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Urban woodlands and their function as outside school learning environments for sustainable learning – Cooperation between educational institutions and the „Industriewald Ruhrgebiet“

Literature review

English version

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1. Introduction

Within the scope of the preliminary study “Urban woodlands and their function as outside school learning environments for sustainable learning – Cooperation between educational institutions and the „Industriewald Ruhrgebiet“”, we conducted an extensive literature review. The results of this review will be presented in this article.

During the search phase, we proceeded as follows. In the electronic data bases FIS Bildung, ERIC und Psynindex we searched for the keywords „forest“, „forest pedagogy“, „social competence“, „social self-concept“, „urban forests“, „extracurricular learning environment“, „emotional competence“, „sustainable development“, and „environmental education“ and for the German equivalents. Furthermore, we also searched Google Scholar and the journal „Environment and Behaviour“ for these keywords.

As a next step we evaluated the found articles’ references in order to discover further material. Following, we organized the articles using an electronic bibliography database manager in several categories consisting of the study’s country and specific keywords.

After these initial steps, we analysed the articles’ contents. It became apparent that the field of forest pedagogy is relatively narrow. The majority of the literature only reflects the personal assessment of the individual authors, i.e., in these articles, the requirements of validity and objectivity are not fulfilled.

Most of the empirical articles are American, the European publications mainly evaluate qualitatively the implementations of forest pedagogic projects. Yet, Europe and North America differ not only in the methods employed but also in the research topics.

The bulk of American studies refers to the positive effects of regular contact to nature, where term „nature“ is used very broadly. Nature does not necessarily refer to untouched nature like woods or forests but also to artificial nature like parks or green spaces. Academics in interdisciplinary cooperation often analyse the effects of nature on physical and mental health, but also the resulting potential economic benefits of a reinforced integration of nature the people’s everyday lives.

These benefits originate in the positive impact of a green environment on the ability to concentrate and efficacy, and the therapeutically effect for ADD patients (Kuo and Faber Taylor, 2001, 2004, 2009). Moreover, researchers found evidence for a

positive effect on levels of physical activity. This in turn reduces obesity and the resulting consequences like diabetes and cardiovascular disease. Particularly in the USA – where obesity and its consequences cause ever increasing costs for the health sector – academics refer to the potential cost savings by implementing nature in children's daily routine.

Promoting such rational considerations could also drive European academics to conduct interdisciplinary research involving psychologists, physicians, health economists and educational institutes in the field on nature and its positive influences on humans.

In Europe, the most advanced implementations of forest pedagogy can be found in Scandinavia and Great Britain. Yet, the empirical assessment of these implementations is problematic. In the UK, there are several project evaluations conducted by the nef (new economics foundation), but these are mainly qualitative. Predominantly, a quantitatively statistical analysis is lacking. The samples, in particular, are not comparable to American studies.

This is aggravated by the fact that there are no valid and reliable standardized assessment methods for the social and emotional competences of preschoolers. These competences are mainly assessed by judgements of parents or teachers. In this regard, experts point out that children under 7 years are not capable of self-reflection. Hence, existing methods bring about the risk of biased subjective external judgements. This must be taken into account when developing a survey instrument in this field. In the realm of a valid measurement of the effect of forest pedagogic implementations there is a large research deficit. Swiss qualitative studies confirm positive effects in the emotional and social domains, however, a standardised qualitative measurement has yet to happen.

This literature review shows a weak research activity in Europe. This could be due to the fact that, although there are numerous implementations on a communal level, the implementations have their own concepts and differ contentswise. Increasing cooperation in Europe concerning the planning and implementation of forest projects but also the valid evaluations of these projects are desirable. Thereby, larger sample sizes and thus more convincing results could be realised. Moreover, the development of consistent projects would be encouraged, and institutions could benefit from other projects' experiences.

2. Literature review

2.1. Attention Deficit Disorder

Faber Taylor, Kuo and Sullivan (2001): Coping with ADD: The Surprising Connection to Green Play Settings (USA).

The authors examine the following hypotheses: 1) Attention deficit symptoms will be more manageable after activities in green settings than after activities in other settings. 2) The greener a child's everyday environment, the more manageable their attention deficit symptoms will be in general. These hypotheses are investigated by the use of a questionnaire among affected parents. They report about their children's behaviour. Both hypotheses are supported by the data. ADS patients show fewer symptoms and are able to control existing symptoms more efficiently. The authors underline that a restorative environment not only improves the symptoms of ADS as predicted by Kaplan's ART, but is also a cheap alternative for other children to influence the own development positively. The design of public spaces, schoolyards and housing areas should take place with due regard to the positive effects of nature and vegetation on children's development.

Faber Taylor and Kuo (2009): Children With Attention Deficits Concentrate Better After Walk in the Park (USA).

The authors examine the ART-argument that exposure to a green environment has a positive impact on attention in children with ADD/ADHD. 17 children aged 7-12, each professionally diagnosed with ADD, experienced each of three environments via individually guided 20-minute walks through either a city park, a downtown area or a residential area. After the walk each of the children completed tests of concentration. Analysis of the tests showed that children's ability to concentrate varied significantly as a function of their previous surroundings. All participants show an increased attention after the walk through the park and a decreased one after a walk through the urban areas. The stay in a natural environment can be regarded as a relatively convenient therapeutic method for ADD/ADHD patients.

Godbey (2009): Outdoor Recreation, Health, and Wellness. Understanding and Enhancing the Relationship (USA).

Godbey's discussion paper is based on numerous studies. The author underlines the positive effects of nature on obesity and ADHD. He argues that many children substitute green space with screen space and suffer from nature deficit disorder. He emphasizes that serious deficits in the socio-emotional development are caused by the nature deficit. The author concludes with the appeal that politics, schools, medicals and families ought to cooperate with the aim of increasing the children's physical activity.

Kuo and Faber Taylor (2004): A Potential Natural Treatment for Attention-Deficit/Hyperactivity Disorder: Evidence From a National Study (USA).

The study is based on 452 parents' responses. The parents rated the after-effects of 49 common after-school and weekend activities on their children's (aged 5 to 18) symptoms of ADD. The activities can be categorized into "green environment", "built outdoor setting" and "indoor setting". The analysis shows that exposure to a natural environment reduces the symptoms of ADD. Furthermore, the relieving effect of nature exposure is sustainable. This effect is independent of the families' socio-economic status. It is worth noting that the ratings of identical activities differ depending on the location in where the activity is conducted. For example, "reading" in a natural environment has a significantly beneficial effect on the ADD symptoms, while reading in an indoor setting is less beneficial.

2.2. Cognitive, emotional and social development

Burdette and Whitaker (2005): Resurrecting Free Play in Young Children Looking Beyond Fitness and Fatness to Attention, Affiliation, and Affect (USA).

Aim: The authors want to show the importance of free and unstructured play for the children's physical, emotional, social and cognitive development. They argue that efforts to increase physical activity of children in order to reduce obesity might be more successful if they are communicated as play and, furthermore, if the positive effects on child well-being other than physical health are emphasised. Attention as one aspect of cognitive functioning and its relationship with physical activity needs further investigation. Since free unstructured play requires different kinds of social interactions such as deciding what to play, to rule and to follow, it encourages

children to communicate and improve their social skills. In free and unstructured play and physical activity the authors see a great potential for the emotional development of a child. Studies with adults have already shown this coherence. Conclusion: Free and unstructured play offers great potentials and the focus should no longer lie on fitness and fatness but move to well-being through play. Compared to physical activity, the expression "play" has a more positive connotation.

Coley, Sullivan and Kuo (1997): Where Does Community Grow? : The Social Context Created by Nature in Urban Public Housing (USA).

Aim: By observing two public housing developments (high-rise buildings versus row houses) the authors answer the following questions: 1) Does the presence of trees increase the probability that local residents use the public outdoor space? 2) Do different characteristics of the trees (presence, number and location) predict the number of inhabitants who use the space together? 3) Does the presence of trees increase the probability that mixed age groups use the space together at the same time? Results: 1) The presence of trees indeed increases the use of the public space. Furthermore, the authors also find evidence for questions 2 and 3. Moreover, these usage patterns could have important consequences for the inhabitants' social interactions, relationships, safety and satisfaction. In addition, time spent in nature may also have restorative effects on the inhabitants' cognitive capacities.

Faber Taylor et al. (1998): Growing Up in the Inner City (USA).

The study investigates the relationship between increased vegetation in barren inner-city neighbourhood spaces and the play behaviour of the resident children. Besides the form of play (rule-bound play or creative play), the authors also analyse the interactions between adults and children. The observations were conducted by residents of the respective neighbourhoods and categorised into the three categories rule-bound play, creative play and no play. The authors assume that creative play is more conducive to children's development than rule-bound play (benefits for language and collaborative skills). Furthermore, the interactions between adults and children are supposed to be beneficial for the children's development, whereas the lack of interactions is supposed to harm the development. Results: The authors find evidence for a relationship between vegetation and children's play behaviour. The higher the nearby vegetation, the higher the probability for forms of creative play.

Moreover, the interaction rate between adults and children increases with the presence of vegetation. The authors conclude that renaturation and greening of public housing developments may contribute to an increase in physical and mental well-being.

Gaschler, Klimek and Lauenstein (2009): Förderung personaler und sozialer Kompetenzen von Kindern durch Erhöhung der Wagniskompetenz (Germany).

