the first place. If we want to change the amount of physical activity in groups that really need help increasing it, we need to look at a variety of factors, for example, psychosocial factors and motor skills (Guinhouya, 2012). Moving in a natural environment may offer more opportunities for children with low motor skills; a lack of social predictions on how to

use the many affordances (for social predictions of affordances, see Gaver, 1996) in the natural environment may be beneficial. For example, you may choose to climb onto the first branch of one tree, or you might simply choose to crawl under the branches of a second tree. This intervention can be helpful for children who are afraid of not mastering, or being measured, when they are going to move in a standardized gymnasium or on standardized equipment. Additionally, staying in a natural environment also has the potential to increase the motor skills of children (Fiskum, 2004; Fjørtoft, 2000; Grahn, 1997) that may be a way of helping inactive children increase their physical activity. Consequently, outdoor education can be a suitable method for adapted teaching that is aimed at getting everyone into a higher level of physical activity. In article 2 (Fiskum & Jacobsen, 2012a) all children have increased physical activity. For a few of them, however, the increase is hardly visible which creates more questions about whether outdoor education really does provide a sufficient amount of physical activity for everybody.

Is the school in the changing society failing to meet the boys?

Research has found gender differences in physical activity: boys have a tendency to be more active compared to the girls (Fiskum & Jacobsen, 2012a, article 2; 2012b, article 1; Harten et al., 2008; Haug, Torsheim, Sallis, et al., 2008; Leatherdale, 2014; Lopes et al., 2006; Nyberg et al., 2009; Waring et al., 2007). The findings in article 2 (Fiskum & Jacobsen, 2012a) also show that outdoor education has a higher effect in decreasing behavioral problems in boys, findings which support the findings made by Gustafsson (2012). Perhaps the larger prevalence of ADHD among boys (Suren et al., 2012) can be linked to such a poorness-of-fit (Chess & Thomas, 1999) situation in school. In Norway, boys have a higher drop-out rates than girls (Statistisk Sentralbyrå, 2012), which might be caused by differences and factors that were already in place when they started their secondary education (The Royal Ministry of Education Research and Church Affairs, 2007/2008). This highlights the importance of meeting the boys with Goodness-of-fit (Chess & Thomas, 1999) during their early years at school.

Academic learning in outdoor education

Teaching in school still has to rely on formal teaching. We have an detailed curriculum (2005) which demands formal teaching and direct learning if we are supposed to reach all the specified goals. This format can, however, increase the gap between the children's experiences at school and in real life (Dewey, 1966, chapter 1). Outdoor education might be an idealistic way of teaching, but it is time consuming. In a study from USA, the authors found that teachers found it difficult to use outdoor education as a supplement to their classroom teaching because they felt constrained by the school

curriculum, heavy testing of the academic content, and lack of competence in outdoor education teaching methods. The traditional instruction methods in the classroom were seen as more effective in reaching all the goals (Carrier, Tugurian, & Thomson, 2013), even though outdoor education or garden projects as supplemental methods have shown benefits within the academic sciences (Blair, 2009; Klemmer, Waliczek, & Zajicek, 2005; Smith & Motsenbocker, 2005; Williams & Dixon, 2013). If we are going to defend the use of outdoor education with our pupils, we will have to look into the benefits of informal learning and the indirect impact on academic outcomes through the concept of self, the pupils' mastering and motivation, or holistic learning.

Although Bloom's taxonomy (Krathwohl, 2002) was mentioned under the heading holistic learning, it is more a taxonomy that is suitable for looking at different levels of learning as well as for finding ways to measure it. This taxonomy addresses the degree of deepness and wholeness in the learning, and not necessarily the most relevant topics for testing academic outcome. If outdoor education as an alternative and complementary method is able to bring academic learning more deeply and to the right in Bloom's taxonomy (see table 1), this way of working can be argued as a teaching method that appeals to the innate nature of children. This is in accordance to Dewey's view on the experience in education.

> An ounce of experience is better that a ton of theory simply because it is only in experience that any theory has vital and verifiable significance. An experience, a very humble experience, is capable of generating and carrying any amount of theory (or intellectual content), but a theory apart from an experience cannot be definitely grasped only as a theory. (Dewey, 1966, page 144)

How effective an education experience is depends to a great degree on whether or not the teacher has made it possible for the pupils to see the relationships between their own actions and other relevant material. When the principles of continuity and interaction are addressed there will always be something from the past that is transferred into the present situations, as well as present experiences preparing the ground for situations in the future (Dewey, 1997, chapter 3, 7 and 8). To be educative, the experiences need to be connected to the academics topics, and children need help in understanding the relationship between the experience and the academic topic he or she is supposed to learn (Dewey, 1997, chapter 8). If we are to help the children with that, no book can be a substitute for personal experience (Dewey & Dewey, 1915, chapter 4).

Looking into the affective domain of Bloom's taxonomy (Krathwohl et al., 1964), the awareness and accessibility of the topics also can have an indirect effect on academic outcomes, creating an environment more conducive to holistic learning. The many topics the children mention in article 1

(Fiskum & Jacobsen, 2012b) can, within the affective domain, be seen as topics they have 'their eyes open for' therefore influencing the learning topics in a positive way.

Studies show a relationship between physical activity, academic learning, and cognition (Etnier et al., 1997; Hillman et al., 2008; Sibley & Etnier, 2003; Tomporowski et al., 2008), and between physical fitness and academic learning (Raine et al., 2013). The increased levels of physical activity in this study also demonstrate that it makes a positive difference in academic learning which in turn is affected by the learning environment. Positive affects discussed under the heading of holistic learning, indirectly affect academic outcomes and contribute to better learning conditions because agitation is more frequently absent.

Doing research in schools

The possible positive and negative effects of outdoor education are many, but what really determines its value in school is whether pupils are learning something or not. This is difficult to measure because the outcome can be influenced by more than one variable. This should make us aware that validating an intervention in school is a challenging area of research to go into.

If we want to go into this research in the post-positivistic way of doing science (Creswell, 2009) it will be difficult to find a design which has strong validity and reliability, and it will demand much effort and time. Additionally, as discussed earlier in the thesis, high construct validity will often threaten both the internal and external validity. Children's behavior and especially their experiences are very variable. Consequently, it will be easier to avoid such research, and rather do research on other topics, or on another area of the topic, which is easier to place into the post-positivistic ideal. This is done gradually in this thesis, since the behavioral variable is more emphasized than the learning topics. The behavioral variables are easier to measure with high validity and reliability, but when comparing two different conditions with two different sets of demands we are in a different area of research design which would be easier to avoid.

Observing overt emotions or communication is easy enough; the child cries, laughs, or his emotion is neutral, he talks or does not. This is easy to note. On the other hand, there is sometimes a lack of connection between overt emotional expression and the real emotion. This is not measured in the observations which constitute the data in article 2 and 3 (Fiskum & Jacobsen, 2012a, 2012c), nor is the nonverbal communication. Observation of agitation is more complicated and challenging because behavior that is seen as agitating inside the classroom, is normal behavior outside the classroom (or

in some settings like practical tasks inside the classroom). If we decide to measure specific verbal or motor behavior we are able to obtain a strong demand of construct validity and reliability but we are not necessarily measuring what we want to measure according to our hypothesis or research question. If, for example, we want to measure the degree of motor agitation, we have to rely on what is seen as motor agitation in the condition we are observing, and not measure actual movements. If the class, for example, has physical education and is supposed to run, the running child is not agitating at all, while the child, who eventually refuses to run, is the one who is agitating. This is also the evaluation approach in the study by Mårtensson et al. (2009) which used a standardized evaluation scale to measure hyperactivity. This study was limited by the scale however, which was sensitive to actions more acceptable outside than inside. The quantitative observations behind article 2 and 3 have instead utilized a method that aims at obtaining high internal and external validity by searching for the degree of an agitation instead of marking a specific type of behavior which is allowed outside but is agitating inside. As a consequence, the construct validity, and in part the reliability demands, are met in a less accurate way.

One of this study's strengths is the combination of methods and the results that are being supported by other theories. This study is done at a school where they were used to outdoor education. How this way of teaching will be when it is introduced as a new teaching method, has therefore not been explored. If the study had been conducted in a school with children not used to this way of learning, the results could have been different because children need some time to get used to a new environment, and in that period their behavior is likely to be affected (Martin et al., 1981). To explore how outdoor education will impact children when a school begins to use outdoor education as an alternative and complementary method, more studies will be needed.

This study has compared behavior and experiences between a natural environment and a large schoolyard with many nature elements. If the study had been conducted in a school with a more traditional schoolyard, with traditional equipment, the differences between the two environments especially during leisure time, could have been different as well. To explore this, more studies will be needed.

Conclusion and educational implication

This thesis contains four research articles that explore the effects of outdoor education. Realistically, if children are to learn everything in the curriculum, the teacher cannot do his teaching outside every day. Nevertheless, if we look at Dewey's recommendations for teaching, we are able to see the

potential to develop this alternative way of teaching further. The reorganization of the curriculum into more integral topics, using the principles of continuity and interaction within experience, as well as the teacher's use of both academic topics and the children's interests and needs in lessons, the potential for learning through outdoor education will be enormous. We need to remember the other benefits; physical health followed by increased physical activity, reduction in stress followed by more physical activity and less demands for action regulation, in addition to the many positive experiences and situations during play, social activities or when mastering the topics. This might, for example, create peak experiences for the children as well as feelings of self-actualization (Maslow, 1987). It could bring them into a condition of 'flow' in their learning (Csikszentmihalyi, 2000; Csikszentmihalyi & Csikszentmihalyi, 1975) which might be useful both in approaching academic topics and in becoming a healthy human being. For the children who often are being boisterous and noisy, these days with a reduction of unwanted behavior can cause the people around them to responds differently, thereby giving them a better picture of themselves (Mead & Morris, 1934). This, as well as the benefits of stress reduction, can offer children the long term benefits of this alternative school day even though the method is only used once in a while as a complementary method.

The direct academic outcomes are not measured in this study, only the experiences and gained knowledge which easily can be directly related to academic topics, and which are mostly reached through informal teaching (Fiskum & Jacobsen, 2012b, article 1). It is therefore difficult to make concludes about outdoor education and its academic outcome and formal teaching. Nevertheless, many indirect affects on academic outcome, holistic learning and healthy development can be linked to outdoor education: The non-standardized environment created with outdoor education in a natural environment gives children a lot of new ways to play and behave. This opens up possibilities for variability in behavior, and meeting every child where they are. If they can choose activities with proper challenges, a natural environment may contribute to goodness of fit for everybody; a way of doing adapted teaching. The unpredictability of this type of environment makes it less possible and less important to measure each other's abilities, which might in turn contribute to both positive circles of learning and motivation for everybody. When activities are perceived as being fun, it seems to take away some of the scariness of not mastering. This brings the children into a paratelic state (see the Reversal Theory in for example Apter, 2001) of mind and can also improve their self-esteem and intrinsic motivation.

Utilizing children's interests seems to have a high impact on their learning, innate curiosity, and intrinsic motivation for learning (Deci & Ryan, 1985; Dewey, 1972; Fallik et al., 2013; Krathwohl et al.,

1964). The power of using the concept of interests within academic learning is also partly explored in this study (Fiskum & Jacobsen, 2012b, article 1).

More research will be needed in order to more clearly define the benefits gained from outdoor education, as well as its affect on the learning process. Many alternative ways of organizing the classroom and the approaches to different teaching methods are being explored in schools today, and outdoor education continues to have its place in the research. That will give us a firm foundation upon which to build pedagogy that is effective, giving children opportunities to develop their potential within academic topics, social skills, emotional skills, practical skills, motor skills, and develop a positive self-image.

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Article 1

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Article 2

Individual Differences and Possible Effects from Outdoor Education: Long Time and Short Time Benefits

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Abstract

This study explores differences in the children's outcomes from outdoor education. The results revealed different outcomes within different subgroups: The children with an easy or a withdrawal temperament are good functioning both indoor and outdoor. Their outcomes from outdoor education are an increased vitality, which might be seen as a short time benefit. The children with a difficult or a mixed temperament increased their vitality in outdoor education too. Additionally they often showed unwanted behavior indoor, which were mainly absent when they were observed outdoor. For these children, outdoor education may contribute to reduce behavioral problems, and consequently give these children a long time benefit. The variables of physical activity, variability in emotions and amount of positive communication are mostly guided by the school conditions, while motor and verbal agitation were guided by both school condition and temperament as well as gender.

Keywords: Outdoor education, Temperamental style, Civil behavior, Goodness of fit

1. Introduction

Research have shown outdoor education to give positive impact on children's motor and verbal agitation, increased variability of emotions, more positive communications and more physical activity (Fiskum & Jacobsen, 2012, Submittet). Physical inactivity may be considered as a risk for many children (Bailey, 2000; Bjorklund & Bering, 2000; Carey, 1992). At school they are mostly seated behind their desk or a table, and after school many children are tempted to sit still with a computer or watch television. Even if many children seem to adapt to a high degree of physical inactivity, it may have temporary and future negative effects to adapt to surroundings which is different to children's biological needs (op. cit.), as well as learning strategies are becoming increasingly abstract (Bjorklund & Bering, 2000). Taking the pupils outside the school building may give different benefits like the possibility to learn more directly and less abstractly, and to be more physical active. This may lead to behavioral benefits (Dyment, 2005; Dyment & Bell, 2008; Fox & Avramidis, 2003; Grahn, 1997), mood benefits (Ozdemir & Yilmaz, 2008; Russell & Newton, 2008) and learning benefits (Canaris, 1995; Dismore & Bailey, 2005; Smith & Motsenbocker, 2005). But children are different in many ways and have variations of needs.

Temperament is a dimension for investigation of individual differences. Risk is often associated with temperamental style. Most children have an easy temperament which is associated with low risk for development of psychopathology and behavior problems (Mendez, Fantuzzo, & Cicchetti, 2002). Slow to warm up or withdrawal contains a small risk, whereas difficult temperament is a high risk condition (Paris, 2000). About 30 % of children do not fit into these three categories and there is a tendency to call this group mixed temperament. The children with mixed temperament tend to be in a slightly higher risk than children with withdrawal temperamental style (Hirshfeld-Becker et al., 2003). This

groups within temperament is build up of a combination of temperamental dimensions; Activity, Rhythmicity, Approach or withdrawal, Adaptability, Threshold, Intensity, quality of Mood, Distractibility and Persistence. These dimensions is based on data collected by Thomas and Chess in a longitudinal study on young children in New York in the 1950s (Thomas & Chess, 1977). Every child has a unique combination of more and less of these nine dimensions.

Most of the temperamental dimensions interrupt the child's life and behavior during the day at school: A child with high Activity may frequently be corrected and considered as a disciplinary problem because he/she is physical active and do not meet the demands to be quiet and sit at her/his chair. A child with a high Mood tends to be comfortable together with other children, and do not argue unnecessary when playing with other children. A child with a high persistence tries to go back to the same activity if he/she is being interrupted, and this child may work with an activity in more than an hour, as well as finishing activities. A child with High Distractibility can easily be drawn away from his/her work. This child has problem to concentrate in the midst of bedlam, and can easily be distracted and disturbed in his/her schoolwork. A child with a High Approach will not try to avoid or just watch new activities or games which he/she is presented for. This child is neither shy when meeting new children. The child with High Adaptability will easily get comfortable in new environment and situations even if the new activities in the beginning seem scaring. A child with a High Threshold is not very sensitive to temperature in the classroom, and usually not complains about the temperature in the classroom. This child is neither very sensitive to brightness and dimness of the light. A child with high Intensity shows enormous reactions if other children are taking things away from him/her, and this child often over-reacts and gets very upset in stressful situations (B. K. Keogh, 1982; Thomas & Chess, 1977).

Temperament may influence the children's life, academic outcome and behavior in different ways: There has been seen a connection between non-Adaptability and non-Approach and low academic achievement. Low persistence and short attention span may make the school situation stressful for a child, especially if it is combined with high Distractibility. Opposite, a child with a highly persistence may have problems when the teacher demands shifts in the scheduled activity. The highly active child and the highly distractibility child may have problems with adapting the school demands, i.e. sitting quiet. But the child with low Activity may also have problems because of the slowlyness these children often have in their everyday doing like dressing, eating and writing. Their academic potential are often underestimated, even though there is no connection between IQ and temperament (Thomas & Chess, 1977). Temperament may be seen as a significant contributor to a healthy development, depending on environment with adaptation to make "goodness of fit" for each individual child concerning which group of temperament the child belongs to as well as the child's levels in the different dimensions (Carey, 1992; Chess & Thomas, 1999; Thomas & Chess, 1977). Regardless of the variations in temperament types, we cannot try to solve everything with the "goodness of fit" idea, with growing age there are increasing demands to the child to adapt to environmental requirements like school conditions and school curriculum (Carey, 1992).