The article basically focuses on the organisation of lessons in sports, but its theoretical design can be applied to other (school) stays in free terrains, e.g. the woodlands. Risk is always connected with the appeal of situations with an uncertain outcome and the appeal to stand the situation. The authors associate terms like, e.g., experience, adventure and risk. The successful handling of uncertainty leads to the acquisition of competencies. Inherent in all children is the seeking of intense sensory stimuli and the testing of the own limits such as the own physical power. The woodlands offer the possibility to satisfy all those desires. Since the everyday-life of children offers less and less risky motion situations and tends to be "over secured", they can hardly prove themselves in extreme situations. Yet, the experience of the own competence is very important for children's development. Children who are able to assess situations and their abilities more realistically get hurt less often. This in turn increases their self-reliance. Moreover, children tend to cooperate more in risky situations. By learning that complicated situations can be solved more easily when working in a team, their social competence increases. Furthermore, collective reflection within the class is important: children become aware of the increase in their competences, they learn about the causes of their own weaknesses, and find alternative ways of solving difficult situations for their future attempts. Showing the children these alternative ways could prevent them from giving up but trying again instead.

Godbey (2009): Outdoor Recreation, Health, and Wellness. Understanding and Enhancing the Relationship (USA).

Godbey's discussion paper is based on numerous studies. The author underlines the positive effects of nature on obesity and ADHD. He argues that many children substitute green space with screen space and suffer from nature deficit disorder. He emphasizes that serious deficits in the socio-emotional development are caused by

this nature deficit. The author concludes with the appeal that politics, schools, medicals and families ought to cooperate with the aim of increasing the children's physical activity.

Gugerli-Dolder, Hüttenmoser, Lindemann-Matthies and Ranft (2003): Was Kinder beweglich macht (Switzerland).

The paper reports on the results of a survey. Participants were 927 kindergartens in Zurich, Switzerland. A growing number of children have perception and motion deficits. These deficits interact with both the social and the cognitive development of children. Former analyses showed that motor deficits can easily be remedied. However, the resulting socio-emotional and cognitive deficits are hard to overcome. The survey wanted to identify methods to prevent motor and perception deficits by interrogating kindergarten teachers. Nearly all of them cited an exposure to nature and woodlands as a possible option. The kindergarten teachers make 18 visits to the woodlands on average per year. Most of them have to walk about 1 km or more to get there. The teachers report that the majority of parents appreciates the visits. The authors underline that both increasing the visits to the woodlands and designing the surfaces of the kindergartens in a natural way may prevent motor and perception deficits.

Häfner (2002): Natur- und Waldkindergärten in Deutschland – eine Alternative zum Regelkindergarten in der vorschulischen Erziehung (Germany).

This study analyses the effects of forest kindergartens on children's development. Therefore Häfner contacted forest kindergartens throughout Germany. The results are: Children who attended a forest kindergarten were highly motivated, showed an enhanced ability to concentrate and high levels of endurance. They are more independent, e.g. in doing their homework. Furthermore, the teachers judge former forest kindergarten children to have enhanced social skills (compared with regular kindergarten children). They show an improved conflict-solving ability and are judged to be more considerate and cooperative. The hypothesis that forest kindergarten children would participate more actively in class could also be confirmed. There was no significant evidence that forest kindergarten children would be blessed with better fine motor skills and better cognitive abilities. However, children of forest kindergartens were more able to sit still than others, although they showed poor

results in the coordination of fine motor processes. Former forest kindergarten children reveal an enhanced knowledge in general studies such as biology and sciences in general. The author concludes that the reasons causing deficits in development need to be investigated in future studies.

Hüttenmoser (2004): Kinder und ihr öffentlicher Lebensraum (Switzerland).

Since 2002 a decree of the "Schweizer Bundesrat" has been offering the possibility to establish so-called "Bewegungszonen" in living areas. Those offer a low-cost alternative to "Spielstraßen", because they can be created without the need of structural changes. The author describes the advantages as follows. The daily outdoor playtime increases rapidly, this leads to more social interactions in the neighbourhood (of both, children and adults). The children's autonomy increases by moving on their own. The "Bewegungszonen" also affect the motor and the social development in a positive way. The study also provides evidence that families living in a low traffic area spend more time at home and use their car less often. Bewegungszonen affect the child's development positively.

Kiener and Stucki (2001): Evaluation Naturspielgruppe Dusse Verusse. Zusammenfassung Elternbefragung (Switzerland).

At the time of the publication of this article there were 11 so called "Dusse Verusse" nature playgroups in Switzerland. Once a week the group with its 3-5 year old members visit a nearby forest. The main aims are to provide social skills and self-competence among the children and to provide education for sustainable development. Changes in children's behaviour are collected using a survey among the parents. 89 out of 90 parents attest positive changes in at least one of the following categories: Relationship to nature, social behaviour, creativity, motor function and self-confidence. The test design has some weaknesses but a tendency is surely noticeable.

Kühn (2006): Mit Kindern im Wald sein – nichts anderes (Germany).

The author of the present report works as a teacher in a primary school and describes the advantages of "a day outside the classroom" spent in the nearby woodlands during the lessons. The single child benefits from the stay as well as the whole class (not only directly but also indirectly during "regular" lessons inside the

classroom). The children improve their social skills. They try to communicate with others or they withdraw into themselves and explore the setting on their own – always according to the own needs and flexible at every time. The possibility of withdrawal enhances both the self-regulation and the autonomous acting (and learning). The author draws a positive result for her own function as a teacher as well. During the stay in the woodlands she does not have to insist on discipline or tranquillity. Instead, she can lean back for a while. The children themselves organise the learning process. Of course the described state is preceded by a phase of settling, which includes both the training and the adaptation of basic codes of behaviour.

Lettieri (2002): Evaluationsbericht des ersten öffentlichen Waldkindergartens der Schweiz (Switzerland).

The evaluation is based on a very small sample. The qualification of children that attended a forest kindergarten did not differ significantly from those who attended a regular kindergarten. The parents who enrolled their children for a forest kindergarten often described their children as "difficult in behaviour" and as "to be afflicted with special needs". Those parents expect the forest kindergarten to have almost "therapeutic effects". The author presumes that forest kindergartens have positive effects on both the emotional and the social development of a child. Due to the lack of reliable instruments the evaluation did not include these aspects. The development of gross motor skills is significantly higher among children who attended a forest kindergarten while the fine motor skills did not show significant differences between the two groups (forest vs. regular kindergarten). Furthermore, the forest kindergarten provoked higher rates in creativity. The underlying criterion was to achieve an aim using only existing resources. The woodlands include a huge variety of objects without determined functions. It depends on both the children's creativity and fantasy to construct and develop objects and scenes. Finally the author elicited the career wishes of the children. He surmised that the children attending the forest kindergarten expressed more nature-related career wishes. This did not occur, the wishes correlated.

Malone (2008): Every Experience Matters: An evidence based research report on the role of learning outside the classroom for children's whole development from birth to eighteen years (Australia).

The article deals with the efficiency of learning experiences outside the classroom. The author refers to the efficiency of various international studies. She defines the effects of experiential learning as benefits in the five domains of child development: Cognitive benefits (What I learn), physical benefits (What I experience), social benefits (How I interact), emotional benefits (How I feel) and personal benefits (How I respond). The examination done by the author is not limited to the field of learning experiences in a natural surrounding, nature is only one part of her discussion. Especially the development of social skills and psychological wellbeing is strongly related to free and unstructured (learning-) activities.

Massey (2002): The Benefits of a Forest School Experience for Children in their Early Years (United Kingdom).

The author reports about a longitudinal research project that was devised to discover potential benefits of a Forest School programme. Using parental questionnaires, informal interviews with teachers, camcorder-recorded observations, photographs and involvement timed observations of playing children the author concludes: 1) Forest School is led by the child's interests, 2) The children develop good self-esteem in a climate of small achievable steps, 3) They enhance their communication and language skills, 4) Forest School allows the teachers to gain an alternative view of the pupils and further insights into the pupils' particular development, 5) Forest School is beneficial to a child's overall development, especially the areas of personal, social and emotional abilities, 6) Forest School provides opportunities for the children to take risks and to practise problem solving, 7) Forest School complements learning in the classroom and the knowledge can be transferred.

Maynard (2007): Forest Schools in Great Britain: an initial exploration (United Kingdom).

Drawing on interviews with three Forest School workers and data posted on the Bridgewater College Forest School website, the article outlines and then evaluates the key aims, approach and ethos of Forest School, focusing specifically on its relevance to young children. Since children's outdoor play is in decline, the article

discusses beneficial potentials of Forest Schools. The primary aim of Forest School is to develop children's self-confidence, self-esteem and independence skills. A second aim is to encourage children to respect and appreciate the natural environment. The strategy noted in Forest Schools is to give the children small, achievable and progressively more challenging tasks. The author notes that the impact on children's self-esteem is less than expected, while regular outdoor activities have a positive effect on children's self-confidence. Furthermore, Forest School also fits well with the recent curriculum frameworks for Wales, which place a particular emphasis on the centrality of learning through play in stimulating indoor and outdoor contexts.

Murray (2003): Forest School Evaluation Project: A Study in Wales (United Kingdom).