Since boys usually are more physical active than girls (Blatchford, Baines, & Pellegrini, 2003; Harten, Olds, & Dollman, 2008), staying at outdoor education may give them better possibility to increase their levels of physical activity, or the possibility to be physical active may reduce their effortful control to behave. Boys are also more likely to engage in rumble and tumble activities, show more aggression and do things which they usually are being disciplined for (Blatchford, et al., 2003), and consequently outdoor education may be more beneficial for them compared with the girls. A study based on interview found that the boys utilized the environmental changes in outdoor education more broadly compared with girls. The boys seemed to be more active, explorative and, in a much higher degree, they did activities which they were not able to do at the ordinary school environment. (Fiskum & Jacobsen, 2012), but whether they really differ in their actions during those days, remains to explore.

Another group of children which have stressful schooldays is the children with learning disabilities. Since this is a stressful situation and may lead these children into disadvantageous patterns, this is a group at risk (Harter, 1980).

Therefore the research question in this study is whether the variations in learning conditions have positive effects for most children or only for a little group of children at risk, or for none.

2. Method

2.1 Design

This study has an ABAB-design, where A is the baseline and B the intervention with outdoor education. In this study there are rather an impressive amount of data for a few participant than a small amount of data for a lot of participants.

2.2 Subjects

Seven boys and five girls (mean 10 years and 3 months, range 10 years to 10 years and 8 months) were recruited from a primary school which is going for outdoor education once a week in grade 1 to grade 4, and once every second week

from grade 5. These pupils were in the first semester in grade 5 and they belonged to two different classes. 31 out of 34 children in those classes were given permission to participate in the study. The group was chosen randomly from the group of 31 children.

Subject number 4, 5, 8, 9 and 11 are girls, and subject 1, 2, 3, 6, 7, 10 and 12 are boys.

Subject number 1, 3 and 5 have light problems with reading and writing. They were joining a group which was given a special education offer in several reading and writing lessons each weak.

2.3 Description of the seven days in the project

The children in the project are used to the learning condition both indoor and outdoor. They know about the different rules in both conditions, and at the special places made for outdoor education, they know the borderlines for where they is allowed to go. There are the same teachers outdoors as indoors.

The observations in the days with indoor education involved teaching, reading silent and loud, exercises in groups and individual as well as practical activities in the subject Norwegian, mathematics, social science, foreign languish, social science and music. These observations also involved breaks and lessons were the pupils was supposed to work with finishing a list of reading and exercises they are supposed to do by their own.

Outdoor education started with a gathering in the classroom. There was a 15 minute walk from the classroom to the outdoor education area. Observations started when the group reach this area. These observations involved time with academic subjects like mathematics, social science, nature science, physical education, Norwegian and foreign languish, but also free activities and lunch time were observed.

Two of the days with outdoor education were at one of the four places the school had made for outdoor education. Those places involved a lean-to, a fireplace and an outside lavatory. One of the outdoor education days (day 5) was alternative, as the groups were mixed into groups with pupils from 5^{th}, 6^{th} and 7^{th} grade, as well as they attended other places than their usual outdoor education areas.

2.4 Temperament questionnaire

To test the pupils score in different temperaments-dimensions, a short version of the teacher temperament questionnaire was used (Barbara K. Keogh, Pullis, & Cadwell, 1982). This is based on the ordinary questionnaire for teachers (Thomas & Chess, 1977), but has fewer questions for each dimension. The questionnaire has 23 assertions, and for each the teacher is supposed to note in a 7-point scale the agreement of each. This test was done in the end of the project and the observators were totally blind for the pupils' temperaments-result during the observation.

2.5 Observation

Four trained observers observed three pupils each. Observations were done in sections. Each section involved 13 observations of one pupil with 15 seconds interval and two minutes of time to write down more information about the situation. This procedure was repeated for the two other pupils the observer should observe. The pupils were at school between 8.30 and 14.00. For the indoor school condition the observation was supposed to be done four times during the day; 09.15-09.45 (two sections of observation for each pupil), 10.15-11.00 (three sections of observation for each pupil), 11.20-12.20 (four sections of observation for each pupil) and 12.30-13.00 (two sections of observations). Even though small displacement may occur, this time schedule secure that observations were done during both lessons and breaks. For the outdoor education the observations were postponed because of the gathering at school and the walking time to the outdoor education area.

2.5.1 Scales for behavior variables

This observation scales are a kind of general classification to make it possible to explore the field. For each variable there was given a guide to the observers:

2.5.2 Observation of the degree of physical activity

Score 1 was given when the child was either sitting, standing or doing some small activity like e.g. slowly walking, score 2 was given if the child was participating in a kind of activity, like e.g. fast walking, score 3 was given if the child was quite physical active like e.g. participating in activities which demanded more physical activity than fast walking e.g. using the hands to throw and catch a ball, or if the child had an activity level which normally will break sweat after a short time, e.g. running a lot or climbing.

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2.5.3 Observation of motor agitation

If no motor agitation is shown score 0 is given, while score 1-3 shows motor agitation. If the pupil did not do what he/she was supposed to do at the specific setting, it was seen as motor agitation. A low degree of motor agitation was given score 1, and a high degree was given score 3.

As a working-tool, this examples was given to the observers; Score 1 should be given if the pupil with purpose is not working successfully in relation to what the situation requires or if there is seen a lot of bothering activities which does not directly disturb the others. Score 2, which is the second level of motor agitation is seen when the child is disturbing the others with motor actions. Score 3, which is the third and highest level of motor agitation is given if the pupil e.g. is taking things from other pupils, obviously is making a racket with his/her motor activity, shows aggression to others or is completely diverted from what the others are doing. Motor activity like e.g. teasing or treating should also be given score 3.

2.5.4 Observation of verbal agitation

If no verbal agitation was seen, the child should be given score 0. Score 1-3 was given when verbal agitations were showed. A low degree of verbal agitation was given score 1, while a high degree of verbal agitation was given score 3. Additionally this examples was given as a working tool for the observers: Score 1 which is the first level of verbal agitation should be given if the pupil was talking about other subjects than the task, but maybe not disturb other pupils around himself/herself, score 2 should be given if the child e.g. was talking about other things than the teaching to a degree that was disturbing the others, or if the pupil was bickering or showing aggression against the others, score 3 was given if the pupil had a load and foul language and really disturb the others. If the pupils hurt each other with their talking, this score was given.

2.5.5 Observation of emotion

This 5-point scale goes from obviously discouragement to joy and laughter. Score 1 is given when the pupil is obviously showing discouragement e.g. by crying, almost crying or being obviously angry. Score 2 is given when the pupil shows discourage e.g. obviously signs of boredom, the third level is the neutral level were no obvious discouragement or obvious joy is shown. Score 4 deals with joy. This score is given when the pupil smiles a lot or when the pupil is really engaged in an activity and shows enthusiastic eagerness e.g. stepping out of reality and taking a role in the play. Score 5 is only given when it is possible to hear the child laugh.

2.5.6 Observation of communication

At this variable the verbal communication was noted. Negative communication was noted as negative, while the rest of the communication was interpreted as positive.

2.6 Reliability

The four observers were trained in a process which involved; introduction and exemplifications of the score-criteria, parallel observations and discussions afterward to obtain common understandings. This procedure was repeated four times. After each day of observation, all the observations and notes were discussed with each observer.

2.7 Analysis

To analyze the observations in relation to groups of pupils SPSS version 19.0 for Windows was used. Descriptive statistic is used to find mean for each variable (physical activity, motor agitation, verbal agitation, amount of neutral emotion, positive communication and negative communication) for the variability of groups for each day.

3. Results

Table 1 shows the results from the TTQ Short Form for each subject. For each dimension they are divided into two groups; one with the half of them with the lowest score and one with the half of them with the highest score within this group. Since there are hardly any differences between the children in the dimension of threshold, this temperaments-dimension is not examined any further.

<Table 1 about here>

Pupil 1: This boy is joining the group of special education. He has a low score in the dimensions of Activity, Approach, Persistence and Adaptability, and a high score in Mood, Distractibility and Intensity, and this combination places this boy within the group of children having an easy temperament.

Outdoor education has the impact to increase the amount of physical activity for this boy. It is not possible to interpret whether outdoor education has a positive or negative impact considering the variable of motor agitation, but outdoor

education does affect the amount of verbal agitation, neutral emotions and positive communications in a positive way for this child. For negative communication, the amount is so low for this child, that interpreting whether outdoor education has a positive or a negative impact on it, will not be possible.

Pupil 2: This boy has a low average score in the dimensions of Mood, Persistence and Adaptability, while he is in the group with the highest score in the dimensions of Activity, Distractibility, Approach and Intensity, and this combination places this boy within the group of children with a mixed temperament.

Outdoor education has an impact to increase the amount of physical activity for this boy, but not in the same degree as many of the others. This boy has most motor and verbal agitation in the group, and outdoor education has a positive impact to decrease these behavior a lot. This school condition also gives other benefits for this boy; decreasing the amount of neutral emotion and increasing the amount of positive communication. Outdoor education also seems to reduce the amount of negative communication a little.

Pupil 3: This boy is joining the group which is given a special education offer. He has a low average score in the dimension of Activity, Distractibility and Approach, while he has a high score in the dimension of Mood, Persistence and Adaptability. His average score in Intensity is missing. The combination of temperamental dimensions for this boy is placing him within the group having an easy temperament.

This boy is one of the pupils were outdoor education has the highest effect to increase the levels of physical activity. Outdoor education also has the effect of increasing the amount of positive communication. Similar outdoor education decreases the amount of neutral emotion for this pupil. Negative communication, motor and verbal agitation is at a very low level for this pupil, and consequently outdoor education hardly affects this pupil's amount of observations in these variables.

Pupil 4: This is a girl who has a low score in the temperament dimension of Activity, Distractibility and Approach and high average scores in Mood, Persistence, Adaptability and Intensity, and this combination is within the group of easy temperament.

This girl is only observed in six days, because she was not at school during the observation one of the outdoor education days.

Outdoor education seems to have a positive effect to increase the amount of physical activity for this girl, as well as to decrease the amount of neutral emotion. Perhaps it also has a small effect to increase the amount of positive communication. Considering the negative variables the patterns are not clear, except that there is a peak at one of the outdoor education days in motor and verbal agitation at first level and for the amount of negative communication.

Pupil 5: This is a girl who is joining the group which is given a special education offer. This girl has a low score in Mood, Approach, Persistence, Adaptabilty and Intensity and a high score in Activity and Distractibility and this is a combination of temperaments which will be within the group of children with a mixed temperament. Because this girl was not at school during the last day with outdoor education, she is only observed in six days.

Outdoor education has an effect to increase the physical activity for this girl. It also has an effect to reduce the amount of verbal and motor agitation, and to decrease the high amount of neutral emotion, as well as increasing the amount of positive communication. Considering negative communication outdoor education is neither a benefit nor a disadvantage.

Pupil 6: This is a boy with a low score in Activity, Mood and Distractibility, and a high score in Approach, Persistence, Adaptability and Intensity. This combination places this boy among the group having a withdrawal temperament.

This boy has a high level of physical activity during both school conditions, and outdoor education do not necessary increase his amount of physical activity. He has motor and verbal agitation during both school conditions, but it is not as much as other boys and it does not look like outdoor education is able to decrease the amount of it. He does have an effect of outdoor education to decrease the high amount of neutral emotion, but since his amount of neutral emotion not are among the highest in the group, he is not the pupil who has the highest effect from outdoor education in this variable. Considering positive communication, this pupil has a large effect of outdoor education, but for negative communication neither benefit nor disadvantage is seen from outdoor education.

Pupil 7: This boy has a low score in Mood, Persistence and Intensity and a high score in Activity, Distractibility, Approach and Adaptability, and this places this boy within the group with a difficult temperament.

Outdoor education may have an effect to increase the physical activity for this boy. This boy has relative high levels of motor and verbal agitation, and outdoor education is able to reduce this kind of behaviour. Considering the amount of neutral emotion, this boy is not among the pupils with the highest levels, but it do looks like outdoor education has the impact to reduce the amount of neutral emotion also for this boy. Except for one outdoor education day with a very high

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level of positive communication, it is not possible to say that outdoor education has the possibility to increase the amount of positive communication for this boy, because this boy is communicate relatively much in both school conditions. Outdoor education has a negative effect to this boy when it serves to increase the level of negative communication coming from him.

Pupil 8: This is a girl who has a low score in Activity, Distractibility and Intensity and a high score in Mood, Approach, Persistence and Adaptability, and as a consequence of this combination of dimensions. this girl fit within the group having an easy temperament.

This girl has a very low level of physical activity during the school days, and a change in the environment and school condition do not seem to be able to increase it. This girl has no verbal and motor agitation, and therefore there is not any benefit nor disadvantage from outdoor education. Even though her observations from one of the days with outdoor education differ from the others, it seems like outdoor education has the impact to reduce the numbers of observations within neutral emotion as well as to increase the numbers of observations in positive communication. This girl has so small amount of negative communication that it looks like the school condition is not able to influence it.

Pupil 9: This girl has a low score in Activity, Mood, Distractibility, Approach, Adaptability and Intensity and a high score in Persistence, which places this girl within the group having a withdrawal temperament.

This girl has a very low level of physical activity during the days at school, but outdoor education is able to increase the activity a little. The motor and verbal agitation from this girl is so small in all days and school condition do not affect it neither positive nor negative. Outdoor education serves to decrease the amount of neutral emotions for this girl, as well as to increase the amount of positive communication, while the lack of negative communication probably not is affected by school condition.

Pupil 10: This boy has a low score in Mood and Persistence and a high score in Activity, Distractibility, Approach, Adaptability and Intensity. This combination of temperament is a combination which places him within the group having a difficult temperament.

Outdoor education gives a positive effect considering the amount of physical activity for this boy. This condition also have a positive effect to decrease the amount of motor and verbal agitation, but it may not give any positive nor negative impact on the amount of neutral emotions observed per day. Outdoor education probably serves to increase the amount of positive communication, but it seems like the distribution of negative communication with only one peak differing from the rest, is incidental.

Pupil 11: This girl has a low score in Distractibility, Approach, Adaptability and Intensity and a high score in Activity, Mood and Persistence. This combination is within the group of easy temperament.

In the aim to increase the amount of physical activity within level three, outdoor education do not serve to do this for this girl. It seems like her small occurrence of motor and verbal agitations disappear when moving the classroom outdoor. Outdoor education also serves to decrease the amount of neutral emotion during a day at school, but since this has a lower occurrence for this girl, the effect is not as big as for many of the other children. Outdoor education serves to increase the amount of positive communication for this girl, but do not affect the amount of negative communication.

Pupil 12: This boy has a low score in Persistence and high scores in Activity, Mood, Distractibility, Approach, Adaptability and Intensity, and this combination of dimensions will be within the group having an easy temperament.

For physical activity, this boy has variability in the amount of observations within the highest level, but still, there seems to be a pattern usually showing a higher level of physical activity during outdoor conditions. His motor agitation has a very low occurrence, and outdoor education does not affect this occurrence in any way. He has a kind of higher occurrence of verbal agitation, and outdoor education seems to have the impact to reduce this occurrence. Outdoor education seems neither to decrease nor increase the amount of neutral emotion during a day, but it does have an impact to increase the amount of positive communication during a day. For this boy, negative communication is not seen, and therefore neither affected by any school condition.

3.1 Physical activity

The normal pattern for physical activity is a higher level of physical activity during the days with outdoor education. Dividing the children in different subgroups based on dimensions in temperament, shows no big differences in physical activity between subgroups, except for the dimension of Intensity were the children with a high score is more active and has a bigger difference between the school conditions (see figure 1). Similarly, there is a difference between boys and girls, were boys have a higher level of physical activity and bigger differences between indoor and outdoor. For the children attending the special education group compared with the children who are not attending this group, there is

hardly any difference considering physical activity.

< Figure 1 about here>

3.2 Motor agitation

The agitation level is higher during indoor schooldays, except for the last traditional day, were the agitation level is nearly at the same level as the outdoor educational days.

For the Activity-dimension the children with the highest score have most effect of outdoor education, since these children all over have big differences between highest and lowest observed levels of agitation (See figure 2). For the children in the group with the lowest score in Activity, outdoor education does not influence their levels in motor agitation. Considering the Distractibility and Approach-dimension, the pattern is almost the same, with the groups given a high score seem to have a positive effect of outdoor education, while the groups with low scores hardly have any agitation at all. The pattern is almost similar for the Mood-dimension and the Persistence-dimension; the groups with a low score in Mood or Persistence have most effect of outdoor education, while the groups with a high score in Mood or Persistence hardly has any agitation and consequently the agitation level is neither affected by the school condition.

For the Adaptability-dimension the groups are almost at the same level, except during one of the traditional days, were the group with a low score has relatively much higher amount of agitation. Considering the dimension of Intensity, both groups seem to have an effect of outdoor education, but the effect is higher for the group with a high score.

Boys have a higher level of agitation, and therefore also more effect from outdoor education, compared with girls. The group of children who do not get special education has a higher agitation level compared with the group who has a special education offer, and it also seems that this group has the highest effect of outdoor education, even though a small effect is visible for the low level of agitation in the children within the special education group.

<Figure 2 about here>

3.3 Verbal agitation

For verbal agitation the main pattern is showing a lower amount of agitation during the three outdoor education days, and also a little lower during the last indoor education day. For the Activity-dimension, the Distractibility-dimension and the Approach-dimension, this normal pattern is seen for the group with a high score, while it for the Mood-dimension and for the Persistence-dimension is a normal pattern for the group with a high score, (see i.e. figure 3). For the Adaptability-dimension the groups are at the same level those days they are at a low level of verbal agitation; during the three outdoor education days and the last day with traditional education. During the traditional days, the groups changes between being the highest and lowest in the agitation level. Considering the Intensity-dimension the groups are quite similar during the days with low levels of agitation, but during the indoor days, the group with the high score, has higher levels of verbal agitation. The girls' amount of verbal agitation is quite low, and as a consequence, the effect of outdoor education is not very extensive, even though there is possible to see lower levels during these days. The boys have a obvious effect of outdoor education. For the children attending the special education group, there is only a small amount of verbal agitation, but there is still possible to see a pattern of lower levels during outdoor education days. For the children not attending the special education group, it is possible to see an effect of outdoor education more clearly.

< Figure 3 about here>

3.4 Neutral emotion

For neutral emotion it is possible to see a pattern of less amount of neutral emotion during the alternative schooldays with outdoor education. For the Activity, Mood, Distractibility, Persistence, Adaptability and Intensity-dimension, the high and low groups seem to have the same effect of the alternative school days. For the dimension of Approach, it seems like the group with a low score in Approach has the highest effect of the alternative school days, while the group with the highest score in Approach has a less curved line, even though this group is at a higher level than the opposite group. The lines for boys and girls are almost following each other, and no bigger effect is seen for one of the gender considering neutral emotion. The children attending the group of special education have a more curved line and a higher effect, compared with the others (see figure 4).

< Figure 4 about here>

3.5 Positive communication

For positive communication, the normal pattern is showing more positive communication during the three outdoor education days. For all the dimensions within temperament, there is hardly any difference between the children with high and low scores. There are neither no obvious difference between girls and boys. Between the children attending the

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special education group and the children who are not attending this group, there is difference in level which may indicate a more positive effect with alternative school days for children attending special education group (see figure 5).

<Figure 5 about here>

3.6 Negative communication

For negative communication there is no pattern showing a lower level at outdoor education days or indoor days. There are differences in levels between the temperamental groups, showing a lower amount of negative communication for the children with a low score in Activity, Distractibility, Approach and Intensity and for the children with a high score in Mood, Persistence and Adaptability (see figure 6). Girls have a lesser amount of negative communication compared with the boys, and the children attending the special education group have a lesser amount of negative communication compared with the other children.

< Figure 6 about here>

4. Discussion

For most of the pupils' outdoor education affects the outcomes for the variables of physical activity, motor agitation, verbal agitation, neutral emotion and positive communication in a positive way. For negative communication, the pattern is not clear.

For the variables of physical activity, amount of neutral emotion and positive communication, it is mostly the school conditions which is predicting the changes. In outdoor education they have the possibility to be more physical active compared to the days where they are sitting in a classroom. They are also moving in a different environment, which might instigate to more physical activity. This is in accordance to other studies showing more physical activity when they are staying in a natural environment (A. C. Bell & Dyment, 2008; J. F. Bell, Wilson, & Liu, 2008; Boldemann et al., 2006; Mygind, 2007). The possibilities for all children, but especially for the ones with high scores in Intensity as well as for the boys, to increase their physical activity, will reduce levels of stress and prevent behavioral problems in a short time perspective, but also in a long time perspective, since it reduces accumulations of stress (Campos, Frankel, & Camras, 2004; Sameroff & Fiese, 2000). Staying outside naturally also open for more possibilities to communicate verbally and to cooperate to each other, which in turn might affect levels of positive communication and levels of neutral emotion. As a consequence, the amount of verbal and motor agitation is affected of school condition, but not for everybody. Some of the children do not have any agitation during the days at school, and as a consequence they do neither have any agitation to reduce during the days with outdoor education. The amount of agitation is there for dependent on both school condition and personality. The amount of negative communication cannot be coupled to the school condition, but rather to the subgroups: Staying at outdoor education increases the possibilities to communicate and cooperate to each other, and as a consequence it also increases the possibilities to perform negative comments to each other. Even though the amount of positive communication increases during these days, the amount of negative communications does not. During these days there is negative communications from some subgroups, but the amount is unaffected.

The effect from outdoor education varies from child to child, as well as between temperamental-dimensions, gender and belonging to special education group or not. Still there is a pattern showing more positive outcomes for subgroups of pupils. Children number 1, 3, 4, 8, 11 and 12 have an easy temperament and are good functioning both in indoor and outdoor education. Nevertheless the results show that this group does increase their vitality at outdoor education. Children 6 and 9 have a withdrawal temperament (slow to warm up) and are good functioning both indoor and outdoor. They increase their vitality in outdoor education too. Children 2, 5, 7 and 10 have a difficult or a mixed temperament. Their behavior during indoor education is problematic and frequently corrected. At outdoor education most of the behavior that have to be corrected is absent.

Placing children within one of these main temperamental subgroups takes time and may be difficult, since every child has a unique combination of temperamental dimensions. Looking more deeply in to each variable and how each subgroup of temperamental dimension, gender or special education/not special education is influenced more or less by the school condition gives more information about the significance of each subgroup, and how to strive for goodness of fit for each child. The results in this study are revealing some subgroups as more at risk for behavioral problems. For the three negative behavioral variables; negative communication, motor agitation and verbal agitation, the subgroups with low scores in Mood and Persistence and the subgroups with high scores in Activity, Distractibility, Approach and Intensity is scoring higher at these variables. The results also reveal the boys as a group more at risk compared with the girls. As a consequence outdoor education is an intervention to prevent problem behavior for these temperamental-dimensions subgroups as well as for boys.

4.1 The study's power and limitation

The study is based on more than 11 thousand observations. A statistical test of significance of this observations, will have given significance but not so much information. Statistical testing is also problematic, since the observations are not single observations which not depend on other observations. To look more broadly into differences within the group without testing statistical significance gives more and interesting information. The advantage with an ABAB-design is the possibility to look into each individual's sensitivity to the variables (Hopkins, Beek, & Kalverboer).If this design is able to demonstrate increases and decreases in behaviour according to presence and absence of the intervention it provides evidence that the intervention (which is outdoor education in this study) caused the behavioural changes.(Sarafino, 1996). A strength with this study is the pattern the figures reveals; the behaviour is changing during the introduction of three days with intervention and reversal of two days with intervention. Figures, which show lines like waves, indicate groups of children where the intervention is working. Obviously, there is daadaptabilys which is reducing or making a confusion about the pattern, and more periods of reversals and interventions would have strengthen the study even more.

A limitation of the study is the low number of subject. Anyway, the results for the subgroups are in accordance with the theory of temperament considering both the dimensions and the subgroups which is a remarkable finding when the number of subjects is not higher.

The fact that it is a teacher and not a parent, who is doing the questionnaires, may be discussable, because the parents know their children best. Anyway there may also be beneficial to have the teacher doing the questionnaires, not only because it will be the same person who temperate all of them, but also because parents often look at their children's temperament with their own personality and behavior expectations, as well as many of them have lack of competence about normative growth and development, and do not know how their child is compared to others (McClowry, Halverson, & Sanson, 2003).

4.2 Conclusion

The outcomes from outdoor education differ between groups of children. For some children the outcomes are crucial to avoid behavioural problems. For these children at risk, this variation in learning conditions may give a long time benefit. The group of children who are not at risk for developing behavioural problems, outdoor education give a short time benefit with an increased vitalizing involving more physical activity, more variation in emotions and more positive communication.

Temperament group and temperament dimensions and gender are predicting the children's behaviour at school as well as their outcomes of changes in school condition. The group of special education pupils in this study only contends three children. It is different ways to deal with their stress during the conditions they are supposed to read and write, and it is possible that all these three children are among the relative quiet ones. Compared with the rest of the group, they have larger outcomes in emotions and positive communications, which may tell that they are relaxing more and vitalized more when attending the outdoor condition. Anyway it looks like temperament is a stronger predictor for the behavior and outcomes of outdoor education than learning disabilities are.

The variables of physical activity, neutral emotions and positive communications are mostly guided by the changes in school condition, but the amount of outcomes varies between subgroups. For motor and verbal agitation the output is guided by the children's temperament and the school condition: Outdoor education has the impact to reduce the motor and verbal agitation for the pupils with high score in Activity, Distractibility, Approach, and Intensity and for the pupils with low scores in Mood and Persistence. For the rest of the groups, there is hardly any agitation to reduce. Considering motor and verbal agitation, the boys have a bigger effect compared with the girls. School condition do not have any impact on the amount of negative communication, but the temperamental dimensions, gender and subgroup of special education do have an impact: High scores in Activity, Distractibility, Approach and Intensity, and low scores in Mood and Persistence generate more negative communication. Boys have a higher level of negative communication compared with girls.

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Table 1. The subjects average values in highest and lowest group within each temperament dimensions

Dimension of temperament		Lowest Group 1	Highest Group 2
Activity	Average scores	1.0, 1.0, 1.0, 1.67, 1.67, 2.33	2.67, 3.33, 3.33, 4.33, 4.67, 5.0
	Subject number	8, 3, 9, 4, 6, 1	10, 5, 12, 7, 2, 11
Mood	Average scores	3.0, 3.5, 4.0, 4.25, 4.75, 5.25	5.5, 5.75, 6.0, 6.25, 6.25, 6.25
	Subject number	10,2 ,6, 7, 5, 9	12, 4, 8, 3, 1, 11
Distractibility	Average scores	1.33, 1.33, 1.33, 1.33, 1.33, 1.33	3.33, 3.67, 4.0, 4.0, 4.33, 4.33
	Subject number	8, 11, 6, 4, 3, 9	5, 1, 7, 10, 2, 12
Approach	Average scores	3.0, 3.0, 4.0, 4.0, 4.33, 4.67	5.0, 5.0, 5.67, 6.33, 6.33, 6.33
	Subject number	5, 9, 1, 3, 11, 4	2, 8, 12, 7, 10, 6
Persistence	Average scores	4.0, 4.0, 4.33, 4.33, 4.33, 5.0	5.67, 6.0, 6.0, 6.67, 6.67, 7.0
	Subject number	5, 2, 7, 12, 10, 1	9, 3, 4, 6, 11, 8
Adaptability	Average scores	2.67, 4.33, 4.33, 4.67, 5.0	5.67, 5.67, 5.67, 6,6,7,7
	Subject number	2, 1, 5, 11, 9	3, 4, 10, 12, 6, 7, 8
Intensity	Average scores	-, 2.0, 2.0, 2.5, 3.0,3.5	4.0, 4.5, 4.5, 5.0, 5.5, 6.0
	Subject number	(3), 8, 7, 9, 11, 5	1, 4, 12, 6, 10, 2
Threshold	Average scores	6.0, 6.5, 6.5,	7,7,7,7,7,7,7,7,7
	Subject number	9, 11, 8	6, 7, 1, 3, 5, 4, 2, 12, 10

**The subjects average scores from the TTQ Short Form and the subjects' position among the rest of the group in each dimension.*

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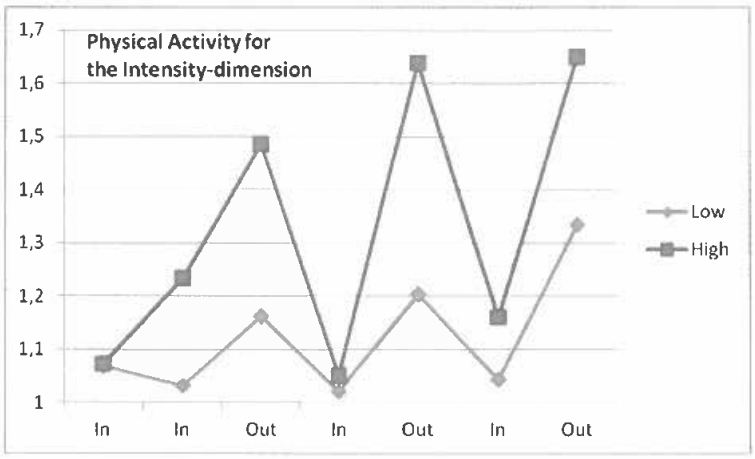

Figure 1. Average level of physical activity per day for the groups within the Intensity-dimension.

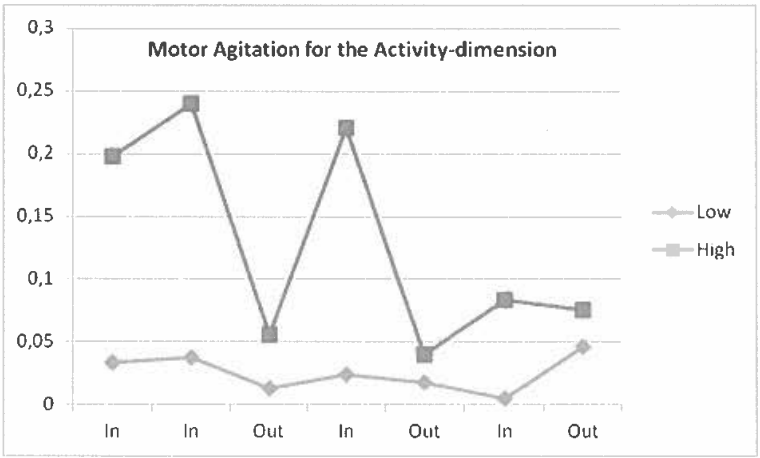

Figure 2. Average level of motor agitation per day for the groups within the Activity-dimension.

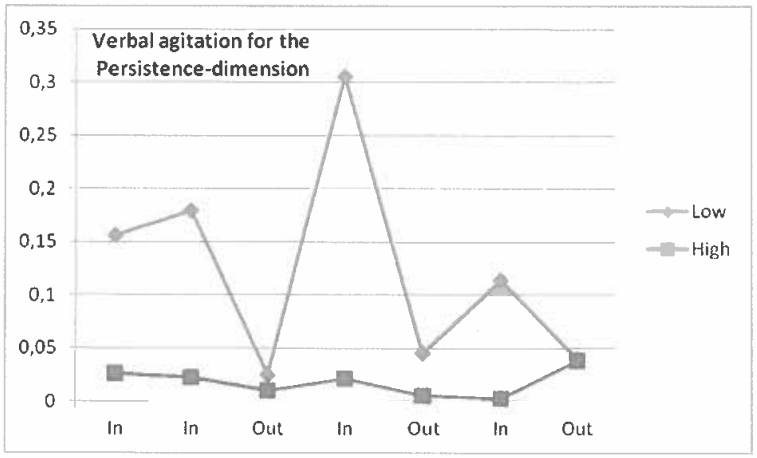

Figure 3. Verbal agitation for the groups within the Persistence-dimension.

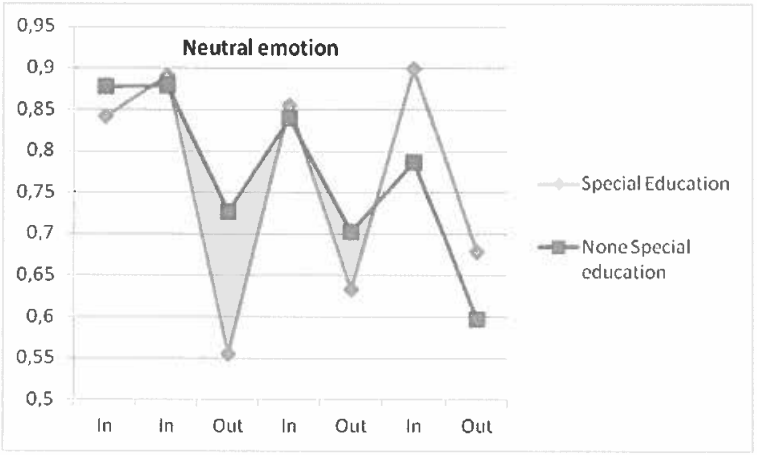

Figure 4. Neutral Emotion for the Special Education-variable

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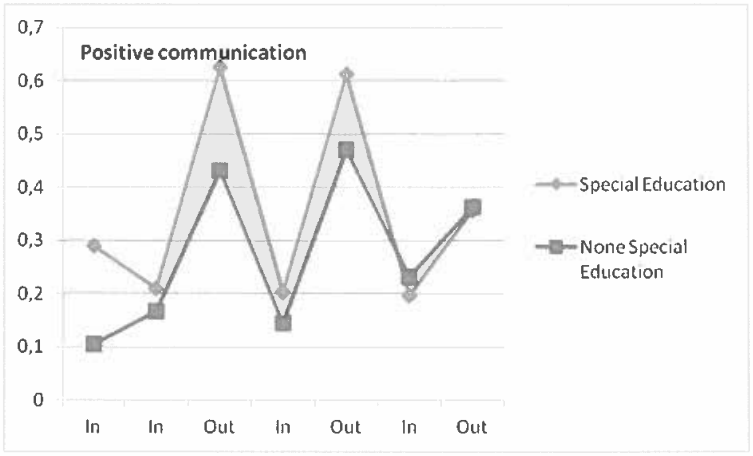

Figure 5. The average of positive communication for each day for the variable of special education.