This detailed report gives information on the historical background, the evaluation and the influences of Forest Schools. The concept of Forest Schools has its origins in Scandinavia and has been established for the first time in Britain in 1995. Most of the cooperating schools visit the woodlands regularly accompanied by a forest school leader. There is a training programme (60 to 90 hours learning time) for teachers and forest school leaders that has been approved through the open college network. The Forest Education Initiative is a partnership of eight environmental and educational organisations that support the conception of Forest School. Two of the 20 existing Forest Schools in Wales are evaluated in this report: the Duffryn Forest School and the Flintshire Transition Project. The authors discuss the need to combine qualitative and quantitative measurements to gain reliable insights and results concerning the benefits of Forest Schools on the children's development. This evaluation relies on qualitative measurement (focus group interviews, workshops) to establish a convincing case for the hypothesis about how Forest School makes a difference. This hypothesis has been tested by quantitative surveys and observations. The most important results are: 1) Forest School increases the self-esteem and self-confidence of individuals who take part, 2) Children work more co-operatively and enhance their awareness of others, 3) Forest School counters a lack of motivation and a negative attitude towards learning, 4) Forest School encourages children to build a closer relationship with and a better understanding of the outdoors/the nature and 5) Forest Schools increase the skills and knowledge as well as problem solving abilities of the

participating children. Furthermore the report lists the most important influencing factor concerning the success of Forest Schools: 1) Trained and experienced self-confident Forest School Leaders, 2) a low child to adult ratio, 3) the same Forest School Leader for each cohort throughout a series of sessions, 4) close contact and good communication between the school staff and the Forest School Leaders, 5) a prepared and established site and 6) activities that are linked with the curriculum.

Murray and Higginson (2004): Measuring the real benefits of forest school-self-appraisal: a description of a stakeholder-lead approach to evaluation (United Kingdom).

The article analyses the evaluation of two forest schools in Wales. Forest schools have a profound and positive effect on the social and the human capital of children. In cooperation with two forest schools the nef (new economics foundation) developed some innovative evaluation tools and compiled evidence demonstrating for two groups of children a link between a range of physical activities carried out in a forest school environment and six specific, positive outcomes that relate to their self-confidence, self-esteem, team working, motivation pride in and understanding of their surroundings. The article is based on Murray 2003.

O'Brien and Murray (2007): Forest School and its impacts on young children: Case studies in Britain (United Kingdom).

The aim of the current research project was to develop a methodology to explore the impacts of Forest Schools. This methodology was then used to track changes in children participating in Forest Schools. Workshops including teachers and other stakeholders identified the following impacts of Forest Schools on children: 1) it increases both self-confidence and self-esteem of children, 2) it improves the ability to work co-operatively in a team, 3) it increases motivation and concentration, 4) it improves the development of language and communication skills, 5) it improves physical motor skills and 6) it enhances the children's knowledge and understanding of the environment. Data were collected by observing 24 children over a period of 8 months. The collected data show that the participation in Forest Schools has positive effects on the children's motor skills and on their environmental knowledge and awareness. Furthermore, the data shows ripple effects of the participation in Forest Schools on the side of teachers and parents and the children's classroom behaviour.

Staempfli (2009): Reintroducing Adventure Into Children's Outdoor Play Environments (Canada).

The author regards adventure playgrounds as locations where children can practise free and unstructured play in urban areas. They are spaces where children can experience freedom and have the possibility to be creative. The complexity of natural surroundings offers various stimuli. Creative adventure playgrounds foster independence and self-esteem and offer children the opportunity for testing boundaries and exploring positive risks. The author underlines that although European children experience less play restrictions, their rates of accidents and injuries on playgrounds are lower compared to North America. The experience of minor injuries is a part of childhood. When children sustain injuries, they gain direct experience of the consequences of their actions and develop their competence. The author pleads once again that adventure and creativity should be put back into the children's outdoor play – as safe as necessary, not as safe as possible.

Strife and Downey (2009): Childhood Development and Access to Nature: A New Direction for Environmental Inequality Research (USA).

The authors underline the positive effect of contact with nature on the cognitive, the emotional and the social and physical development of a child. Furthermore, the authors show that access to nature and green spaces varies according to class and race. This form of social inequality mainly affects disadvantaged children and teenagers. Neighbourhoods characterised by high-rise buildings and asphalted spaces instead of green spaces have negative effects on children's development. This implies that already disadvantaged children are further disadvantaged by the negative effects of the neighbourhood. This negative neighbourhood effects mainly impact Afro-Americans and Hispanics. This environmental inequality has far-reaching consequences.

2.3. Cognitive Functioning

Berman, Jonides and Kaplan (2008): The Cognitive Benefits of Interacting With Nature (USA).

Aim: Demonstrate the restorative effect of a natural environment on cognitive functioning. Method: 38 students of the University of Michigan participated in tests of their ability to concentrate and of their cognitive performance. The tests were

interrupted by a 50 min break during which the participants had to take a walk. One group took a walk through a large park, the other group had to walk along a heavily trafficked street. Subsequently, further tests of cognitive performance were administered. Results: The tests reveal the restorative effect of nature, which in turn increases the participants' cognitive abilities. This was shown by an increase of the participants' directed attention during the test phases.

Coley, Sullivan and Kuo (1997): Where Does Community Grow? : The Social Context Created by Nature in Urban Public Housing (USA).

Aim: By observing two public housing developments (high-rise buildings versus row houses) the authors answer the following questions: 1) Does the presence of trees increase the probability that local residents use the public outdoor space? 2) Do different characteristics of the trees (presence, number and location) predict the number of inhabitants who use the space together? 3) Does the presence of trees increase the probability that mixed age groups use the space together at the same time? Results: 1) The presence of trees indeed increases the use of the public space. Furthermore, the authors also find evidence for questions 2 and 3. Moreover, these usage patterns could have important consequences for the inhabitants' social interactions, relationships, safety and satisfaction. In addition, time spent in nature may also have restorative effects on the inhabitants' cognitive capacities.

Faber Taylor, Kuo and Sullivan (2002): Views of Nature and Self-Discipline: Evidence from Inner City Children (USA).

The study investigates the impact of a view of nature on teenagers' (both male and female) self-discipline (concentrating, inhibiting initial impulses and delaying gratification). Based on the ART (Attention Restoration Theory, Kaplan) the authors assume that contact with nature can renew the capacity to direct attention. This capacity is seen as resource for self-discipline. Results: Concerning all three dimensions of self-discipline, girls significantly benefit from views of nature, whereas there is no significant effect for boys. A possible explanation for the different effects could be the fact that boys tend to go away farther from their neighbourhood than girls. The authors conclude that further research in this field is needed.

Kuo (2001): Coping with Poverty: Impacts of Environment and Attention in the Inner City (USA).

The author analyses the relationship between exposure to green environments and the ability to manage life's demands. She derives the following hypotheses: 1) the capacity to direct attention is important not only for day-to-day functioning but for the management of major life issues. 2) Relatively low levels of nearby vegetation are sufficient to reduce attentional fatigue. 3) By reducing attentional fatigue, the presence of nearby vegetation enhances the management of major life issues. To test these hypotheses, structured interviews and attentional tests were conducted. All three hypotheses could be confirmed. It is also worth noting that the positive effect of nearby nature on the attentional capacities remains the same even after being exposed to the same view for years.

Kuo and Sullivan (2001): Aggression and Violence in the Inner City: Effects of Environment via Mental Fatigue (USA).

Based on the ART (Kaplan), the authors hypothesise that mental fatigue provokes an increased propensity for outbursts of anger and violence within families. Since contact with nature is expected to have restorative effects on mental fatigue, it may also reduce aggression and violence within the observed families (145 urban public housing residents, each with an annual income of 10.000 \$ and below). 69 persons have relatively low levels of nearby nature, and 76 have relatively high levels of nearby nature. The structured interviews lasted 45 minutes on average. The interviews assessed the residents' attentional capacity and their aggression. The authors found that levels of aggression in this population were much higher than in national samples. Families living in green conditions reported significantly less aggression against their partners and family members than families living in barren spaces. Furthermore, the authors' hypothesis that nature has restorative effects on mental fatigue could be confirmed. The authors conclude emphasizing the enormous potential of renaturation, especially in poor urban housing. Renaturation can be regarded as a relatively cheap method to improve the living conditions (environment, families, skills) of disadvantaged children and teenagers and their families. Therefore, renaturation can indirectly help to reduce violence and increase living quality of poor families.

Wells (2000): At Home with Nature: Effects of "Greenness" on Children's Cognitive Functioning (USA).

In the present article the author Nancy Wells combines the scientific disciplines psychology and architecture. She analyses the linkage between the restorativeness or naturalness of the home environment and the cognitive functioning of children. Therefore, she tests the cognitive capacities of children who lived in a "poor" housing environment. After the relocation of the children and their families to better housing she once more tests the children's cognitive abilities. The results show that children growing up in a "poor" environment (substandard) tend to exhibit more behavioural problems and have poorer physical health. Furthermore, they practise more rule-bounded play than children living in "richer" environments (low-rises, single-family). Indeed, children's cognitive functioning improved after relocation and children whose homes improved the most (in terms of naturalness and greenness) show the largest increase in their levels of cognitive functioning after relocation. The author underlines the importance and the potentials of interdisciplinary cooperations, as they might help to reduce the disadvantages of impoverished urban children.

2.4. Environmental attitudes and environmental behaviour

Bixler, Floyd and Hammitt (2002): Environmental Socialization: Quantitative Tests of the Childhood Play Hypothesis (USA).