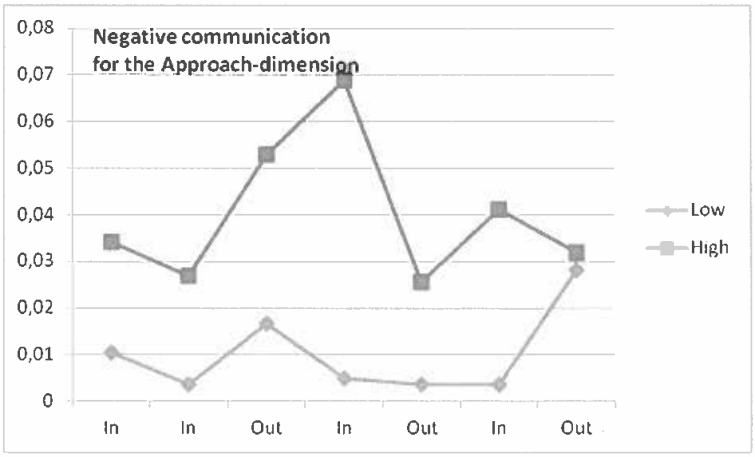

Figure 6. The average of negative communication per day for the Approach-dimension.

Article 3

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Relation Between the School Environment and the Children's Behaviour

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Abstract: The aim of this study was to investigate the behavioural outcomes in outdoor education compared with the traditional indoor school condition. 12 children were observed intensively during three days with outdoor education and four days with the indoor condition. Results showed that different organization of the educational environment affected the children's behaviour in various ways, such as levels of physical activity, concentration, being at ease in the situation, verbal and motor agitation, emotional expressions and communication. Outdoor education influenced behavioural changes in a positive direction. During outdoor education, there were only minor differences between leisure time and pedagogical time, with the most desired result in leisure time. In classroom, the difference was enormous, with the most desired results in leisure time.

Keywords: Children's environment, outdoor education, physical activity, regulated behaviour, emotion, communication.

INTRODUCTION

Primary school lessons normally take place in some form of classroom. This normal life in school places large demands on regulation of behaviour. In Norway, however, there are an increasing number of teachers who prefer to vary the educational conditions for their pupils and sometimes take them out of the classroom and do the teaching outdoors. In the general part of the Norwegian curriculum [1] there are a lot of situations which might be used as arguments for bringing the classroom outdoors, e.g. the chapters on the creative human being, the working human being, the social human being, the environmentally aware human being and the integrated human being. In any case, since the second world war it has been possible to find arguments for outdoor education in the curriculum [2]. The changing in the way we live our lives is probably a more important reason for changing our school practice: While children in ancient cultures learned tasks in context, and their problem solving was immediately relevant for them, teaching in school today has become increasingly abstract [3]. Additionally, childhood has moved indoors, and Nature-Deficit Disorder is the consequence for many of the children. Nature-Deficit Disorder is not an official diagnosis but a label to explain the loss incurred by the children through losing their contact with nature. As a consequence the possibility of learning from nature and the real world is reduced [4, 5].

Research has shown the benefits of taking the pupils out, for example, to a nearby forest or a beach, taking into consideration elements such as the benefits of less demands of action regulation [6], real world experiences [7-9], motivation and behavioural benefits [10, 11], less crowdedness giving benefits and more enjoyment [12] as well as less aggression and behavioural problems [13, 14], cooperative play and civil behaviour [10, 15, 16], mood benefits [17], which might broaden the scope of attention and action repertoires [18].

Since the schools impose sedentary activity, disruptive behaviour may occur simply because the children need physical activity [3]. Lessons in physical education may be one way to deal with the pupils lack of physical activity, but this does not always promote physical activity [19], even though there is methods to increase the levels of physical activity during physical education [20]. The amount of physical activity in leisure time, may be affected by the surrounding environment i.e. the availability of playgrounds and areas suited for physical activity [21]. Nevertheless, there might be a trend that children spend most of their leisure time without physical activity [22]. Additionally Dale *et al*. [23] found that children who had restricted possibilities for physical activity during the school day did not compensate by being physically active in their leisure time, while the children who were given the opportunity of physical activity at school, were the most physically active children after school. This implies that the school has some kind of responsibility for children's physical health.

In the natural environment, there are many possibilities that incite the children to activity; it can be considered a kind of enriched environment compared to, for example, a classroom. Gibson [24] calls the options for activities found by the individual in a specific setting 'affordances.' An affordance is something in the environment that offers the person an opportunity to get involved in certain activities. A natural landscape may offer a variety of activity, such as green structures, transportable objects, different landscape elements and diversity of topography that give important potentials for different and versatile play for children [25].

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The natural environment is a trigger for getting preschool children [26] and children at school [27] into more physical activity.

If schools promote physical activity in children, they thereby give them health benefits in different ways [28-32]. Ways to deal with this challenge are to strive for a big enough schoolyard as well as to avoid overcrowding of the pupils' environment [12, 33-35], make it possible to stay in green environments [36] or increase facilities which entice the children into physical activity as well as having adults who supervise them into physical activity [37, 38].

Increasing the amount of physical activity is of current interest for many researchers, for instances a new American study made out a *bottom-up* study in four primary schools, in the aim to make the schools suitable to increase the physical activity, which they did in three of them. Among the factors which made this possible was facility changes, equipment additions or structures recesses [39].

A meta-analysis [40] showed that exercise has a small positive effect on cognition and other research shows that the effect is even higher in children [41]. Both human and non-human research support the fact that physical activity, and, especially aerobic fitness training, is a contributor to positive brain function and cognition [42]. Physical activity is an important method in enhancing children's executive functions [43]. Since executive function is related to the set of processes underlying goal-directed behaviour such as planning, inhibitory control, attention flexibility and working memory [44], this may affect all behaviour in children as well as the learning processes. This executive function is related to the process of regulation occurring in the cortex, when action is initiated in the limbic system [45]. This cortical activity works in the same way when regulating behaviour as when regulating emotions [46, 47]. When this system is not working successfully, unwanted behaviour and emotional reactions will be like the spontaneous reactions in small children. As this system matures throughout childhood, the children become more able to inhibit their emotional tendencies [48]. Playing, especially rough and tumble play, require a lot of social-behavioural and psychological dynamic skills [49]. In play and especially vigorous play, the brain has to regulate and suppress initiations to action from the limbic system, and consequently, this system is being developed through this kind of activity. Giving children greater access to play therefore helps them to regulate impulses better and perhaps even to facilitate brain maturation. This is beneficial for all children, and may even decrease the propagation of ADHD (Attention Deficit Hyperactivity Disorder) [48-51].

Accordingly, it is not surprising that we can see positive academic outcomes from outdoor education [7, 52-54] as well as positive behavioural outcomes [7, 10, 11, 55].

The studies and theories presented above give ample evidence for the benefits of physical activities among children for several reasons; the activity could be positive for learning, for health and order and discipline in the classroom, etc. This can easily be made into an argument for adopting outdoor schooling, if we presuppose that this teaching method both contributes to more physical activity and gives the children an enriched environment for practical experiences that later may be translated into an understanding of theory and better motivation for further education. Outdoor education probably influences behaviour and emotions in different ways. There is, however, limited documentation about this effect in outdoor education. If there is such an effect through outdoor education, is it caused by the changed organization of the school day or is it mostly caused by the changed environment they are offering the children? We, therefore, set out to investigate how the children actually behave during outdoor schooling compared to normal indoor school days. To explore this wide area of opportunities, we raised two questions considering the possible behavioural changes that might happen because of outdoor education.

Are there any differences between the days organized as outdoor and indoor education in terms of children's behaviour, such as physical activity, verbal and motor agitation, communication or emotion?

Is the present tested behaviour most influenced by the environment the chid is in or whether it is teaching time or leisure time?

METHOD

To explore this relatively many different variables and how they might be affected during the whole day, during teaching time and during leisure time, there was made a roughly sort out of categories within the variables, as well as a qualitative study to explore more directly how this may affect the child at school.

Design

This is a one-group study; a natural ABAB-design with phases guided by the schools ordinary schedule. An ABAB-design is a one-group experimental design were the purpose is to reveal the effects which occur when the intervention is on in condition B and when it is off in condition A. The benefit with this kind of design is the possibility to look at intra-individual differences while manipulating with one variable at time [56, 57], but this design will only fit if the behavioural changes are not permanent [58].

In this study, only few subjects are observed, but with many observations per subject, instead of observing many subjects a few times. In the ABAB-design, the subjects are their own controls. A single AB-design may therefore be classified as a pre-experiment, but an ABAB-design may be classified as a quasi-experiment. If the length of the intervention-phases is randomized, it may even be a true experiment [58].

This ABAB-design involves both a large quantitative study with the variables of verbal and motor agitation, physical activity, communication and emotion, as well as a qualitative part with two pupils. This part is to a wider degree exploring the behaviour within the context. These data are reduced into one ABAB-story for a girl given the fictive name Ida, and for one boy, given the fictive name Frank.

Subjects

The subjects were recruited from the 5th grade in a primary school in Norway. From a total of 34 children in two

classes, 31 were given permission from their parents to participate in the study. From this group seven boys and five girls were randomly selected. Their mean age at the beginning of the study was 10 years and 3 months, with a range from 10 years to 10 years and 8 months. The children were in the first semester of their fifth year at school when the study was carried out. All these children were observed in a qualitative way, while one of the girls and one of the boys were randomly chosen to the qualitative part of the research project.

Teaching and Activities

Observation was obtained in seven days: four days with indoor teaching and three days with outdoor teaching. The plan was to observe four days inside and four days outside, but unfortunately we did not decide or affect the plans for each day. One of the days they decided to play football. This day differed too much in structure and other characteristics to be comparable with the other days and had to be let out. The pupils were familiar with both conditions. During both conditions, they were observed during teaching and during breaks.

During the indoor schooldays, when the children had various academic subjects, they were seated individually or in groups of two and three children. At the end of the day, however, when they were required to focus on their 'weekly work plan', they were allowed to sit in groups of three or more children together.

The three days with outdoor education started with one lesson in the classroom. Afterwards they walked to one of their outdoor education areas. Those areas have a lean-to, a fireplace and an outdoor lavatory. Two of these days were like the outdoor education practice they were most used to; they stayed at the place, had some time for free play, ate lunch and participated in various outdoor academic lessons led by the teachers. One of the days was a bit different, as the children were divided into mixed age groups (pupils from 5th, 6th and 7th grade) and they attended other places than the places they would usually go to.

Time Schedule

In order to quantify the children's behaviour, they were observed under two different conditions, for seven days altogether.

The school started for all conditions at 8.30 and lasted until 14.00. For indoor school, the children were observed after this time schedule 09.15-09.45, 10.15-11.00, 11.20-12.20 and 12.30-13.00, which ensured that the observations covered different academic subjects and at least one recess every day.

The observations for both conditions were done in sections. Each section involved a series of three minutes of quantified observations (involving 13 observation points with 15-second intervals) for each child and two minutes available for writing qualitative notes for the same child. After 5 minutes with this focus on one child, the observer started to focus on another child for five minutes and thereafter for the third child for five minutes. One section like this lasted for 15 minutes.

For each observation point, the observer made notes about the child's verbal and motor behaviour, the child's degree of physical activity, the child's mood and whether the child communicated with someone. If the child was speaking to someone, notes were taken as to whether the communication was positive or negative.

For outdoor education, the observation started as soon as the group had reached the particular outdoor area. Under these two conditions, observations were made continuously in order to get the same amount of data as collected during indoor condition.

The goal was to observe each child in 11-sections per day. Since the pupils were not observed during the walking session before and after outdoor education, and because sometimes extra time was needed to localize the child, this number of sections was not achieved for every child during these days.

The structure for indoor schooldays was 45 minutes with learning sections, followed by 15 minutes leisure time, except for the lunch that lasted about 30 minutes, as well as they once a while was getting some extra leisure time to play outside. The structure during outdoor some time with free activities before lunch. These activities often where indirect guided into academic topics, but it was all voluntary and it is therefore in the observations noted as leisure time. After lunch they had a time schedule with approximately 45 minutes of teaching and 15 minutes of leisure time.

Observations

The observations were done by four trained persons each day, each observer collecting data for three children. All observers were students of pedagogy at a university college. The number of observations for each subject across conditions, observer and gender, is shown in Table **1**.

Table 1. Subjects, Observers and the Distribution of Observations

Subject	Sex	Observer	Number of Observations		
			Outdoor	Traditional	Total
1	M	1	403	571	974
2	M	2	390	572	962
3	M	1	403	573	976
4	F	2	247	559	806
5	F	1	260	572	832
6	M	2	390	546	936
7	M	4	325	572	897
8	F	3	390	559	949
9	F	3	390	571	961
10	M	4	338	572	910
11	F	3	247	560	807
12	M	4	325	572	897
Total			4108	6799	10907

Scales

To quantify the variables, different scales was used. This observation scale is a kind of general classification with the aim of exploring the field. In this roughly categorizing of the activities, one of the variables, physical activity is divided in 1-3, because there cannot be any absolute absence of physical activity. The variables of agitation starts with zero, because there might be an absent of agitation, and the scores 1-3 deals with the degree of agitation. Emotion is divided into five categories; strongly negative, moderate negative, neutral, moderate positive and strong positive.

For each of the variables, each level was characterized as a guide for the observers as follows:

Observation of the Degree of Physical Activity

To measure the physical activity of the children, a 3-point scale was used: Score 1 (low activity) was given when the child was either sitting or standing or was doing some small physical activity like walking slowly. Score 2 (medium activity) was given if the child was participating in a kind of activity like walking fast. In score 3 (high activity), the child was quite active and was e.g. running or participating in activities more demanding than walking, e.g. throwing and catching a ball, or if the child was running a lot, climbing or doing activities which would usually break sweat after a short time.

Observation of Verbal Agitation

The scores can be characterized as follows: Scores 0: no verbal agitation at all.

Score 1(low degree of verbal agitation) should be given when the child was talking about other subjects than the task, but not disturbing others nearby. Score 2 (medium degree of verbal agitation) should be given when the child was talking about other things than the teaching to a degree that was disturbing for the others. If the child was bickering or showing any kind of aggression, this score should also be given. Score 3 (high degree of verbal agitation) should be given if the child had a lot of foul language that was considered to disturb the others a lot. If the child e.g. was yelling, making noises to disturb the others, hurting others or quarrelling with others, this score was also given.

Observation of Motor Agitation

The scores can be characterized as follows: Scores 0: no motor agitation at all.

Score 1 (low degree of motor agitation) should for example be given if the pupil was working with other subjects than the object of the teaching or if the pupil is not working successfully in relation to what the environmental situation requires. Score 2 (medium degree of motor agitation) should be given if the child was disturbing the others with his/her actions. If the child was seeking amusement or was sitting in other places than expected, he/she should also be given score 2. Score 3 (high degree of motor agitation) should be given when the child was walking around without doing anything connected to the teaching. This score should also be given if the child was grabbing things from other pupils, was obviously creating a disturbance with his/her motor activity, showed aggression to others or was completely diverted from what the others are doing. Outside, this score was given when the child was not doing what the environmental situation required and, at the same time, was disturbing the others a lot and perhaps teasing or threatening the others with his/her motor activity.

Observing Emotion

Emotion is divided into a 5-point scale ranging from obvious discouragement to joy and laughter. Score 1: (strong negative emotion) should be given when the child is obviously showing discouragement e.g. by crying or almost crying or being obviously negative. Score 2: (moderate negative emotion) is a less discouraged level, e.g. showing obvious signs of boredom. Score 3: (the neutral emotion) is the neutral level, showing neither obvious discouragement nor obvious joy. Score 4: (moderate positive emotion) deals with some kind of joy. It is when the child smiles without laughing really joyfully, or when the child is really engaged in an activity and shows enthusiastic eagerness e.g. stepping out of reality and taking a role in the play. Score 5: (strong positive emotion) is only given when it is possible to hear the child laugh.

Observing Communication

Whether the child was communicating verbally with someone was noted. If there was any kind of communication, it was noted whether it was positive or negative. All communication that was not negative was interpreted as positive.

Qualitative Observations

For each section of observations, the observer was told to write something about the child in the situation and the demands and activity in the section.

Reliability

As a preparation for the study, the four observers were trained in a process that involved:(1) introduction and exemplifications of the score-criteria, (2) parallel observations, (3) discussions to obtain common understandings. This procedure was repeated four times, and then the observers where almost identical. During the observation days checkpoints where made to make sure that inter-rater reliability still was high (97,9%). This high percent of reliability is not surprising considering the relatively rough categories.

Analysis

SPSS version 19.00 is used to make the t-test for independent sample and to make the descriptive data of the ABAB-design.

For the qualitative data, the first step was to write something for each section. When the qualitative notes are looked at together with all the observations in relation to each other, it gives abroad sample of information for each child. In the next step, each section-description is interpreted and concentrated: first in a wide description for each day and thereafter into single stories for each of the days where the most typical and the most specific happenings and behaviour were recorded.

Table 2. Relationship Between Outdoor Education and Indoor Education

Variable	Teaching Method	Teaching Time and Leisure Time		Leisure Time		Teaching Time	
		Mean	*p*	*Mean*	*p*	*Mean*	*p*
Motor agitation	***Outdoor***	0.039	0.000*	0.030	0.000*	0.046	0.000*
	Indoor	0.106		0.092		0.108	
Verbal agitation	***Outdoor***	0.027	0.000*	0.151	0.000*	0.040	0.000*
	Indoor	0.105		0.075		0.110	
Neutral emotion	***Outdoor***	0.662	0.000*	0.596	0.408	0.712	0.000*
	Indoor	0.853		0.612		0.893	
Positive communication	***Outdoor***	0.456	0.000*	0.532	0.000*	0.399	0.000*
	Indoor	0.177		0.394		0.141	
Negative communication	***Outdoor***	0.027	0.415	0.026	0.415	0.028	0.230
	Indoor	0.024		0.031		0.023	
Physical activity	***Outdoor***	1.430	0.000*	1.404	0.000*	1.449	0.000*
	Indoor	1.083		1.532		1.007	

*Significant 0.001.

T-test for independent samples for all observations during the day, for the leisuretime observations and for the teaching time observations. The variables of emotion and communication, is dichotomized; neutral emotion is given value 1 and the other emotions is given value 0, positive communication is given value 1 and the rest of the observations (with negative or none communication) is given score 0 in the variable of positive communication, while it for the variable of negative communication is the negative communication which is given value 1.

RESULTS

The first step in analysing the quantitative data is an t-test for independent samples for the whole conditions first, and thereafter separately for the leisure time and for the pedagogical time (see Table **2**).

Considering the quantitative date, for all variables there is a trend that pedagogical time follows the pattern for the whole day, and the leisure time, which has fewer observations, has another pattern.

Physical Activity

Independent of school organization, the results from observations show that children spend most of their time with only a small occurrence of high physical activity, but outdoor education is able to increase the amount of time spent in high physical activity as well as the average for physical activity during the day (see Fig. **1**).

For outdoor education, there is hardly any difference between the results in leisure time and in pedagogical time. For the indoor condition, the difference is enormous; there is much more inactivity during pedagogical time and much more activity during leisure time. Since breaks only are a small part of the days at school and of the observations in this study, this hardly affects the results for the whole day.

Motor Agitation

The results for motor agitation are shown in Fig. (**2**). This shows a main pattern of lower levels of motor agitation

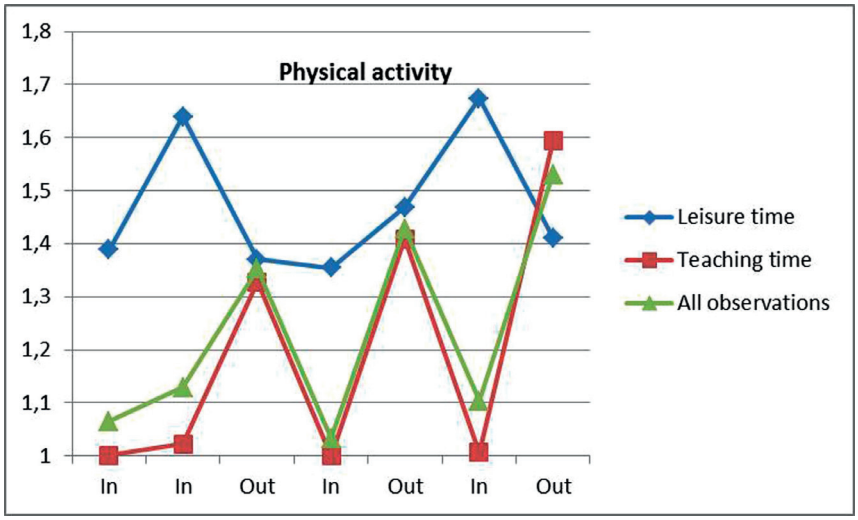

Fig. (1). Average levels of physical activity during the days with observations. Low levels of physical activity is given score 1, middle levels of physical acitivty is given score 2 and high levels of physical activity is given score 3.

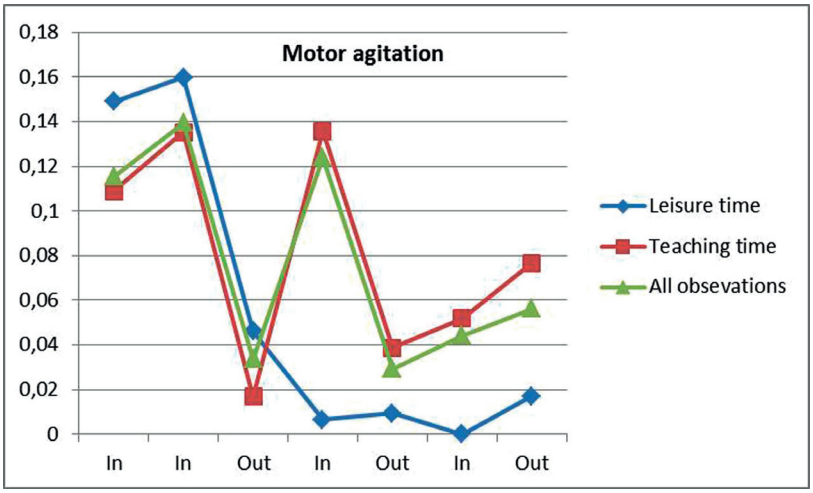

Fig. (2). Average levels of motor agitation during the days with observations. No agitation is given score 0, low levels of agitation is given score 1, middle levels of agitation is given score 2 and high levels of agitation is given score 3.

during two of the outdoor education days and some lower level for the last outdoor education day and the last indoor education day. Average levels of motor agitation are remarkably higher during three of the indoor education days. Motor agitation during leisure time shows another pattern: For four of the days the average amount of motor agitation is lower during leisure time compared with pedagogical time. For two of the days with indoor education the average amount of motor agitation during leisure time is higher compared with pedagogical time. In one of the outdoor education days, the amount is also higher during leisure time.

Verbal Agitation

The main pattern for verbal agitation is a lower level of agitation during outdoor education compared with indoor education (see Fig. **3**). Indoor education shows an irregular result, with a peak on the third day with indoor education and a much lower level on the last day with indoor education.

For leisure time the pattern is different: There might be a pattern of lower levels during outdoor education, except for the last day of indoor education, which has the lowest levels of all days. The verbal agitation during leisure time is mostly at lower levels compared with pedagogic time, but there is an exception on the first two days with indoor education where the levels are higher during leisure time.

Emotion

For emotion, the majority of observations are placed at the neutral level. Therefore, the result is focused on the

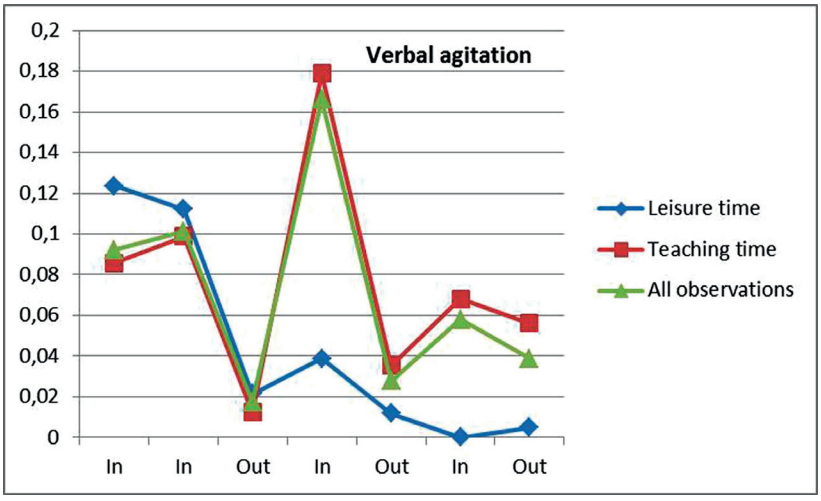

Fig. (3). Average levels of verbal agitation during the days with observations. No agitation is given score 0, low levels of agitation is given score 1, middle levels of agitation is given score 2 and high levels of agitation is given score 3.

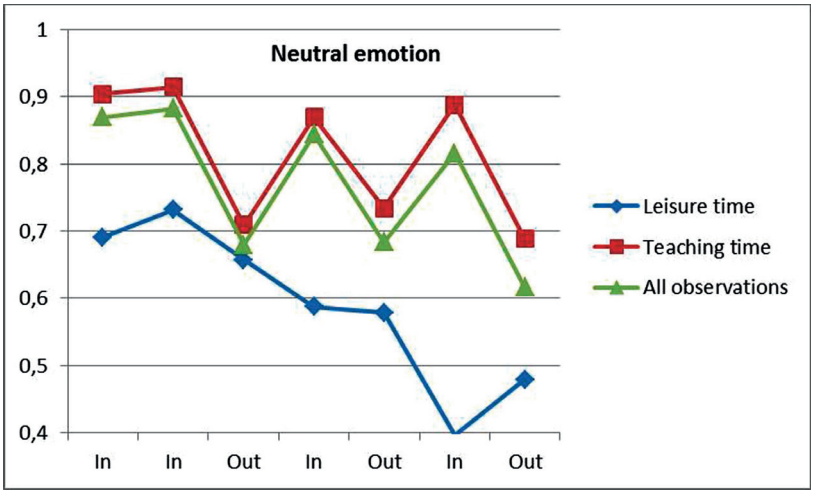

Fig. (4). Average levels of neutral emotions during the days with observations. Neutral emotion is given score 1 and other emotions is given score 0.

amount of neutral emotions. There is however, some variability about the amount of observations placed at neutral level for each day and for the conditions leisure time and pedagogical time. Fig. (**4**) shows a pattern of lower levels of neutral emotions during outdoor education days. For all school days, teaching time has an average higher amount of neutral emotion compared with leisure time. The pattern for leisure time is very different from teaching time: It is not possible to see a pattern between the two school conditions, since indoor education both has the day with the highest and the lowest level. Outdoor education does have the smallest difference between teaching time and leisure time.

Communication

The amount of positive communication shows a clear pattern with higher average levels of communication during outdoor education (see Fig. **5**). The average amount of positive communication during leisure time is at a higher level on all days, and at the same time follows almost the same pattern, except in day four. The difference between teaching time and leisure time is smaller for the outdoor education days.

Negative communication is only observed in a very minor occurrence (see Fig. **6**), and the pattern is not clear. It shows a lower level during three days with indoor education and one with outdoor education. The absolute highest amount of negative communication is observed during an indoor education day with one day of outdoor education right after. The average amount during pedagogical time follows the same pattern as the average for the whole day. The average amount of negative communication during leisure time shows a higher level during the three first days, while the level is lower during two days with indoor education and two days with outdoor education.

The statistical analyses showing the trends for changing during the changing conditions in school is an indicator about how we should suppose outdoor education might work on the class of pupils. Anyway, in school there is the individuals we meet, as well as we meet them in situations day to day. The qualitative date showing the day-to-day life in school for two randomly chosen pupils is therefore shown in Frame **1** and Frame **2**.

DISCUSSION

The aim of this study is to explore the relationship between outdoor education and indoor education considering a wide range of variables. The results from both the t-test and the main pattern of the curves in the figures, as well as the examples from the two pupils show that outdoor education has more benefits than learning biology and getting fresh air in the lungs. Outdoor education has a positive influence on the children's behaviour as it increases their levels of physical activity, decreases verbal and motor agitation, increases the amount of positive communication and elicits more joy and laughter as well as broadening the repertoire of emotions.

Physical Activity

Compared with the indoor school setting, outdoor education increases the children's level of physical activity. It is not surprising that the children are less physically active on the indoor days. They are supposed to sit in the classroom during the lessons and the recesses are the only time they are allowed to be physically active. Days with outdoor education include time to play in the natural environment which could well provide scope for the children's physical activity [24, 25, 36, 59], but these days include pedagogical time too, and these activities do not always tend to elicit physical activity. In the three days with outdoor education observed in this project, the level of physical activity during pedagogical time is almost as high as during leisure time. The difference between the conditions during pedagogical time is therefore what we would expect since traditional pedagogic time usually involves sitting. The difference in the leisure time is more interesting: It looks as if the children, in some way, are trying to compensate for the inactivity during the pedagogic time in the indoor condition, which could be a signal for

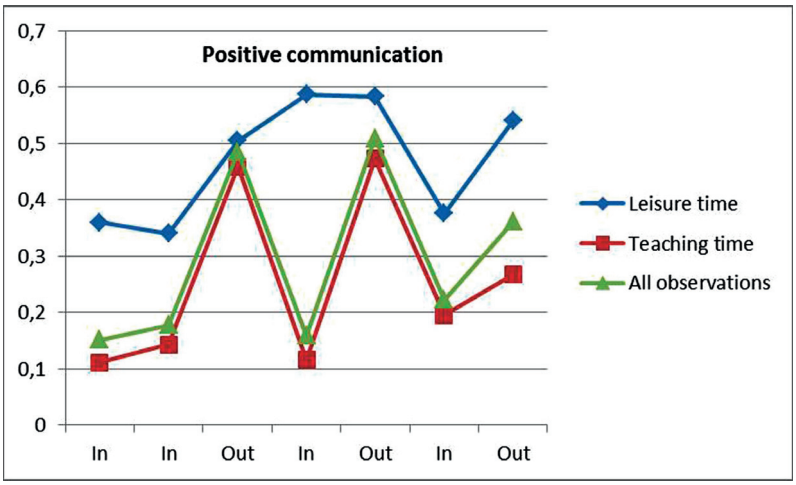

Fig. (5). Average levels of positive communications during the days with observations. Positive communications are given score 1 and obsevrations with no communications or negative commuications are given score 0.

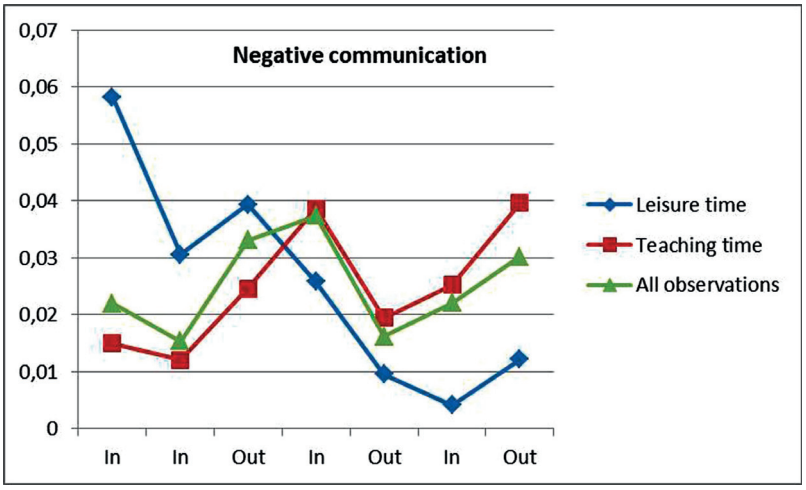

Fig. (6). Average levels of negative communications during the days with observations. Negative communications are given score 1 and observations with no communications or positive commuications are given score 0.

children's real need for physical activity (see e.g. [3]). These findings do not support the research, which found a lack of compensation after inactivity [23]. The activity in leisure time in this research is only in some of the breaks between the lessons, and may therefore give another picture than the study by Dale, Corbin and Dale [23], which gives a picture of the activity after school. The wide and relatively unlimited area the children use in the leisure time during the indoor condition may be another explanation for their relatively high levels of physical activity. This is in accordance with the study by Ozdemir and Yilmaz [12] which found a connection between the size of the schoolyard and children's BMI, assuming the physical activity to be the mediating variable as well as the study made by Kulinna *et al.* [39] which managed to increase the levels of physical activity with i. e. the variables off facility changing in the schoolyards and equipment additions. The number of observations with a higher level of physical activity is not large enough to influence the whole day percentages, and, consequently, the children's day at school is quite inactive.

For outdoor education, the level of physical activity is almost the same during leisure time as during pedagogic time. This might be the result of some of the pedagogic activities involving physical activity as well as the fact that leisure time observations also involve lunch-time, when children sat down to eat their lunch. Some of the children used a longer time with their lunch at outdoor education, since they had brought some extra food, some biscuits to eat after lunch or some food they wanted to barbecue at the bonfire.

Frame 1. Ida's Behaviour During the Observation Days

Day 1: In the lessons, she fiddles frequently and in short periods her concentration slips. When exercises activate her, either with writing or reading together with others, she focuses on task and the restlessness disappears. She is also observed with negative communication to others. Otherwise, she does not talk much during lessons. Emotion is mostly neutral. While eating lunch her interaction with other classmates is negative.

Day 2: When she is frustrated from opposition, she becomes agitated, but when she focuses on the exercises she works successfully. She is mostly quiet, but when the teacher is absent, she talks to another pupil. In the break she plays football, though it looks like she is hurt physically during this game. She then runs inside to loneliness. She appears sad. In the lessons afterwards her sadness continues in a crying period. No talking is observed during this.