Aim: To analyse the relationship between childhood play experiences in wild environments and later environmental preferences in the life domains of work, leisure and school. In particular, the authors investigate whether childhood play in natural environments cause higher environmental awareness later in adulthood. Method: Public school students from North Carolina and Texas were interviewed by the use of structured questionnaires. The questionnaire included questions on e.g. the frequency of childhood play in different environments, recreation activity preferences, fears concerning wild environments, and desires for modern comfort. Results: The authors find a strong effect of childhood experiences and the later preferences (recreation, work, living). However, these childhood experiences did not increase the interest in environmental sciences or environmentalism. The authors note the need for further research in this area.

Bögeholz (2006): Nature experience and its importance for environmental knowledge, values and action: recent German empirical contributions (Germany).

The article analyses recent empirical German research on the importance of nature experience for environmental knowledge, environmental values and environmental behaviour. Nature experience (during childhood/youth) is the central foundation for the development of knowledge and values in relation to the environment. In addition, further two variables predict the development mentioned above: the accompaniment by family members, partners and friends. Long-term educational programmes are more effective than short-term programmes (5 versus 1 day programmes). Furthermore, the environmental conduct of parents and peers has an effect on environmental behaviour. All studies refer to samples of at least ten-year-old persons.

Brämer (2003): Waldpädagogik im Test. Besucher eines Walderlebnisparks im Vorher-Nachher-Vergleich (Germany).

The author does not claim to present a valid survey. He rather intends to give hints on the need of a wide research of the impacts of environmental educational activities on children and teenagers. He presents some results of written questionnaires of sixth graders before and after a visit of a forest experience centre (including instructions by an expert). The central result is a significant lower interest in nature and environment after the visit. The author suspects an "exaggerated" pedagogisation of environmental education that leads to a diminishing interest.

Farmer, Knapp and Benton (2007): An Elementary School Environmental Education Field Trip: Long-Term Effects on Ecological and Environmental Knowledge and Attitude Development (USA).

The authors examined the long-term effects of an environmental education school field trip on fourth grade elementary students, especially their environmental knowledge and pro-environmental attitude. The participants' investigation one year after the field trip leads to the impression that there is a positive long-term effect on the pupils' environmental awareness. However the sample was very small (15 pupils).

Home, Bauer and Hunziker (2010): Cultural and Biological Determinants in the Evaluation of Urban Green Spaces (Switzerland).

The article describes an exploratory study consisting of 17 interviews. It wants to find out whether the appreciation of nature is inherently human, cultural, or something that one learns. The research contributes to an understanding of the meanings of urban green spaces. This in turn would provide planners with a tool to match urban natural resource management with the needs of residents. The research does not show a unique pattern. There was no evident consistency in the grouping of components between respondents. Both cultural and biological ways of reacting to nature dictate our preference. The management of urban green spaces cannot rely on a blueprint of what has been successful elsewhere. Any intervention must be carefully tailored to the needs of stakeholders.

Kals, Schumacher and Montada (1999): Emotional Affinity toward Nature as a Motivational Basis to Protect Nature (Germany).

Nature-protective behaviour cannot be sufficiently explained using a pure rational approach. Therefore the present questionnaire study focuses on emotional motivations and affinity toward nature to explain nature-protective behaviour. The analyses reveal that emotional affinity towards nature raises the probability of nature-protective behaviour. 39% of emotional affinity toward nature can be explained by present and past experiences of natural environments.

Mayer et al. (2009): Why Is Nature Beneficial?: The Role of Connectedness to Nature (USA).

The study examines the effects of exposure to nature (actively by taking a walk or virtually watching a video) on well-being and nature affection and the ability to reflect on a life problem. The authors find strong evidence for a relation between exposure to nature and the mentioned personal skills. Direct contact to nature (walking) enhances the effect.

Maynard (2007): Forest Schools in Great Britain: an initial exploration (United Kingdom).

Drawing on interviews with three Forest School workers and data posted on the Bridgewater College Forest School website, the article outlines and then evaluates

the key aims, approach and ethos of Forest School, focusing specifically on its relevance to young children. Since children's outdoor play is in decline, the article discusses beneficial potentials of Forest Schools. The primary aim of Forest School is to develop children's self-confidence, self-esteem and independence skills. A second aim is to encourage children to respect and appreciate the natural environment. The strategy noted in Forest Schools is to give the children small, achievable and progressively more challenging tasks. The author notes that the impact on children's self-esteem is less than expected, while regular outdoor activities have a positive effect on children's self-confidence. Furthermore, Forest School also fits well with the recent curriculum frameworks for Wales, which place a particular emphasis on the centrality of learning through play in stimulating indoor and outdoor contexts.

Meinhold and Malkus (2005): Adolescent Environmental Behaviours: Can Knowledge, Attitudes, and Self-Efficacy Make a Difference? (USA).

The authors analyse the relationships among adolescent environmental behaviours and self-efficacy, knowledge, and attitudes. The questionnaire responded by 848 pupils (aged 14-18) consisted of 142 items. Dependent variables are environmental behaviours. The self-reported behaviour was investigated by statements like "choosing household products that are better for the environment", which the teenagers commented with one of the given responses, e.g. "I have done this in the last 12 months", "I would consider doing this" or "I would not consider doing this". Independent variables are the teenagers' environmental attitudes. Furthermore, self-efficacy was evaluated by ten questions. The authors found strong support for the hypothesis that environmental attitudes and environmental behaviours are related to each other. However, no significant evidence could be found for the second hypothesis that adolescents who demonstrate more pro-environmental attitudes and high self-efficacy would have more pro-environmental behaviours. Yet, self-efficacy does have a positive effect on environmental behaviour (independent of environmental attitudes). The third hypothesis predicting that adolescents who demonstrate more pro-environmental attitudes and high environmental knowledge would report more pro-environmental behaviour was confirmed.

Murray (2003): Forest School Evaluation Project: A Study in Wales (United Kingdom).

This detailed report gives information on the historical background, the evaluation and the influences of Forest Schools. The concept of Forest Schools has its origins in Scandinavia and has been established for the first time in Britain in 1995. Most of the cooperating schools visit the woodlands regularly accompanied by a forest school leader. There is a training programme (60 to 90 hours learning time) for teachers and forest school leaders that has been approved through the open college network. The Forest Education Initiative is a partnership of eight environmental and educational organisations that support the conception of Forest School. Two of the 20 existing Forest Schools in Wales are evaluated in this report: the Duffryn Forest School and the Flintshire Transition Project. The authors discuss the need to combine qualitative and quantitative measurements to gain reliable insights and results concerning the benefits of Forest Schools on the children's development. This evaluation relies on qualitative measurement (focus group interviews, workshops) to establish a convincing case for the hypothesis about how Forest School makes a difference. This hypothesis has been tested by quantitative surveys and observations. The most important results are: 1) Forest School increases the self-esteem and self-confidence of individuals who take part, 2) Children work more co-operatively and enhance their awareness of others, 3) Forest School counters a lack of motivation and a negative attitude towards learning, 4) Forest School encourages children to build a closer relationship with and a better understanding of the outdoors/the nature and 5) Forest Schools increase the skills and knowledge as well as problem solving abilities of the participating children. Furthermore the report lists the most important influencing factor concerning the success of Forest Schools: 1) Trained and experienced self-confident Forest School Leaders, 2) a low child to adult ratio, 3) the same Forest School Leader for each cohort throughout a series of sessions, 4) close contact and good communication between the school staff and the Forest School Leaders, 5) a prepared and established site and 6) activities that are linked with the curriculum.

Nisbet, Zelenski and Murphy (2009): The Nature Relatedness Scale: Linking Individuals' Connection With Nature to Environmental Concern and Behaviour (Canada).

The study analyses the relation between nature relatedness (appreciation of nature, understanding of our interconnectedness with all other living things on earth, understanding of the importance of all aspects of nature, even those that are not aesthetically appealing to humans, e.g. spiders) and environmental concern and behaviour. Nature-related humans spend more time outside than others. The higher the nature relatedness, the more intensive is the reflection of topics that concern nature. The environmental behaviour as well is correlated to nature relatedness. The authors refer to Kaplan. Kaplan believes that tapping into the human desire to explore and learn is far more effective in inspiring concern for nature than dictating behaviour. The preservation and the maintenance of local parks and natural areas and woodlands are more efficient than expensive marketing-campaigns focusing on environmental behaviour. Increasing nature relatedness may be one way to narrow the gap between peoples' feelings and attitudes about environmental problems and their own actions. The study also shows that nature relatedness is related to specific characteristics as agreeableness, openness, adventurous and easygoing.

O'Brien and Murray (2007): Forest School and its impacts on young children: Case studies in Britain (United Kingdom).

The aim of the current research project was to develop a methodology to explore the impacts of Forest Schools. This methodology was then used to track changes in children participating in Forest Schools. Workshops including teachers and other stakeholders identified the following impacts of Forest Schools on children: 1) it increases both self-confidence and self-esteem of children, 2) it improves the ability to work co-operatively in a team, 3) it increases motivation and concentration, 4) it improves the development of language and communication skills, 5) it improves physical motor skills and 6) it enhances the children's knowledge and understanding of the environment. Data were collected by observing 24 children over a period of 8 months. The collected data show that the participation in Forest Schools has positive effects on the children's motor skills and on their environmental knowledge and awareness. Furthermore, the data shows ripple effects of the participation in Forest Schools on the side of teachers and parents and the children's classroom behaviour.

Ryan (2005): Exploring the Effects of Environmental Experience on Attachment to Urban Natural Areas (USA).