Day 3: While walking to the other outdoor area she interacts with her classmates. When they have to wait she communicates both positively and negatively with the others. Once she yells to one of the other pupils. In a break, she hurries to the swing. When making the swing go fast she smiles, but she has no interaction with others during the activity. In another break she crawls under a boat with others and talks and laughs. When working with academic subjects she communicates verbally to others and emotion increases to level 4. Activities that are more practical activate her even more.

Day 4: She has neutral emotion during the day except for a few observations. When starting a new activity she starts quickly and dutifully, but after a while, she is mostly restless and absent minded. She also has negative comments to other pupils. In lectures she participates, puts up her hand to answer questions, and she smiles when she is among those who are to read the text in English. In music they have a practical activity. In this condition she becomes restless and makes negative comments to other pupils, followed by a period of an increased amount of positive behaviour.

Day 5: She is not at school this day.

Day 6: She is at the library together with older helpers. She interacts with others and emotion is positive. Later emotion rises to level four while she reads by herself. In mathematics she is restless but concentrated; she put up her hand to answer questions and she cooperates and works successfully with group exercises. Outside in the break she plays with younger pupils. Then emotion increases in periods but she does not communicate verbally. In a lecture her restlessness increases and she is obviously disturbing the others with her motor activity. Then her concentration decreases and she is disturbing the others with verbal agitation. Emotion is neutral during this. During the lesson where they are supposed to work with their weekly exercises, she sits together with three other pupils. She interacts verbally with them, mostly in a positive way.

Day 7: She is alone at the swing. During swinging her emotion increases. After that, she begins to communicate verbally with others and emotion often rises to level 4. While waiting to start the academic subjects, she made negative comments to others and joined in a rough and tumble play which develops negatively. At the post with physical education, her level of physical activity increases and her emotion is positive. An incident makes her start to become agitated, followed by a decrease in activity and emotion. When starting with mathematics she seems bored. She is restless and agitated. When the activity is more practical, her activity increases and she communicates verbally to others and her emotion is positive. After a while, her positive behaviour is retained. When academic subjects are finished she does not participate with the others at the beginning, and she only had one negative comment. Then she starts participating in rough and tumble play; physical activity rises, emotion rises to level 4 and 5 and communication increases.

Frame 2. Frank's Behaviour During the Observation Days

Day 1: When the class has an academic activity involving competition and/or entertainment, he is eager but restless. Emotion is positive. When the academic activity slows down, he mostly concentrates on task, but in periods, he is restless and absent minded. When they have to wait, he is restless and makes several negative comments to others. When they eat their lunch he talks all the time, his emotion is positive and he is restless in periods. Outside he just looks at something the older boys are doing. He makes negative comments to others and his emotion is neutral.

Day 2: Except for periods with less concentration, he mostly is concentrating on task. He is restless in periods and makes several negative comments to others. His emotion is mostly neutral. During a practical activity, he cooperates with another pupil. He makes several negative comments to a girl next to them. In breaks he plays football or cycles. He mostly plays with high levels of physical activity. In periods, the emotion and the amount of verbal communication are increased. In a period he rides his bicycle in places where he has no permission to cycle.

Day 3: In the beginning he sits alone whittling. Emotion is positive. Another pupil arrives and they interact with each other. An incident makes him show negative behaviour against another pupil near them. Emotion goes back to neutral for a period, before it rises to a positive level again. During the rest of the spare time he talks almost all the time. When they work with academic subjects, he tries to be the leader of the group. He is happy and eager.

Day 4: During the lessons he is often restless and absent minded. Emotion is mostly at neutral level. When they have a practical activity he first works successfully while emotion is at level four and he interacts with other pupils. Then the emotion goes down to neutral, he starts to be restless and absent minded as well as making negative comments to another pupil. In music, the activity is more practical, he is eager to show his competence, and his negative behaviour is absent. When they are going to have a little competition in the English-lesson, he is eager and laughs, but ignores the rules and does not do what he is supposed to. He also made negative comments to another pupil.

Day 5: Emotion is often at level four and five this day. Some negative comments to other pupils and some short periods with restlessness and absent-mindedness are observed, but for most of the time the negative behaviour is absent. While working with academic subjects he tries to take the responsibility of the work in the group. He talks much both during academic subjects and during spare time. In one of the activities, things do not go his way and his emotion goes back to neutral for a while. At the same time, he is restless and interrupts the others with his motor activity.

Day 6: At the beginning they have some library-time together with older pupils. He communicates and cooperates and emotion is at neutral or at positive levels. When having a lecture he is restless and in periods absent minded, while emotion is neutral. When they start with practical activities in the same subject, he is the leader in the group: eager, with positive emotion and an increased amount of communication. In breaks he plays football in the snow, which makes them smile and laugh because of the slippery ground. Physical activity varies between medium and high levels, and in periods he talks to the others. After one of the breaks, he works successfully and concentrates with some exercises, while emotion is neutral.

Day 7: He communicates frequently, and he has an increased level of physical activity and positive emotion while playing in the forest. He leads the work in the group when they have academic subjects in English and Norwegian grammar. His emotion varies between neutral and positive. When his group is at the post with physical education his level of physical activity is high and emotion is at neutral and positive levels. He even laughs in periods. When they start working with mathematics he opts out of the task at the beginning. During this, he also made negative comments to another pupil. Emotion is neutral. Then he starts working; he becomes more eager, he communicates positively, physical activity increases and emotion becomes positive.

Verbal and Motor Agitation

The outdoor education had the lowest occurrence of verbal and motor agitation when looking at the whole day. The curves for teaching time followed the curves for the whole day. The curves for leisure time differ from pedagogical time in both variables, though they follow almost the same pattern in the two variables. For leisure

time, there is a trend of less agitation both indoor and outdoor, except for two of the indoor days.

This positive outcome in behaviour in outdoor education may be caused by the gap between real life and theoretical schedule being filled, making the students more enthusiastic and motivated for the tasks [7, 9]. This makes it easier to concentrate on the tasks over time. Since one reason for the disruptive behaviour among young children is the inability to concentrate for a long period of time [3], this method of working will increase civil behaviour. Natural environment may increase attention [16, 60]. Perhaps it is also connected to the fact that they use their whole body and not only their eyes, ears and brain, and the connection between physical activity and academic learning [40, 42, 61, 62] may give support to this assumption about concentration. The histories from 'Ida' and 'Frank' show a pattern of more time concentrating on tasks when they were at outdoor education and less when they were in the indoor school days. These findings give support to the assumption that the concentration is a mediating variable for agitation.

There is also the possibility that outdoor education has more unstructured time, and, consequently, gives the children more recesses during the day, and the recess may elicit positive behavioural changes [63]. Even when working with academic subjects, outdoor education settings will give room for small recesses when the children are moving from one practical activity to another. Recesses can have a direct influence on decreasing disruptive behaviour [63] and the possibility of engaging in other subjects even for limited moments of time may therefore influence their behaviour. Since the children in this study never reach any high percent of verbal or motor agitation in any condition, the effect might be greater for a group of children that has a relatively high percent of agitation.

Emotion

The most amazing result is the increased variability in emotions. The outdoor education elicited more joy, smiles and laughter as well as more crying, obvious anger and sadness. Since staying in a natural environment may encourage the children's cooperative behaviour as well as decreasing their disruptive behaviour [16, 36], this may lead to increasing engagement and a broader scope of emotional repertoire. The results when the pedagogic time and the leisure time are separated show us that there is a lower percent of neutral emotion during leisure time every day. This occurs in the moments where they are able to, and are supposed to, create their own activity and situation, which probably is more engaging than following the pedagogic activity. The relatively small difference between the outdoor education and the indoor condition during leisure time may be explained by the children's eagerness for doing different activities during their breaks in the traditional school day. The leisure time is only a small part of their day at school in this condition. The environment at this school is relatively wide, open and gives a lot of space for different activities, even though there are many pupils outside together.

Communication

Outdoor education probably gives access for more verbal communication between the pupils than the indoor condition. The obvious differences between indoor and outdoor condition considering positive communications for the whole day and for the teaching time, is probably caused by the fact that they were given permission to talk to each other. More interesting is the curve for leisure time that shows almost the same pattern, except for day 4, which is a day with indoor education and a high average level of positive communication. During leisure time, they have the possibility to communicate with each other in both conditions, but outdoor education in this study seems to have the impact of eliciting more positive communication compared with the leisure time in the schoolyard in the indoor condition. This finding could mean that the outdoor situation and/or the environment in this condition elicit more cooperation and communication, which is in accordance with other studies [10, 15, 16]. For negative communication the level is low and no pattern is visible. The increased possibilities for communication during outdoor education can lead to negative communication as well as positive, but the increased crowdedness during indoor education can lead to more aggression and consequently an increased potential for making negative comments [13, 14], as well as the fact that the natural environment can broaden the scope for cooperative play and positive communication [10, 15, 16].

General Discussion

While the curves for the whole day and for the teaching time follow each other, the curves for leisure time have a different pattern: For all the variables there is less difference between leisure time and pedagogical time in outdoor education as well as the amount of desired and healthy behaviour being higher. This could mean that staying in the natural environment is positive for the children. Another explanation is that the teachers are creative and skilled at organizing pedagogical lessons that go hand in hand with the affordances in the environment. Whether it is mostly the environment or the organization that influences the results for the outdoor condition is therefore hard to say. For the indoor condition, the positive behavioural changes occur going from pedagogic time to leisure time. These changes can have different explanations; first, the change in environment may lead to changed behaviour and second, the changing demands on the children open up for more communication, more physical activity and more individual choices.

The day-to-day stories for 'Ida' and 'Frank' show a trend of combinations between variables: Increased physical activity, positive emotion and positive communication and lack of negative behaviour seem to follow each other. For example, when they are being activated either with a practical task or an increased physical activity, their emotion and communication increases as well, and the negative behaviour is absent. On the other hand, the negative behaviour seems to be connected: If for example the pupil's concentration slips away, restlessness will occur, the potential for performing negative comments increases and agitation may occur. Seeing the large amount of neutral emotion together with other variables may indicate some qualitative differences between the neutral emotion in the classroom and the neutral emotion outside the classroom. The neutral emotion in the classroom has connections with lack of concentration, no communication and restlessness. It

would seem that the neutral emotion in the classroom is more related to lack of engagement in the situation.

Even though the examples of Ida and Frank are relatively short rather than wide descriptions of the days, they are showing individual ways for reactions on the different conditions. This is in accordance to another study [64] showing different outcomes for subgroups.

LIMITATIONS AND DIRECTIONS FOR FURTHER STUDIES

A limitation with this study is that only one school is explored. This school has a large schoolyard, in some places without any clear boundaries. This gives the children a wide area to play in, and their schoolyard differs less from their outdoor education environment than will be the case for children in schools that have small schoolyards with gravel and fences. A study including more schools and subjects rather than one school with 12 subjects, would have made it possible to test the significance of the hypotheses rather than exploring the field in this way. Nevertheless, the reversal design in this study makes it possible to explore the field without any control group. Each child is observed intensively in different conditions, making it possible to see the trends of behavioural changes during different school organizations.

Subjective observations are challenging with regard to their reliability, and even though the observers had undergone a learning and agreement procedure and all series were discussed with the first author afterward, there may be some weakness with this kind of observation, especially in the observation with scales. We solved this problem by giving examples and by giving only a small number of possible scores for each variable. Nevertheless, except for the physical activity, which could be measured objectively, the other variables are difficult to ascertain without some kind of subjective observation. The observers have observed the children's behaviour and reactions to changing conditions. Only overt behaviour and expressions are noted, which may make it problematic to say anything about the real emotions within each child. In any case, the overt expressions of emotions are usually connected with the children's real emotions and the atmosphere in the situation.

With randomized phases it is possible to make sure that the phases do not follow any 'natural' units, which can give other variables the possibility of influencing the results [65]. Unfortunately, we were not able to randomize the phases of the interventions in this study, because we did not make the interventions as scientists. We were only following the phases the school was organizing, and anywhere, the outdoor education days will often follow a day-schedule, because it often is a long walk to get to the area. Anyway, the A-phases are somewhat randomized, since the length between the outdoor education days varied. Since the aim of this study was rather to explore the field, than to make a true experiment, following the school time-schedule and not interrupting their plans was a natural choice.

Since our culture seems to afford an increasing amount of sedentary activities, the necessity of a wider variability within teaching conditions will become more important. More studies like this will be needed to explore different effects of this alternative method of outdoor education.

An argument against outdoor education is that too much time is spent on physical activity, play and practical tasks, and as a consequence the time to spend on academic subject is reduced. These alternative activities may be worth something by its own because it is doing something good for the children's development and health [see e.g. [11, 15, 36, 59]] and maybe we should not be so afraid of using some of the academic time to other activities [60-62]. The outdoor education concept should not only be grounded on positive effects in the children's development, but also in academic learning. More studies will therefore be needed to explore more of the learning potentials in outdoor education, as well as to develop good learning methods. These learning outcomes can be hard to state, since the learning process in outdoor education may lead to consolidation of memory both in the cognitive and emotional memory system [6], whereas indoor learning tend to consolidate only in the cognitive memory system which is the kind of learning we usually measures.

CONCLUSION

Exploring the field of outdoor education is important in order to avoid it becoming an ideology without empirical support. This explorative study shows that outdoor education has many positive behavioural effects such as more physical activity, greater concentration, less restlessness, less verbal and motor agitation, more positive emotions and a larger amount of emotional variability. More studies will be needed to examine these findings further, especially studies with a rigorous methodology and design. However, this study provides a picture of more welfare and healthy development if the children are given the possibility to go to outdoor education occasionally. This will give results that are easily validated and confirmed. However, these results could be used to construct learning benefits for the pupils, e.g. the increased wakefulness and attentiveness should be a subject in further studies, with the aim of developing methods to increase learning outcomes for the pupils. Outdoor education is able to reduce the amount of negative behaviour. This possibility is beneficial for all pupils. First, it is beneficial for the process of socialization and the social learning for children at risk. Secondly, the children nearby are affected by the agitation, since they are disturbed and some are even being threatened or hurt by the agitation.

AUTHORS BIOGRAPHICAL STATEMENT

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CONFLICT OF INTEREST

The authors confirm that this article content has no conflict of interest.

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Article 4

How Outdoor Education Affects Children with Reading Disabilities

Abstract

This study explores whether children in Norway with reading disabilities experience school situations differently in a traditional indoor school setting compared to education conducted outdoors. In the first study children with reading disabilities are compared to the rest of the classes in how they report well-being in different school settings. Thirty children participated in this study. In the second study the answers from the six children with various degrees of reading disabilities were analyzed further, and qualitative observations of their behavior, both indoors and outdoors, were analyzed. The studies reveal that outdoor education can reduce the amount of unpleasant elevated arousal, which can lead to internalized and externalized problem behavior for the group of children with reading disabilities.

Key words: Reading Disabilities, Outdoor Education, Well-being, Mastering, Problem Behavior

1. Introduction

Outdoor education can be defined as a pedagogical method at school, where learning is located outdoors, with the goal of making the learning topics less abstract by relating them to real life. Outdoor education can be conducted in either a natural environment or in an outdoor, man-made setting. This is a normal method of introducing alternative and complementary teaching into the Norwegian subject curriculum; since we have the public right of access we have the opportunity to visit a natural environment without permission from the owner. When Norwegian teachers utilize this setting, the time schedule usually involves both teaching time and time for free play, and there is variation between academic goals and the desire for children to work together to improve their social skills in a more holistic atmosphere. Norwegian schools have been integrating outdoor education and the use of the local environment into their teaching curricula since 1939 (Jordet, 2010, page 13). The amount of teachers using outdoor education seems to be growing, but research about this form of teaching in Norway or in other Scandinavian countries is minimal (see for example these doctoral theses; Bentsen, 2010; Hyllested, 2007; Jordet, 2007; Munkebye, 2012; Mygind, 2005). This paper examines the issue of outdoor education and children with reading disabilities.

Earlier studies have shown outdoor education to be a useful intervention method for reducing undesirable behavior, such as different degrees of agitations, as well as a way to engage children, provide a positive experience and increase the amount of desirable behavior such as more focus on tasks and better integration in the entire learning experience (Dyment, 2005; Dyment & Bell, 2008; Fiskum & Jacobsen, 2012a, 2012c; Ozdemir & Yilmaz, 2008). Outdoor education seems to be particularly effective in reducing externalizing behavior among pupils showing a great deal of this (Fiskum & Jacobsen, 2012a; Roe & Aspinall, 2011), and in empowering the pupils with internalizing behavior (Fiskum & Jacobsen, 2012a). Interviews with children, who are used to outdoor education reveal a picture of participants who are exploring their environment, having fun and engaging in a variety of activities (Fiskum & Jacobsen, 2012b).