The study analyses the relation between place attachment and both environmental experience and environmental attitudes among the visitors of the green space. Therefore, 328 park visitors (neighbours, visitors, staff, volunteers) were asked about their attachment, use, environmental knowledge and attitudes. The data showed that neighbours and recreational users held a place-specific attachment while volunteers and staff held a conceptual attachment. Since the public has a strong attachment for nearby parks, planners should benefit from the neighbours, involving them in the preservation and the restoration of parks. Personal experiences and emotional attachments are a result of direct experiences with nature, e.g. local parks and therefore help to guarantee their existence.

Ward Thompson, Aspinall and Montazino (2008): The Childhood Factor: Adult Visits to Green Places and the Significance of Childhood Experience (United Kingdom).

In the light of the numerous positive social and economic impacts of green spaces, the authors analyse whether childhood experiences of woodlands and other green or natural places have an influence on adults' use of and attitude towards such places. In this questionnaire study 339 subjects from Scotland and 459 subjects from the Midlands of England were asked about the frequency of their woodlands visits nowadays and during their childhood. Furthermore, the authors assessed whether the subjects have a special relationship to woodlands or green spaces. The data suggest that both the distance of the green place from home and the frequency of childhood visits to green places have a strong effect on the frequency of adult visits to such spaces. The authors argue that more research on the determinants of the frequency of adult visits of green spaces is needed.

Wells and Lekies (2006): Nature and the Life Course: Pathways from Childhood Nature Experiences to Adult Environmentalism (USA).

The study examines the relationship between childhood involvement with the natural environment and adult environmentalism. The authors form two categories of childhood participation with nature: participation with "wild nature" and with "domesticated nature". Independent variables are "childhood participation with nature", "participation in environmental education in childhood" and "childhood

experiences in nature with other people". The dependent variables are "environmental attitudes in adulthood" and "environmental behaviours in adulthood". The analyses of the questionnaires show that childhood participation in wild and domesticated nature has significant effects on environmental attitudes in adulthood. The participation in environmental education programmes does not have significant effects. Furthermore, childhood participation with wild nature had a significant direct effect on environmental behaviours in adulthood. People who engaged in activities in a natural environment before the age of eleven were more likely to express pro-environmental attitudes and pro-environmental behaviours as adults. The finding that participation in environmental educational programmes is not a significant predictor of environmental attitudes or behaviour is contrary to the author's hypotheses. For this reason, teachers should rather visit natural environments with their classes than realise theoretical educational programmes on this topic. The authors conclude by presenting alarming figures: American children aged three to twelve spend only as much as one percent of their leisure time outdoors and 27 percent watching television.

2.5. Environmental Education

Brämer (2003): Waldpädagogik im Test. Besucher eines Walderlebnisparks im Vorher-Nachher-Vergleich (Germany).

The author does not claim to present a valid survey. He rather intends to give hints on the need of a wide research of the impacts of environmental educational activities on children and teenagers. He presents some results of written questionnaires of sixth graders before and after a visit of a forest experience centre (including instructions by an expert). The central result is a significant lower interest in nature and environment after the visit. The author suspects an "exaggerated" pedagogisation of environmental education that leads to a diminishing interest.

Feige (2006): Lernortpädagogik in der Grundschule (Germany).

The article deals with the potentials of learning outside the classroom, e.g. in the woodlands, without referring to the data of a survey. The author underlines the positive effect of learning outside the classroom on the inner-school situation. The article lists a huge variety of practical hints.

Flogaitis, Daskolia and Liarakou (2005): Greek kindergarten teachers' practice in environmental education: an exploratory study (Greece).

The introduction of environmental education in the national Greek curriculum took place in the 1990s. The adequate preparation of teachers at all school levels in environmental education is still considered to be lacking. The implementation of environmental education depends to a great extent on the teachers' personal commitment, knowledge and initiative. It is striking that only 110 out of 661 questionnaires were sent back to the researchers, which is a very low response rate. One reason may be that environmental education is not particularly widespread in Greek kindergartens and schools. Therefore, it is possible that the institutions did not even bother or were unable to answer the questionnaire. 50 out of 100 teachers stated that they had implemented environmental education in their school or kindergarten. The majority of teachers realising environmental education did not participate in any relevant in-service training. Instead, they stated that they practise self-learning, which means to look for knowledge concerning environmental education by resorting to specialized books, periodicals or the media (TV/Internet). The teachers' motives for participating in environmental education were mostly professional, e.g. early sensitization, EE as the foundation of education. Moral motives, e.g. responsibility towards nature, were mentioned less. The article concludes that despite the official inclusion in the kindergarten and school curricula, the implementation of environmental education cannot be considered as implemented (area-wide). Especially the teachers' lack of pre-service and in-service training has to be filled.

Häfner (2002): Natur- und Waldkindergärten in Deutschland – eine Alternative zum Regelkindergarten in der vorschulischen Erziehung (Germany).

This study analyses the effects of forest kindergartens on children's development. Therefore Häfner contacted forest kindergartens throughout Germany. The results are: Children who attended a forest kindergarten were highly motivated, showed an enhanced ability to concentrate and high levels of endurance. They are more independent, e.g. in doing their homework. Furthermore, the teachers judge former forest kindergarten children to have enhanced social skills (compared with regular kindergarten children). They show an improved conflict-solving ability and are judged to be more considerate and cooperative. The hypothesis that forest kindergarten

children would participate more actively in class could also be confirmed. There was no significant evidence that forest kindergarten children would be blessed with better fine motor skills and better cognitive abilities. However, children of forest kindergartens were more able to sit still than others, although they showed poor results in the coordination of fine motor processes. Former forest kindergarten children reveal an enhanced knowledge in general studies such as biology and sciences in general. The author concludes that the reasons causing deficits in development need to be investigated in future studies.

Kruger et al. (2010): Building on Partnerships: Reconnecting Kids With Nature for Health Benefits (USA).

The article summarises eight programmes discussed at the web-based meeting "Reconnecting Kids with Nature for health benefits". 1) "Take it outside", Bureau of Land Management. The BLM provides annual grants (land, staff) to various partners. Children and teenagers benefit as well as families. 2) "Get fit with US" is a joint venture of different partners. Booklets with extensive information are offered to interested parties. 3) "More kids in the woods", US Forest Service. This is a cost-share program for local projects that connect children to nature. 4) "Let's go outside", US Fish and Wildlife Service. Children are informed about environmental topics in national wildlife refuges. 5) "Children and nature plan for action", National Park Service. Encourages families to visit national wildlife refuges. 6) "National junior ranger day", National Park Service. Educational program for children and teenagers who visit national parks. 7) "Health care provider initiative", National Environmental Education Foundation. Provides tools and resources for adults that aim to inform pupils about environmental topics. 8) "National Public Lands Day", National Environmental Education Foundation. Encourages volunteerism to plant trees etc. Empirical research shows positive effects of the initiatives mentioned above on children's physical activity. The authors advise a continuous expansion of similar cooperation.

Kühn (2006): Mit Kindern im Wald sein – nichts anderes (Germany).

The author of the present report works as a teacher in a primary school and describes the advantages of "a day outside the classroom" spent in the nearby woodlands during the lessons. The single child benefits from the stay as well as the

whole class (not only directly but also indirectly during "regular" lessons inside the classroom). The children improve their social skills. They try to communicate with others or they withdraw into themselves and explore the setting on their own – always according to the own needs and flexible at every time. The possibility of withdrawal enhances both the self-regulation and the autonomous acting (and learning). The author draws a positive result for her own function as a teacher as well. During the stay in the woodlands she does not have to insist on discipline or tranquillity. Instead, she can lean back for a while. The children themselves organise the learning process. Of course the described state is preceded by a phase of settling, which includes both the training and the adaptation of basic codes of behaviour.

Lindemann-Matthies (2006): Investigating Nature on the Way to School: Responses to an educational programme by teachers and their pupils (Switzerland).

In this study, the responses of more than 3000 children (8-16 years old) and 117 teachers to the educational programme "Nature on the Way to School" were investigated with the help of questionnaires. The main objectives of the programme were the promotion of interest in and the tolerance of local plants and animals and the promotion of opportunities for children to experience nature first-hand. The provided teaching material contained relevant information, including methodical and didactic aids. Teachers and pupils were asked the following questions: 1. How many and which activities did teachers realise during the educational programme? 2. How much time did they spend on these activities? 3. How did the pupils respond to the different activities? 4. What did pupils like best during the programme? 5. Did age and the residential area in which they were living influence their preferences? 6. Was the programme equally sustainable for schools with different neighbourhood features? 7. Did unanticipated events occur during the programme? The results show that the knowledge on local plants and animals increased significantly among the participating children. The children enjoyed the observation of animals and the categorisation of plants. Some of them kept diaries for taking notes about their observations. The satisfaction of teachers with the programme is especially important because other supplementary educational programmes can only be realised with the willingness of teachers.

Szczepanski et al. (2006): The distinctive nature and potential of outdoor education from a teacher perspective. An intervention study of teachers in nine-year compulsory school (Sweden).

The research question in the present study is what conceptions of outdoor learning do teachers have (6 in the intervention group, 5 in the reference group) and what is the impact of an outdoor educational intervention on these conceptions. Furthermore, the study measures the teachers' well-being and their mood. It was found that the majority of the teachers had fairly clear conceptions of the distinctive nature of outdoor education after the intervention. The teachers list the following benefits of outdoor learning: 1) Better health and learning through movement in an outdoor environment, 2) The activation of several senses outdoors and 3) The activation of both halves of the brain outdoors. The authors underline the potential of outdoor learning for the children's motivation.