The findings from the studies mentioned above may indicate positive experiences during outdoor education. The way we experience a situation impacts how we feel and characterizes our motivation: we can feel motivated or nonmotivated in regards to an activity for many different reasons. The Reversal Theory (see for example Apter, 1997; Apter, 2001; Apter, Cowles, & Kerr, 1988) divides these reasons into opposite pairs. This theory is called a metamotivational theory, because it concerns the reasons behind the motivation. To feel that we are mastering a situation, or that we are calm enough to feel comfortable with it, is the most positive outcome in the *telic* state (from the telic/paratelic domain) in The Reversal Theory. If we feel able to handle a situation, we will feel comfortable. In contrast, if we do not master a situation, we will experience a heightened sense of anxiety, which could contribute to an increased sense of fear. Another possibility is that our metamotivation shifts to the opposite state, the paratelic state, where a high level of arousal may lead to pleasure because we think something is fun. In that state the situations with low levels of arousal will give us a feeling of boredom (Apter, 2001). If a child is feeling good about a situation at school, that feeling can, in accordance with the Reversal Theory, be caused by the metamotivational pair of telic and paratelic states in suitable amounts of arousal: either the child is feeling a high degree of mastering, or the child is feeling that something is fun. Both feelings are positive and generate motivation and well-being. If the child is not feeling good about the situation, that feeling can, in accordance to the same metamotivational pair, be caused by an unsuitable amount of arousal. If the child feels a high degree of not mastering the task or the situation, the child will not be satisfied with the situation in the telic state of mind (level of felt arousal is too high). If bored, that child is in the paratelic state of mind and will not be satisfied with the situation because the level of felt arousal is too low.

Contingent events, frustration or satiation are the main factors which might cause us to shift from one state to another (Apter, 2001). We don't create these reversals by choice; instead, they are being guided by the situation (contingency, frustration and satiation) and our own personality (dominance and liability to easily change state) (Apter, 2001). Children are very likely to be playful (Huizinga, 2000) and exist in the paratelic state of mind which indicates that they are in the *here and now*. In this state of mind, they appreciate high levels of arousal as well as having fun (Apter, 2001). Children who have problems with mastering the

academic topics at school often encounter situations where they wished the arousal was lower so they would feel better able to handle the situation. When they experience a too high arousal level, they do not feel comfortable and at the same time are not able nor is it a natural contingency to be in the paratelic state of having fun. They are then likely to feel uncomfortable in the situation or even experience anxiety.

Children with different learning disabilities may often experience this. The feeling that they cannot achieve mastering, and the low well-being often connected to this, an also be explained with the theory of intrinsic and extrinsic motivation and the need of mastering in order to increase the amount of intrinsic motivation (Deci & Ryan, 1985). Harter and Jackson (1992) found that perceived competence and motivation followed the same curve, demonstrating that the need of mastering is necessary to gain intrinsic motivation for academic subjects in order to increase a pupil's ability, gain better skills, and as a consequence achieve more experiences of mastering. This is the positive circle of motivation (Harter, Whitesell, & Kowalski, 1992).

Connected to mastering is also perceived self-worth. Harter, Whitesell and Junkin (1998) found that learning-disabled children reported themselves to be lower within cognitive competence and peer likability when compared to their normally achieving classmates. Using the eight dimensions within the perceived self-worth theory (Cognitive Competence, Behavioral Conduct, Physical Appearance, Romantic Appeal, Peer Likability, Close Friendship, Athletic Competence and Job Competence), the children with a high self-worth were able to judge domains where they felt low levels of adequacy/competence as less important, while the children with a low global self-worth were not able to do so (op. cit.). This highlights the importance of striving to achieve a high global self-perception for every child, and can be especially useful for children with learning disabilities. These childrens' shortcomings in classroom activities are easily identified both by themselves and others: developing a positive self-worth will help the children with learning disabilities discover a pattern of mastery, competence and motivation. Global self-worth is a result of self-perception in all the eight underlying dimensions: consequently, increasing self-perception in the underlying dimensions increases global self-worth (Harter, Whitesell, et al., 1998).

Several studies have identified the relationship between internalizing problem behavior (withdrawal, somatic complaints, anxiousness and depression) and learning disabilities (Arnold et al., 2005; Moilanen, Shaw, & Maxwell, 2010; Yu, Buka, McCormick, Fitzmaurice, & Indurkhya, 2006) and this lack in perceived self-worth may put the children with learning disabilities at risk. Externalizing problem(delinquent and aggressive behavior) behavior has also been related to learning disabilities (Heiervang, Stevenson, Lund, & Hugdahl, 2001; Moilanen, et al., 2010). In addition, studies have examined different aspects of self-worth among children and youth with learning disabilities: when interviewing Swedish youth and adults with dyslexia concerning their time in school, Ingesson (2007) found that the majority of the participants had experienced feelings of being different, inferior or stupid during their first six years of school. Studies have also shown children with learning disabilities are at risk for social maladjustments (Bauminger & Kimhi-Kind, 2008), for having problems with regulating their emotions (op. cit.) and for scoring lower in emotional intelligence (Mavroveli & Sanchez-Ruiz, 2011).

In a theoretical article Elksnin and Elksnin (2004) concluded that there is not enough positive intervention for children with learning disabilities, and that more research is required in order to better understand the cause of their social-emotional problem. Considering the Reversal theory and the studies mentioned above, children with learning disability may be more likely to demonstrate other patterns when reporting their feelings of well-being in school situations compared to their normally achieving peers. These children may also display different behavioral patterns during indoor and outdoor educational situations, as well as expressing other feelings and experiences from their days at school.

In this study we therefore set out to explore the following research questions:

Do the children with reading disabilities possess different patterns in their reporting of well-being in different school situations?

What characteristics do children with reading disabilities display in an indoor vs. an outdoor educational setting?

2. Method

This study is a part of a larger study about outdoor education. The study as a whole was approved by the Norwegian Social Science Data Service. The parents gave an informed consent to their children's participating in the study.

2.1. Study 1

2.1.1. Participants

31 children from grade 5 at one school agreed to participate in the study (mean age 122.6 months, Std. Deviation 3.8 months). There were 14 girls and 17 boys in this group. They were together as one group during outdoor education, and divided into two different classes during indoor classroom teaching. These children were used to outdoor education; in grades 1 to 4 they participated in outdoor education once a week, and in grade 5 they participated in outdoor education once every second week. Their days with outdoor education started with one lesson inside the classroom in the morning, followed by a walk to a nearby environment were they had some shelters, a fireplace, a primitive toilet, some playing equipment and self-made huts. This school had four places adapted for outdoor education. Upon arrival at the chosen site, the childrens' normal routine was time for free activities, followed by lunch and time for participating in different academic programs such as making huge geometrical figures in the snow, guessing and measuring distances, and counting the difference between their guess and their measurement.

Six (three girls and three boys) of these children participated in an special reading education plan a few times each week, because of various degrees of reading and writing disabilities. Although these six children had not necessarily been diagnosed with dyslexia, they were weaker readers than their classmates, and their teachers felt they would progress faster with an adapted lesson plan. They were with the entire class the rest of the week.

When interviews started, one of the boys did not want to be interviewed; he was not among the children joining the special education group. The other 30 children were interviewed 1-3 times.

2.1.2. Interview-procedures

The interviews were performed at the end of the school day. The child was presented with an outline of things that had happened during the day so that he/she could discuss each situation and try to recall feelings of well-being during that situation.

Examples of situations might be:

Inside (during one lesson and one break):
1: English; listening to a CD-player and spelling with the voice on the CD.
2: English; reading their homework together like a role-play
3: English; a practical activity involving a little contest
4: Break; playing football
5: Break; playing with Pokemon Cards

Outside (from the beginning and until half of the time with academic program):
1: When they walked to the outdoor education area
2: Lunchtime; sitting together with two friends and a teacher
3: Time for free activities; swinging on the equipment
4: Teaching activities; waiting to start working
5: Teaching activities; working with English Christmas words
6: Teaching activities; Finding nouns in the forest and using their grammar skills.
7: Teaching activities; dictate-relay in groups

69 interviews were performed. The average time for each interview was around 20 minutes including the time used to explain the procedures to the child. The Reversal Theory (Apter, 2001) made a theoretical lens in working out the questions for these interviews. The interviews were structured; for each situation the child was asked to choose one face out of the five face options drawn onto a piece of paper; a big smile, a smaller smile, a neutral mouth, a small sad mouth or a big sad mouth. If the child pointed at the face with a big smile for one given situation, the interviewer asked the child why he/she felt a high degree of well-being during that particular situation.

The categories were explained in detail to the child at the beginning of the interview. The categories of mastering (relaxing and not being afraid of failing in the situation) and not mastering (afraid of not mastering, or the situation was unpleasant for some reason) were also explained. Children who selected the highest level (big smile) or the lowest level (big sad face) of well-being were asked to explain their choice in regards to high or reduced well-being. For every situation in which the child answered by pointing to a face which did not implicate the highest level (big smile) or the lowest level (big sad face) of well-being, the child was asked to explain both high and reduced well-being.

High well-being: Was it because of a feeling of fun or because the child felt capable of handling the situation and therefore felt a lack of stress and the ability to relax? While asking these questions, the interviewer again pointed to boxes drawn on a piece of paper requesting that the child point at one of five boxes; a box with only FUN, a box with mostly FUN, a box with the same amount of FUN and MASTERING, a box with mostly MASTERING or a box with only MASTERING. To avoid any misunderstanding, the child was told they did not have to answer every question. If the child was not sure, it was okay to say so.

Reduced well-being: If the child had chosen a face other than the big smile, the interviewer asked about the cause of the reduction in well-being. Again the child was asked to choose among five boxes; a box ‘only because of boredom’, a box ‘mostly because of boredom’, a box with ‘the same amount of boredom and not mastering’, a box ‘mostly because of not mastering’ and a box ‘only because of not mastering’.

2.1.3. Statistics

In considering the variables of well-being, fun versus mastering and difficult versus boring, all the situations where the children in the interviews pointed to faces and boxes were quantified.

To explore differences and similarities in well-being, mean and standard deviation was measured for each subgroup. The lowest level of well-being was 1 and the highest degree of well-being was 5. To explore differences and similarities between the groups in their explanation of high or reduced well-being, mean and standard deviation were measured for both variables. For high well-being; value 1; well-being caused by the feeling of mastering, value 2; well-being caused mostly because of mastering, value 3; well-being caused by the same levels of both mastering and fun, value 4; well-being caused by mostly fun, 5; well-being caused by fun. For reduced well-being; value 1; reduced well-being caused by not mastering/difficult, value 2; reduced well-being caused by mostly because of not mastering/difficult, value 3; reduced well-being caused by equal amounts of not mastering and boredom, value 4; reduced well-being caused mostly by boredom, 5; reduced well-being caused by boredom.

2.2. Study 2

2.2.2. Participants

From the sample in study 1, data from six children attending the special education group were analyzed more deeply. This group involved three boys and three girls. All six participants were interviewed, while three of them, two boys and one girl belonging to the same classroom group, were observed.

2.2.3. Observation

The three observed children were also participants in other studies (Fiskum & Jacobsen, 2012a, 2012c) where the observations are being quantified. In this study, the qualitative comments are the main focus. Observation was conducted for seven days. Each day approximately 11 series of observations were made including a focus on the degrees of physical activity, mood expression, motor and verbal agitation and positive and negative communication. For each of the eleven sections the child was observed quantitatively for three minutes, and two minutes were provided for writing qualitative notes about the situation and the child's behavior.

2.2.4. Interpretation of data from observations into the table

First an overall description of the situation was recorded for each section for each child. During this process focus areas like mood expression, physical activity, agitation and communication were examined separately as well as together to determine their effect on the situation as a whole. The next step was to examine the different situations to find patterns indicating positive or negative behavior. “A boy is participating in a role-play. He is eager and is smiling, and his level of physical activity also increases.” This observation from an outdoor educational setting is an example of positive behavior. An example of a situation exhibiting negative behavior, externalizing behavior with low intensity, is when a boy working eagerly with a task in a group gets angry with a girl in the group because he thinks she is not doing the task well. Not every situation leading to either positive or negative behavior is placed in the table; situations demonstrating both positive and negative behavior are left out.

Whether the negative behavior is internalizing, externalizing or both, is more self-evident. Withdrawn behavior such as creating some kind of distance from the others, being restless, or being absent minded considering the topic, is placed into the category of internalizing behavior. Externalizing behavior also involves others; for example if the pupil is gesticulating to make others laugh, or if the pupil is disturbing or hurting others with his/her motor or verbal agitation. Often an externalizing situation starts with a period of internalizing. Sometimes this period is short and then the behavior is seen as only externalizing.

The division between high and low intensity is mainly based of the amount of energy the pupil is showing in the situation. To a lesser degree this division is also based on the length of the situation; for example a situation where the girl has stopped doing her tasks and at the same time gives negative comments to another girl, is a situation with both low and high energy levels. The time when she hurts another person is very short, and therefore this situation as a whole is placed in the category of low intensity.

2.2.5. Data based on interview

The interviews are the same as in study 1. In study 2, the different situations which lead to different levels of well-being are taken into account. Comments or explanations, which the authors have interpreted as significant, have also been taken into account.

2.3 Trustworthiness

The first author has observed three pupils as well as undertaken all the interviews in study 1 and 2. During this data-collection she became aware that outdoor education has an affect on this group of children. Since the valuing process for the interview data was made by which boxes and faces the child pointed at, any pre-conceptions were not able to influence the values. To secure validity further, the valuing of the interviews were done into schemas, and the scoring was checked by another researcher for some of the interviews.

The process of making a table of observations, judged as either positive or negative patterns in the behavior, were first done in a table with a description of each situation. It was then reviewed by another researcher, followed by a discussion about whether it looked reasonable or not.

The authors have no personal experience with pupils having reading disabilities going on outdoor education.

3. Results

3.1. Study 1

Table 1 shows a high degree of well-being, around 4.5, for all groups during both school conditions. There are only minor differences between outdoor and indoor education, but there is a trend towards higher well-being in indoor classroom settings. St.d. are below 1, except for some groups during outdoor education. There is more than 1 in St.d. for both girls and boys not participating in the adapted lesson plan and for the girls in this adapted program.

Table 2 shows the exploration of the high well-being and reduced well-being responses. There is a pattern of reduced well-being during outdoor education, mainly caused by boredom for everyone, which indicate more episodes within the paratelic state of mind. The responses of boredom are lower during outdoor education than during indoor education, which means that the explanations of reduced wellbeing are weighted more to the telic side of the scale during outdoor education. The most remarkable comparison in table 2 is how the two groups respond to working in an indoor classroom when they are explaining their reduced well-being. The group without the special reading education lessons connects their reduction in well-being mostly to boredom, while the group with special reading education lessons credits feelings of not mastering and feelings of high arousal with their reduction in well-being. There is also a significant difference for the boys in what warrents marks of high well-being during outdoor education; boys in the group offered the special reading education lessons are more likely to connect well-being partly with a feeling of mastering, while-boys without those special reading education lessons mostly connect well-being with having fun.

Table 1: The childrens' experience of well-being during different school settings

Outdoor education											
Special education group						**No special education group**					
All		Girls		Boys		All		Girls		Boys	
Mean/ N.	St.d.	Mean/ N.	St.d.	Mean/ N.	St.d.	Mean/ N.	St.d.	Mean/ N.	St.d.	Mean/ N.	St.d.
4.34/44	.94	4.24/25	1.05	4.47/19	.77	4.38/303	1.08	4.31/141	1.11	4.44/162	1.05
Indoor education											
Special education group						**No Special education group**					
All		Girls		Boys		All		Girls		Boys	
Mean/ N.	St.d.	Mean/ N.	St.d.	Mean/ N.	St.d.	Mean/ N.	St.d.	Mean/ N.	St.d.	Mean/ N.	
4.46/67	.86	4.29/38	.87	4.69/29	.81	4.51/284	.89	4.50/129	.80	4.51/155	.96

Table 1 shows the mean of well-being (5 is the highest level of well-being, and 1 is the lowest), and the number of situations being commented upon.

Table 2: The explanation of high and reduced well-being

Group	**Outdoor education**						**Indoor education**					
	Explanation of reduced wellbeing			**Explanation of high wellbeing**			**Explanation of reduced wellbeing**			**Explanation of high wellbeing**		
	N	Mean	St.d.	N	Mean	St.d.	N	Mean	St.d.	N	Mean	St.d.
Special education group												
All	18	3.50	1.82	42	3.60	1.81	21	2.19	1.66	60	3.97	1.65
Girls	12	3.83	1.80	23	3.83	1.72	17	2.18	1.74	33	3.85	1.70
Boys	6	2.83	1.83	19	3.32	1.92	4	2.25	1.50	27	4.11	1.60
No Special education group												
All	96	3.51	1.65	282	4.01	1.45	71	3.82	1.60	269	3.77	1.53
Girls	49	3.67	1.56	131	3.82	1.48	34	4.09	1.29	122	3.60	1.54
Boys	47	3.34	1.75	151	4.18	1.41	37	3.57	1.82	147	3.90	1.51

Table 2 shows the explanation of high well-being and of reduced well-being. Explanation of reduced wellbeing uses the difficult/boring scale: value 1; reduced well-being caused by not mastering/difficult, value 2; reduced well-being caused mostly because of not mastering/difficult, value 3; reduced well-being caused by the same amounts of not mastering and boredom, value 4; reduced well-being caused mostly by boredom, 5; reduced well-being caused by boredom. Explanation of high wellbeing uses the difficult/boring scale: value 1; well-being caused by a feeling of mastering, value 2; well-being explained mostly because of mastering, value 3; well-being caused by the same levels of both mastering and fun, value 4; well-being caused mostly by fun, 5; well-being caused by fun.