Waite and Rea (2006): Pedagogy or place?: attributed contributions of outdoor learning to creative teaching and learning (United Kingdom).

The article focuses on the opportunities afforded by the outdoors to stimulate creativity in children and teachers. It describes how teachers report approaching outdoor learning and in what ways these approaches can be viewed as creative and how they may differ from those indoors. The study is based on 334 responses of early years settings, primary schools and youth service providers. The authors summarize that both pedagogy (repeated process) and place (in terms of a natural and supportive environment) influence creativity in the outdoor environment.

Van Petegem et al. (2005): Implementing environmental education in pre-service teacher training (Belgium).

The authors analyse the attempts of implementing environmental education by two Flemish schools (1998-2000). While one of the schools has a long tradition of realising cross-curricular activities, the other one has only recently started to do so. The authors consider seven criteria: the participants' commitment (both teachers and students), the teachers' credibility, the intention, functionality, self-efficacy, school atmosphere and evaluations. Surprisingly, the authors could not find any difference between the two schools concerning the course of the implementation. The most significant restriction was the motivation and the willingness to work in a team. The

teachers were used to plan and act autonomously. Furthermore, they felt to be overstrained by implementing further learning content into the already extensive curricula. Finally the implementation stagnated, because the schools did not have a culture of common decision-making. The article ends with proposals to avoid the designated problems in further implementations. The authors underline the importance of personnel development in schools, which should improve and preserve both the enthusiasm and the commitment of teachers.

2.6. Forest Pedagogy

Massey (2002): The Benefits of a Forest School Experience for Children in their Early Years (United Kingdom).

The author reports about a longitudinal research project that was devised to discover potential benefits of a Forest School programme. Using parental questionnaires, informal interviews with teachers, camcorder-recorded observations, photographs and involvement timed observations of playing children the author concludes: 1) Forest School is led by the child's interests, 2) The children develop good self-esteem in a climate of small achievable steps, 3) They enhance their communication and language skills, 4) Forest School allows the teachers to gain an alternative view of the pupils and further insights into the pupils' particular development, 5) Forest School is beneficial to a child's overall development, especially the areas of personal, social and emotional abilities, 6) Forest School provides opportunities for the children to take risks and to practise problem solving, 7) Forest School complements learning in the classroom and the knowledge can be transferred.

Maynard (2007): Forest Schools in Great Britain: an initial exploration (United Kingdom).

Drawing on interviews with three Forest School workers and data posted on the Bridgewater College Forest School website, the article outlines and then evaluates the key aims, approach and ethos of Forest School, focusing specifically on its relevance to young children. Since children's outdoor play is in decline, the article discusses beneficial potentials of Forest Schools. The primary aim of Forest School is to develop children's self-confidence, self-esteem and independence skills. A second aim is to encourage children to respect and appreciate the natural environment. The strategy noted in Forest Schools is to give the children small,

achievable and progressively more challenging tasks. The author notes that the impact on children's self-esteem is less than expected, while regular outdoor activities have a positive effect on children's self-confidence. Furthermore, Forest School also fits well with the recent curriculum frameworks for Wales, which place a particular emphasis on the centrality of learning through play in stimulating indoor and outdoor contexts.

Maynard and Waters (2007): Learning in the outdoor environment: a missed opportunity? (United Kingdom).

Proposals for a Foundation Phase (2004-2007) for children aged three to seven years aimed to address the perceived over-formalization of early educational experiences and so advocate a play-based approach to children's learning in both indoor and outdoor environments. Drawing on data from semi-structured interviews with teachers and observations conducted in four primary schools, the study documents the current use of the outdoor environment as playscape and especially the teachers' view on its potential. Furthermore, the study documents the teachers' current practice. It shows that the teachers use the outdoor environment's potential only to a small extent: the use of the outdoors was dependent on good weather and the activities outdoors did not differ from the indoor activities. The authors list a number of reasons: 1) practical difficulties; the sites of outdoor play are difficult to reach from the schools, 2) the teachers are not fully aware of the potential uses and benefits of outdoor play, 3) risk, that children could be hurt both physically, e.g. falling from a tree, and by others, e.g. inappropriate adults approaching the children.

Murray (2003): Forest School Evaluation Project: A Study in Wales (United Kingdom).

This detailed report gives information on the historical background, the evaluation and the influences of Forest Schools. The concept of Forest Schools has its origins in Scandinavia and has been established for the first time in Britain in 1995. Most of the cooperating schools visit the woodlands regularly accompanied by a forest school leader. There is a training programme (60 to 90 hours learning time) for teachers and forest school leaders that has been approved through the open college network. The Forest Education Initiative is a partnership of eight environmental and educational organisations that support the conception of Forest School. Two of the 20 existing

Forest Schools in Wales are evaluated in this report: the Duffryn Forest School and the Flintshire Transition Project. The authors discuss the need to combine qualitative and quantitative measurements to gain reliable insights and results concerning the benefits of Forest Schools on the children's development. This evaluation relies on qualitative measurement (focus group interviews, workshops) to establish a convincing case for the hypothesis about how Forest School makes a difference. This hypothesis has been tested by quantitative surveys and observations. The most important results are: 1) Forest School increases the self-esteem and self-confidence of individuals who take part, 2) Children work more co-operatively and enhance their awareness of others, 3) Forest School counters a lack of motivation and a negative attitude towards learning, 4) Forest School encourages children to build a closer relationship with and a better understanding of the outdoors/the nature and 5) Forest Schools increase the skills and knowledge as well as problem solving abilities of the participating children. Furthermore the report lists the most important influencing factor concerning the success of Forest Schools: 1) Trained and experienced self-confident Forest School Leaders, 2) a low child to adult ratio, 3) the same Forest School Leader for each cohort throughout a series of sessions, 4) close contact and good communication between the school staff and the Forest School Leaders, 5) a prepared and established site and 6) activities that are linked with the curriculum.

Murray and Higginson (2004): Measuring the real benefits of forest school-self-appraisal: a description of a stakeholder-lead approach to evaluation (United Kingdom).

The article analyses the evaluation of two forest schools in Wales. Forest schools have a profound and positive effect on the social and the human capital of children. In cooperation with two forest schools, the nef (new economics foundation) developed some innovative evaluation tools and compiled evidence demonstrating for two groups of children a link between a range of physical activities carried out in a forest school environment and six specific, positive outcomes that relate to their self-confidence, self-esteem, team working, motivation, pride in and understanding of their surroundings. The article is based on Murray (2003).

O'Brien and Murray (2005): "Such enthusiasm - a joy to see": An evaluation of Forest School in England (United Kingdom).

This paper is an extended version of O'Brien and Murray (2007).

O'Brien and Murray (2006): A marvellous opportunity for children to learn. A participatory evaluation of Forest School in England and Wales (United Kingdom).

This paper is an extended version of O'Brien and Murray (2007).

O'Brien and Murray (2007): Forest School and its impacts on young children: Case studies in Britain (United Kingdom).

The aim of the current research project was to develop a methodology to explore the impacts of Forest Schools. This methodology was then used to track changes in children participating in Forest Schools. Workshops including teachers and other stakeholders identified the following impacts of Forest Schools on children: 1) it increases both self-confidence and self-esteem of children, 2) it improves the ability to work co-operatively in a team, 3) it increases motivation and concentration, 4) it improves the development of language and communication skills, 5) it improves physical motor skills and 6) it enhances the children's knowledge and understanding of the environment. Data were collected by observing 24 children over a period of 8 months. The collected data show that the participation in Forest Schools has positive effects on the children's motor skills and on their environmental knowledge and awareness. Furthermore, the data shows ripple effects of the participation in Forest Schools on the side of teachers and parents and the children's classroom behaviour.

Voitleithner and Killingseder (2001): Waldpädagogik in Österreich. Zwischen Bildung und forstwirtschaftlicher Öffentlichkeitsarbeit (Austria).

The article summarizes the status quo of the Austrian forest pedagogies. The authors note critically that forest pedagogical work in Austria is forestally dominated. The authors note constructively that cooperations between various institutions show a great potential. With reference to Scandinavian countries, the authors underline the fruitful effect of cooperations between school and society. The method of "open learning" comes more and more into the pedagogical focus. This is the reason why forest pedagogies correspond perfectly to the current state of research regarding the teaching-learning processes in educational institutions.

2.7. Methods

Matson and Wilkins (2009): Psychometric testing methods for children's social skills (USA).

The present article evaluates current testing methods for children's social skills. While role-play tests dominated in the past, researchers nowadays use standardised tests because of their enhanced practicability. These tests have similar constructions and consist of items, generally 25 to 75, each with five possible answers. The standardised test methods do barely include direct interviews with the children (especially pre-schoolers) but with parents and teachers instead. The authors refer to the SSRS-test (Social Skills Rating System), which is widely used in pre-schools and primary schools. Moreover, the SSRS has been retested and is considered to be valid and reliable. The authors conclude that future research should focus on identifying common social behaviours that are most salient for the adjustment in society. Furthermore, standardised tests should be developed to test the identified criteria.

2.8. Motor development

Fjørtoft and Sageie (2000): The natural environment as a playground for children: Landscape description and analyses of a natural playscape (Norway).

This study investigated the impacts of playing in a natural environment on the development of children aged 5 - 7. The landscape serves as playscape. The article focuses on motor development and on the coherence between the complexity of environment and the complexity and types of play that children choose outside. Data from landscape structure, vegetation, topography and diversity have been analysed by GIS software. The study was carried out with children in Telemark, Norway. The experimental group consisted of 46 children, who spent free playtime in the nearby forest. The comparison group (29 children) did not visit the nearby forest. When provided with a natural landscape (experimental group), children showed a statistically significant increase in motor fitness (balance and coordination).

Fjørtoft (2001): The Natural Environment as a Playground for Children: The Impact of Outdoor Play Activities in Pre-Primary School Children (Norway).

This article describes the experiment of 2000 in a more detailed way. The experimental group went to the nearby forest for 1-2 hours a day, while the

comparison group spent the same time on the institution's playground. The children were observed for 9 months. Both groups were tested with the European Test of Physical Fitness. The test included the following items: flamingo balance test for testing of general balance, the speed of limb movement, explosive strength and sit-ups. Furthermore, two additional tests were introduced: beam walking for testing dynamic balance and test for the cross co-ordination. Children of the experimental group showed an increased competency in all tests.

Fjørtoft (2004): Landscape as Playscape: The Effects of Natural Environments on Children's Play and Motor Development (Norway).

This article describes the experiment of 2000. It underlines that neither socio-demographic characteristics of the children's families nor their gender influences the results in the experimental group and the comparison group.

Gugerli-Dolder, Hüttenmoser, Lindemann-Matthies and Ranft (2003): Was Kinder beweglich macht (Switzerland).

The paper reports on the results of a survey. Participants were 927 kindergartens in Zurich, Switzerland. A growing number of children has perception and motion deficits. These deficits interact with both the social and the cognitive development of children. Former analyses showed that motor deficits can easily be remedied. However, the resulting socio-emotional and cognitive deficits are hard to overcome. The survey wanted to identify methods to prevent motor and perception deficits by interrogating kindergarten teachers. Nearly all of them cited an exposure to nature and woodlands as a possible option. The kindergarten teachers make 18 visits to the woodlands on average per year. Most of them have to walk about 1 km or more to get there. The teachers report that the majority of parents appreciates the visits. The authors underline that both increasing the visits to the woodlands and designing the surfaces of the kindergartens in a natural way may prevent motor and perception deficits.

Häfner (2002): Natur- und Waldkindergärten in Deutschland – eine Alternative zum Regelkindergarten in der vorschulischen Erziehung (Germany).

This study analyses the effects of forest kindergartens on children's development. Therefore Häfner contacted forest kindergartens throughout Germany. The results

are: Children who attended a forest kindergarten were highly motivated, showed an enhanced ability to concentrate and high levels of endurance. They are more independent, e.g. in doing their homework. Furthermore, the teachers judge former forest kindergarten children to have enhanced social skills (compared with regular kindergarten children). They show an improved conflict-solving ability and are judged to be more considerate and cooperative. The hypothesis that forest kindergarten children would participate more actively in class could also be confirmed. There was no significant evidence that forest kindergarten children would be blessed with better fine motor skills and better cognitive abilities. However, children of forest kindergartens were more able to sit still than others, although they showed poor results in the coordination of fine motor processes. Former forest kindergarten children reveal an enhanced knowledge in general studies such as biology and sciences in general. The author concludes that the reasons causing deficits in development need to be investigated in future studies.

Kiener and Stucki (2001): Evaluation Naturspielgruppe Dusse Verusse. Zusammenfassung Elternbefragung (Switzerland).

At the time of the publication of this article there were 11 so called "Dusse Verusse" nature playgroups in Switzerland. Once a week the group with its 3-5 year old members visit a nearby forest. The main aims are to provide social skills and self-competence among the children and to provide education for sustainable development. Changes in children's behaviour are collected using a survey among the parents. 89 out of 90 parents attest positive changes in at least one of the following categories: Relationship to nature, social behaviour, creativity, motor function and self-confidence. The test design has some weaknesses but a tendency is surely noticeable.

Lettieri (2002): Evaluationsbericht des ersten öffentlichen Waldkindergartens der Schweiz (Switzerland).

The evaluation is based on a very small sample. The qualification of children that attended a forest kindergarten did not differ significantly from those who attended a regular kindergarten. The parents who enrolled their children for a forest kindergarten often described their children as "difficult in behaviour" and as "to be afflicted with special needs". Those parents expect the forest kindergarten to have almost

"therapeutic effects". The author presumes that forest kindergartens have positive effects on both the emotional and the social development of a child. Due to the lack of reliable instruments the evaluation did not include these aspects. The development of gross motor skills is significantly higher among children who attended a forest kindergarten while the fine motor skills did not show significant differences between the two groups (forest vs. regular kindergarten). Furthermore, the forest kindergarten provoked higher rates in creativity. The underlying criterion was to achieve an aim using only existing resources. The woodlands include a huge variety of objects without determined functions. It depends on both the children's creativity and fantasy to construct and develop objects and scenes. Finally the author elicited the career wishes of the children. He surmised that the children attending the forest kindergarten expressed more nature-related career wishes. This did not occur, the wishes correlated.

Murray and Higginson (2004): Measuring the real benefits of forest school-self-appraisal: a description of a stakeholder-lead approach to evaluation (United Kingdom).

The article analyses the evaluation of two forest schools in Wales. Forest schools have a profound and positive effect on the social and the human capital of children. In cooperation with two forest schools the nef (new economics foundation) developed some innovative evaluation tools and compiled evidence demonstrating for two groups of children a link between a range of physical activities carried out in a forest school environment and six specific, positive outcomes that relate to their self-confidence, self-esteem, team working, motivation pride in and understanding of their surroundings. The article is based on Murray 2003.

O'Brien and Murray (2007): Forest School and its impacts on young children: Case studies in Britain (United Kingdom).

The aim of the current research project was to develop a methodology to explore the impacts of Forest Schools. This methodology was then used to track changes in children participating in Forest Schools. Workshops including teachers and other stakeholders identified the following impacts of Forest Schools on children: 1) it increases both self-confidence and self-esteem of children, 2) it improves the ability to work co-operatively in a team, 3) it increases motivation and concentration, 4) it

improves the development of language and communication skills, 5) it improves physical motor skills and 6) it enhances the children's knowledge and understanding of the environment. Data were collected by observing 24 children over a period of 8 months. The collected data show that the participation in Forest Schools has positive effects on the children's motor skills and on their environmental knowledge and awareness. Furthermore, the data shows ripple effects of the participation in Forest Schools on the side of teachers and parents and the children's classroom behaviour.

Strife and Downey (2009): Childhood Development and Access to Nature: A New Direction for Environmental Inequality Research (USA).

The authors underline the positive effect of contact with nature on the cognitive, the emotional and the social and physical development of a child. Furthermore, the authors show that access to nature and green spaces varies according to class and race. This form of social inequality mainly affects disadvantaged children and teenagers. Neighbourhoods characterised by high-rise buildings and asphalted spaces instead of green spaces have negative effects on children's development. This implies that already disadvantaged children are further disadvantaged by the negative effects of the neighbourhood. This negative neighbourhood effects mainly impact Afro-Americans and Hispanics. This environmental inequality has far-reaching consequences.

2.9. Obesity

Lumeng et al. (2006): Television Exposure and Overweight Risk in Preschoolers (USA).

The authors analyse the relationship between television exposure and overweight risk in preschool-aged children. The collected data include a sample of 1016 children aged 36 months and 54 months. The results show a significant correlation between extended television exposure (more than 2 hours a day) and an increased risk of overweight. This correlation is robust throughout all sample groups and it is not affected by the socio-economic status. It is notable that maternal education was the most powerful predictor of overweight risk. Two hours or more television exposure was associated with non-white families with lower incomes. A single mother showing symptoms of depression often headed those families. Preschoolers growing up in

such an environment more often exhibit behavioural disorders. Neither the children's gender nor the visit of an educational institution has an effect on TV exposure.

McCurdy et al. (2010): Using Nature and Outdoor Activity to Improve Children's Health (USA).

The paper reports on the positive effect of unstructured outdoor play on obesity and resulting diseases. The authors survey several studies. The time spent outdoors increases physical activity. Thus, the surroundings have to include an adequate number of green spaces, parks etc. Furthermore, the authors refer to the large potential savings in the health sector created by additional green spaces. Instead of focussing on the treatment of obesity and its consecutive symptoms, the government should invest in creating and preserving green spaces and parks. Particularly, the importance of cooperation between paediatrics, schools, parents and city planners for a reversal of the current trend is emphasized.

Wells and Lekies (2006): Nature and the Life Course: Pathways from Childhood Nature Experiences to Adult Environmentalism (USA).

The study examines the relationship between childhood involvement with the natural environment and adult environmentalism. The authors form two categories of childhood participation with nature: participation with "wild nature" and with "domesticated nature". Independent variables are "childhood participation with nature", "participation in environmental education in childhood" and "childhood experiences in nature with other people". The dependent variables are "environmental attitudes in adulthood" and "environmental behaviours in adulthood". The analyses of the questionnaires show that childhood participation in wild and domesticated nature has significant effects on environmental attitudes in adulthood. The participation in environmental education programmes does not have significant effects. Furthermore, childhood participation with wild nature had a significant direct effect on environmental behaviours in adulthood. People who engaged in activities in a natural environment before the age of eleven were more likely to express pro-environmental attitudes and pro-environmental behaviours as adults. The finding that participation in environmental educational programmes is not a significant predictor of environmental attitudes or behaviour is contrary to the author's hypotheses. For this reason, teachers should rather visit natural environments with their classes than

realise theoretical educational programmes on this topic. The authors conclude by presenting alarming figures: American children aged three to twelve spend only as much as one percent of their leisure time outdoors and 27 percent watching television.