3.2. Study 2

3.2.1. The information behind well-being and reduced well-being for the boys

The boys mostly report a high degree of well-being in both indoor and outdoor settings. The high degree of well-being is mostly caused by the boys' feelings of fun and joy in the situation. In the inside classroom setting the lessons with special reading education differ from the rest of the classroom situations. During these lessons, these pupils are likely to use mastering as an explanation of high well-being. The explanation for reduced well-being is both boredom and the feeling that the situation/task is too difficult. For example, one of the boys reports a reduction in well-being during a special education class when they are working through their extra homework. He feels that is difficult, and responds with negative emotions to extra homework; it is too much for him to manage. In the outside setting, the boys define most of their well-being with fun and joy. Examples of situations which they explain as easy to manage (low arousal, mastering) are when they are making geometrical figures in the snow, discussing Christmas-words in English, preparing the bonfire or walking a longer distance. Those situations are felt to be easy, but also a bit boring, and as a consequence these situations are not given the highest outcome in well-being.

3.2.3. The information behind well-being and reduced well-being for the girls

The girls also often report a high degree of well-being, but they are also more likely to report reductions in well-being, compared with the boys. The feeling of not mastering the tasks is the most frequent explanation of reduced well-being in the traditional indoor classroom setting.

The girls describe many difficult situations resulting in reduced well-being. In mathematics one of the girls is afraid of missing what the teacher is saying. In music one of the girls thinks it is difficult to hear the teacher because it is noisy in the classroom. In English one of the girls is afraid of not managing the task when they are supposed to write English words in their books, and the same girl is afraid of writing the wrong answer in English when they are supposed to listen and write in English. When they are reading loudly in Norwegian one of the girls is afraid of not knowing where to start when she is going to be the next one to read. In English lessons one of the girls thought it was difficult to listen to the CD because she was disturbed by the noise the boys were making and it is difficult to understand the text. In the test in mathematics one of the girls is afraid of not mastering the task because she knows that she cannot manage it.

Well-being is mostly explained by fun or joy, but can also be connected to feelings of mastering something. For example, one girl feels she masters the task when doing a test in academic subjects during the last period. One girl feels a little mastering of the task during a test in mathematics and when she performs exercises in mathematics. One girl reports a feeling of mastering during a task in the special education lesson and one girl reports a feeling of mastering during a little writing task about outdoor education.

In the outside classroom most of the reductions in well-being are being caused by boredom. Examples of situations which are a bit boring are when they have lunch time, while they are throwing paper airplanes, while they are throwing cones, while they are counting points and when they are looking for nouns in the environment outside. Situations which are mentioned as difficult are when one of the girls did not manage to climb up on the swing, when one of the girls stumbled and got hurt, and when the group was supposed to count points. An activity where a dictation is combined with a relay is also mentioned as difficult, but this does not matter, since the task is very funny and well-being is therefore at the highest level anyway.

3.2.4. Positive and negative patterns of behavior

The positive and negative patterns of behavior from the observations are placed in table 3. The table shows a higher number of positive behavior during outdoor education, more high intensity reversals for the boys and low intensity reversals for the girls. For the negative patterns of behavior there is, except for a relatively high number with low intensity among the boys, a reduced frequency in both internalizing and externalizing behavior for both genders.

Table 3: The number of positive and negative reversals of behavior for boys and girls during outdoor and indoor education

		Positive		**Negative**			
		High intensity Count (%)	**Low intensity** Count (%)	**High intensity** (Count (%)	**Low intensity** Count (%)	**Internalizing** Count (%)	**Externalizing** Count (%)
Outdoor education							
	Boys	23 (52%)	14 (33%)	1 (4%)	10 (40%)	7 (23%)	4 (15%)
	Girls	5 (11 %)	10 (23%)	3 (11%)	4 (16%)	3 (10%)	4 (15%)
Indoor education							
	Boys	10 (23%)	16 (37%)	14 (52%)	2 (8%)	11 (35%)	6 (22%)
	Girls	6 (14%)	3 (7%)	9 (33%)	9 (36%)	10 (32%)	13 (48%)
Total		44 (100%)	43 (100%)	27 (100%)	25 (100%)	31 (100%)	27 (100%)

Table 3 shows the positive and negative reversals of behavior for boys and girls during outdoor and indoor education. Positive reversals are divided into the qualities high and low intensity, while the negative reversals also are divided into internalizing and externalizing behavior. The sum of Internalizing and Externalizing behavior is higher than the sum of High and Low Intensity, because some of the situations were interpreted as both internalizing and externalizing.

4. Discussion

4.1. Study 1

All groups report a high degree of well-being in both school environments. For all groups, the well-being is a little higher during activities indoors, but mean of well-being is between 4.24 and 4.69 in both conditions in every group. There is a pattern of higher standard deviations during outdoor education. This might indicate a high variability of experiences either between different situations or between different individuals. The main difference in the pattern between the special reading education group and the ordinary pupils are the differences boys have in explanations of high feelings of well-being during outdoor education and in girls and boys the explanation of reduced well-being during indoor education. The special reading education group more frequently reports mastering (or low arousal) as an explanation for well-being in outside education, even though both groups more often report fun as the main explanation. This difference is mainly in the boys' explanations and it might indicate a need for the feeling of mastery.

The difference in the explanation of reduced well-being during indoor education is more obvious. While the special education group has a mean of 2.25 to explain reduced well-being, indicating more weight on the not mastering side, the result from the rest of the class is 3.57, which indicates more weight on the side of boredom. This could mean that the children with reading disabilities are spending more time in the telic state of mind (Apter, 2001), and are using a lot of energy on their shortcoming in reading and writing, especially when they are participating in a traditional indoor school day. These findings are in accordance with the Reversal Theory (Apter, 2001), that the situational condition or experience the child is having has a great deal of influence on the reversal process of the state of mind. The children with reading disabilities seem to feel higher arousal in the learning situations in an indoor setting.

Limits of this study are the structuring of the interviews. When children are told to choose either one side or another, or point at one figure instead of another, they are able to do so without reflecting upon their choices. This type of interviewing is not as reliable as open interviews with open-ended questions (Aldridge & Wood, 1998; Krahenbuhl & Blades, 2006;

Lamb & Brown, 2006). Nevertheless, this method has the benefit that one can ask many questions in a relatively short time (Patton, 2002, chapter 7), as well as the practical tools to explain pattern in answers; for example, explaining their degree of well-being may have made the children start thinking before they pointed at one of the five faces. When the children were able to choose between two degrees of MASTERING, two degrees of FUN, or the neutral category, they had more viable options, which therefore increased the trustworthiness of the study. The pattern of answers from the children with reading disabilities revealed in study 1 therefore highlights the importance of study 2.

4.2. Study 2

The reason reported for reduction in well-being was often 'not mastering' during traditional academic indoor work. The boys report more mastering during the special reading education lessons and during the work with academic topics outside. During outdoor education, they are also likely to report well-being because of fun, and as a consequence, the focus on failing is reduced. For the girls, the most frequently reports of reductions in well-being in the traditional indoor classroom is not mastering. They are often afraid of not mastering the task, or of missing important messages from the teacher, which makes them fail in the academic setting. Outside, the most frequent reason for reduced well-being is boredom.

Considering the positive and negative reversals in behavior there is a trend showing fewer negative reversals during outdoor education. There is also a small difference in the number of positive reversals in behavior, but this is hardly visible. Both genders give themselves some extra breaks. While the boys yawn and take more legal and silent breaks, the girls are often agitated. The boys' breaks can often be seen as internalizing behavior, while the breaks made by the girls in this study are often seen as externalizing behavior. The boys have a higher amount of internalizing problem behavior, compared with the amount of externalizing behavior. This negative behavior reduces both in prevalence and in intensity when going into an outdoor setting. For the girls, the prevalence of externalizing behavior is somehow higher during both conditions, but prevalence and intensity reduces when going outdoors. Both genders report that they appreciate outdoor education. There they participate with others, and their shortcomings in reading and writing do not matter. Outdoor education makes the pupils feel that their competences are assessed less, even though one of the girls is still aware of the assessment outside, as well as her shortcoming in these topics.

The fear of failing the task seems to increase the levels of arousal in the indoor school setting for this group of children; the only time they report boredom in this setting is when they are talking about the special reading education lessons. During these lessons, the levels of arousal are probably reduced, and as a consequence a feeling of boredom can be the result. This is in accordance to the Reversal Theory (Apter, 2001), and indicates that the situational contingency is making pupils change from the telic to the paratelic state of mind. This provides a benefit for pupils who often find the tasks too difficult: When tasks are perceived as fun, they usually do not report unpleasantness, even if they do not master the task. This could mean that if the children are getting into a paratelic state of mind, and as a consequence of that, their shortcomings in academic subjects do not stress them to the same degree. Since a reversal from one metamotivational state to another (Apter, 2001), for example from telic to paratelic, can be induced by the situation, outdoor education may affect the amount of time spent in paratelic state of mind.

The children's behavioral changes and changes in reports of well-being during outdoor education are evidence that outdoor education is an arena that allows for positive contribution to children's self-worth whether through social activity, athletic competence or even scholastic competence when working with academic topics in more practical ways. A stronger feeling of self-worth can make children less vulnerable even though they have a low self-perception in the scholastic domain (Harter, Whitesell, et al., 1998).

A limitation of study 2 is the small number of children participating. Of the three boys and three girls, all of them have been interviewed but only three (two boys and one girl) have been observed. The two boys had quite similar behavior, while the girl had a different way of responding to the demands of school. Regardless of gender, we should be aware that there are many ways to respond. However, the cases outlined in this article can make a contribution to understanding children with reading disabilities and their experiences at school.

4.3. General discussion

The data in study 1 and study 2 demonstrates that outdoor education is less likely to give the children with reading disabilities feelings of their shortcoming in different situations, even though those situations may be difficult and academically demanding. Situations experienced in an outdoor setting can bring them into a state of mind where they experience fun, and therefore do not feel inadequate. If this kind of teaching method gives the children some feelings of mastering in the situations, it can generate even more motivation for the topics (see for example Harter, 1980).

The studies also show the children's ability to demonstrate competences in different areas during outdoor education, which probably will be more important for the group of children who are striving with their readings indoors. This might open up the possibilities for an increased self-perception in another dimension than reading/learning of academic topics in the classroom, which can increase global self-worth, and thereby reduce the negative effect of their shortcoming in for example reading (Harter, Waters, & Whitesell, 1998). When they are given the chance to demonstrate competences in other areas, they also are given some positive feedback from their classmates, which will affect their view of the self (see for example the theory from Mead & Morris, 1934).

The results in study 1 and study 2 also indicate that the children with different degrees of reading disabilities are more likely to stay in the paratelic state of mind (Apter, 2001) during outdoor education. This is a part of being a child, and is a state where they can more easily deal with a high degree of arousal. Therefore outdoor education can be a healthy alternative and complementary method for this group of children.

5. Conclusion

Data from this study indicates that children in general are calmer, have more fun and are more positive when learning through outdoor education rather than in the traditional indoor classroom. Children with reading difficulties seem to relax more outdoors because the framework from traditional learning is removed. Perhaps outdoor education, in addition to contributing to children's learning, also contributes to a relief from stress built up during indoor education. If this is so, it might be an argument for varying between indoor and

outdoor education. The stress relief from outdoor education may then also contribute to increased learning quality and self-concepts in indoor education.

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Appendices

Appendix 1

Norsk samfunnsvitenskapelig datatjeneste AS
NORWEGIAN SOCIAL SCIENCE DATA SERVICES

Harald Hårfagres gate 29
N-5007 Bergen
Norway
Tel: +47-55 58 21 17
Fax: +47-55 58 96 50
nsd@nsd.uib.no
www.nsd.uib.no
Org.nr. 985 321 884

Tove Anita Fiskum
Avdeling for lærerutdanning
Høgskolen i Nord-Trøndelag
7600 LEVANGER

Vår dato: 15.09.2008 Vår ref :19724 / 2 / KH Deres dato: Deres ref:

KVITTERING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 14.08.2008. Meldingen gjelder prosjektet:

19724	*Uteskole - en læringsarena på barnas premisser?*
Behandlingsansvarlig	*Høgskolen i Nord-Trøndelag, ved institusjonens øverste leder*
Daglig ansvarlig	*Tove Anita Fiskum*

Personvernombudet har vurdert prosjektet og finner at behandlingen av personopplysninger er meldepliktig i henhold til personopplysningsloven § 31. Behandlingen tilfredsstiller kravene i personopplysningsloven.

Personvernombudets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, eventuelle kommentarer samt personopplysningsloven/-helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, http://www.nsd.uib.no/personvern/forsk_stud/skjema.html. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, http://www.nsd.uib.no/personvern/prosjektoversikt.jsp.

Personvernombudet vil ved prosjektets avslutning, 20.07.2009, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Bjørn Henrichsen Kjersti Håvardstun

Kontaktperson:Kjersti Håvardstun tlf: 55 58 29 53
Vedlegg: Prosjektvurdering

Appendix 2

Til foreldre/foresatte i 5. klasse på XXXX skole

I forbindelse med forskningsprosjektet "Uteskole – en læringsarena på barnas premisser?" er det planlagt å se nærmere på forskjellene mellom tradisjonell undervisning i klasserommet og uteskole. I den anledning er det ønskelig å følge en skoleklasse som veksler mellom uteskoleundervisning og tradisjonell undervisning. Dette forskningsprosjektet er en del av et doktorgradsarbeid ved Høgskolen i Nord-Trøndelag.

Forskningsprosjektet vil innebære at undertegnede følger klassen i 3-4 uteskoleopplegg denne høsten og i omkring 10 dager med undervisning i klasserommet. I disse dagene vil elevene bli observert. I noen av observasjonsdagene vil allmennlærerstudenter fra HiNT delta i disse observasjonene. Fokus for observasjonene er hvordan elevene responderer på ulike organiseringer av skoledagene. Gjennom observasjonene vil vi forsøke å få et bilde på hvordan ulik organisering av skoledagen påvirker elevenes konsentrasjon, fokusering på oppgaver, humør/trivsel og orden/uro.

I tillegg vil alle elevene bli spurt om å skrive hva de synes om det å ha uteskole. Etter noen av skoledagene undertegnede har vært på skolen er det også ønskelig å intervjue noen elever. Det taes sikte på å intervjue alle elevene som har levert samtykke, og som synes det er greit selv, en til to ganger hver. Den praktiske organiseringa av dette vil bli gjort i samråd med skolen, slik at det passer med skolebuss eller annen skyss hjem for de som trenger det. Fokuset for disse intervjuene er hvordan elevene har oppfattet denne skoledagen. Hvert intervju vil vare fra 10-20 minutter. For å få skrevet ned intervjuene mest mulig korrekt, vil intervjuene bli tatt opp på bånd. Undertegnede oppbevarer båndet i inntil en uke etter hvert intervju. Deretter slettes båndopptaket. Ingen andre får høre intervjuet eller båndopptaket.

Skolen vil ikke få tilbakemelding om observasjoner og annen informasjon fra enkeltelever. Derimot vil skolen få en umiddelbar tilbakemelding, på et generelt grunnlag, om hvordan ulike opplegg i skolen ser ut til å fungere.

Observasjoner og informasjon fra enkeltelever er underlagt taushetsplikt. Informasjonen vil bli ført inn på data uten navn og annen gjenkjennbar informasjon. Navn med tilhørende kode, oppbevares på en separat liste, som ikke oppbevares elektronisk. Denne lista vil kun være tilgjengelig for undertegnede. Lista vil bli makulert 20. juni 2009.

Deltakelse i forskningsprosjektet er frivillig. Hvis det er ønskelig, kan dere uten videre begrunnelser, trekke dere fra undersøkelsen og be om at deres barns data skal bli slettet.

Med hilsen

Tove Anita Fiskum
Doktorgradstipendiat

For mer informasjon kan jeg kontaktes på
Røstad
Høgskolen i Nord-Trøndelag
7600 Levanger
Tlf 74 02 26 35, Mobil XXXXXX, Tove.a.fiskum@hint.

Fyll ut svarslippen nedenfor, og lever den til skolen innen mandag 29. september

……kan/kan ikke *(stryk det som ikke passer)* delta i prosjektet ”Uteskole – en læringsarena på barnas premisser?”

(elevens navn)

……kan/kan ikke *(stryk det som ikke passer)* bli intervjuet like etter skoletid.

(elevens navn)

I forkant av et intervjuet blir eleven spurt om det er greit. Dersom intervjuet fører til at eleven kommer senere hjem enn ellers, blir det gitt beskjed på forhånd. Elever som ellers pleier å ta skolebuss, blir kjørt hjem etter intervjuene.

……..

(Foresattes underskrift)