Wells et al. (2007): Environment, Design, and Obesity: Opportunities for Interdisciplinary Collaborative Research (USA).

The article underlines the potentials and the necessity of interdisciplinary cooperation. Based on the assumption that environment can affect the development and the containment of obesity among children and teenagers the authors focus on different fields. Clothing is the children's closest environment. To encourage physical activity it should be comfortable and easy to clean. Further, clothing details that may encourage physical activity among children are e.g. sneakers that light up as the child walks or runs. On the other hand an increased weight leads to higher energy consumption and may therefore help to prevent obesity. The food environment as well affects the health of consumers. Super-size portions have increased dramatically and influence people to eat more. Moreover, local infrastructures affect the buying-behaviour of the consumers. Neighbourhood grocery stores increase physical activity of the inhabitants in so far as lots of people walk to the store instead of taking the car. Technology as well banes physical activity because it makes it more and more unnecessary. The Internet allows us to work in the home office, to shop online and reduces the energy expenditure. Electrical appliances, e.g. a washing-machine or a dish-washer, make physical activity once more unnecessary. Furthermore, the design of buildings enables people to expend less energy. Research shows that that certain colours or music can increase the probability of stair usage. Instead of shortening distances planners and architects should rather consider to extend walking distances, e.g. from the car park to the building. Wells considers creative interdisciplinary collaboration as an important option to redesign living environments and to reintroduce activity in our lifestyles.

2.10. Physical activity

AlHassan, Sirard and Robinson, 2007: The effects of increasing outdoor play time on physical activity in Latino preschool children (USA).

This study aims to analyse the effect of increasing outdoor playtime on preschool children's physical activity. Method: 33 preschool children, a randomly selected treatment group and one control group. Compared to the control group's outdoor play time (which was 60 min per day), the treatment group's outdoor play time was increased for 2 x 30 min per day. The participants' physical activity was measured by the use of an "actigraph". Result: there was no significant effect of increasing outdoor playtime on the treatment group's physical activity.

Burdette and Whitaker (2005): Resurrecting Free Play in Young Children Looking Beyond Fitness and Fatness to Attention, Affiliation, and Affect (USA).

Aim: The authors want to show the importance of free and unstructured play for the children's physical, emotional, social and cognitive development. They argue that efforts to increase physical activity of children in order to reduce obesity might be more successful if they are communicated as play and, furthermore, if the positive effects on child well-being other than physical health are emphasised. Attention as one aspect of cognitive functioning and its relationship with physical activity needs further investigation. Since free unstructured play requires different kinds of social interactions such as deciding what to play, to rule and to follow, it encourages children to communicate and improve their social skills. In free and unstructured play and physical activity the authors see a great potential for the emotional development of a child. Studies with adults have already shown this coherence. Conclusion: Free and unstructured play offers great potentials and the focus should no longer lie on fitness and fatness but move to well-being through play. Compared to physical activity, the expression "play" has a more positive connotation.

Godbey (2009): Outdoor Recreation, Health, and Wellness. Understanding and Enhancing the Relationship (USA).

Godbey's discussion paper is based on numerous studies. The author underlines the positive effects of nature on obesity and ADHD. He argues that many children substitute green space with screen space and suffer from nature deficit disorder. He emphasizes that serious deficits in the socio-emotional development are caused by

this nature deficit. The author concludes with the appeal that politics, schools, medicals and families ought to cooperate with the aim of increasing the children's physical activity.

Morris (2003): Health, Well-Being and Open Space Literature Review (United Kingdom).

The article summarises the benefits of open space/nature on physical health and mental well-being. The main results are: 1) Access to natural open space and greenspace offers a variety of social, economic and environmental benefits. 2) Woodlands and greenspaces can promote economic regeneration, as they transform boroughs into attractive environments for new employers. 3) Urban greenspaces also play a vital role in urban living-quality, since they promote mental and physical wellbeing among the habitants. 4) Outdoor recreation provides an opportunity to increase quality of life and heighten social interaction.

O'Brien and Morris (2009): Active England. The Woodland Projects (United Kingdom).

This report analyses the usage of five forest projects between 2005 and 2008. (These projects took place as a part of the Active England programme. This programme's aim is to increase the populations' sports activities. In total, 241 projects were subsidised.) The authors note that the number of visitors has strongly increased during these years. Interviews with visitors revealed two main reasons for visiting the Forest Projects: visitors appreciate the possibility of meeting other people, and they like to live more actively and to improve their health. The people benefit from their visits in various ways: they meet others, get in touch with nature, improve their physical and mental well-being and generally, they have fun. All in all, the visits of the Forest Project lead to a more active lifestyle. Some visitors also report about losing weight and an increased self-confidence. Project staff complain about time problems extending the outreach work because they are already fully engaged with delivering and running the projects. However, staff regard the outreach work as a crucial factor for reaching the target groups of the Active England programme.

Pretty et al. (2009): Nature, Childhood, Health and Life Pathways (United Kingdom).

The article analyses the importance of consequent physical activity during childhood and mentions its mental and physical benefits for humans. Particularly outdoor physical activity in green spaces enhances wellbeing and provokes ample ecological knowledge. If children are encouraged and enabled to undertake more green exercise, then they are more likely to have active exposure to nature embedded in their lifestyle as adults. The article suggests ten priorities for action to improve wellbeing and to reduce the costs of the social sector: 1) Encourage a better understanding of the long-term outcomes of parental and social connections during ages 0-5. 2) Encourage more outdoor free play for children ages 6-11. 3) Develop better provisions for teenage children aged 12-18 to congregate in their own communities. 4) Encourage schools to incorporate use of gardens, allotments and woodlands as a regular part of the curriculum. 5) Evaluate the outcomes of outdoor play and green education on the cognitive capacities of children and their long-term health.

2.11. Well-Being

Frumkin and Louv (2007): The Powerful Link Between Conserving Land And Preserving Health (USA).

The authors focus on the positive effects of nature on human beings. Compared to water or air, the resource land is barely protected through laws or other initiatives. More and more areas are used as building grounds instead of being conserved. This article is based on various empirical research and is an appeal for land conservation.

Fuller et al. (2007): Psychological benefits of green space increase with biodiversity (United Kingdom).

The research shows that the measurable physical and psychological benefits of daily contact with nature increase with the species richness of urban green spaces (plants, butterflies and birds). The results indicate that successful management of urban green spaces should promote biological complexity to enhance human wellbeing in addition to biodiversity conservation.

Herzog and Strevey (2008): Contact With Nature, Sense of Humour, and Psychological Well-Being (USA).

The study investigates the relationship between nature and humour in relation to individual well-being. The article is based on the data of a questionnaire which was answered by 823 students. The questionnaire consisted of 259 items and assessed information about the respondents' self-description, activity and feelings. Results: The factors "contact with nature" and "sense of humour" are independent and additive predictors of psychological well-being. Furthermore, the analyses suggested that contact with nature was a predictor of effective functioning.

Lawrence et al. (2009): Social benefits from the Forestry Commission Public Forest Estate in England: review of current evidence (United Kingdom).

The aim of this preliminary report, which is part of a comprehensive evaluation of England's woods and forests, is to analyse whether citizens have different expectations concerning publicly-owned forests and woods compared to other forms of ownership, what these expectations are, and how these expectations are reflected in the management of the publicly-owned forests. This report only reviews the relevant literature.

Mayer et al. (2009): Why Is Nature Beneficial?: The Role of Connectedness to Nature (USA).

The study examines the effects of exposure to nature (actively by taking a walk or virtually watching a video) on well-being and nature affection and the ability to reflect on a life problem. The authors find strong evidence for a relation between exposure to nature and the mentioned personal skills. Direct contact to nature (walking) enhances the effect.

Morris (2003): Health, Well-Being and Open Space Literature Review (United Kingdom).

The article summarises the benefits of open space/nature on physical health and mental well-being. The main results are: 1) Access to natural open space and greenspace offers a variety of social, economic and environmental benefits. 2) Woodlands and greenspaces can promote economic regeneration, as they transform boroughs into attractive environments for new employers. 3) Urban greenspaces also

play a vital role in urban living-quality, since they promote mental and physical wellbeing among the habitants. 4) Outdoor recreation provides an opportunity to increase quality of life and heighten social interaction.

O'Brien (2005): Trees and their impact on the emotional well-being of local residents on two inner London social housing estates (United Kingdom).

By using focus group interviews the author examines the attitudes of the inhabitants of a London borough towards a local woodland. The respondents appreciate the trees and green spaces in the neighbourhood; they like the colours during springtime and autumn and they enjoy the view from the hill. They dislike the rubbish on the site, the lacking lighting on the footpaths and the overgrown vegetation. The inhabitants mainly use the woodland as a shortcut to the bus, to the doctor etc. Children like to use the woodland as playscape because they can run freely, meet friends and can breathe fresh air. The children also expressed their worries about possible threats posed by other people in the woodland.

O'Brien (2006): "Strengthening heart and mind": using woodlands to improve mental and physical well-being (United Kingdom).

The article analyses the contributions of woodlands and green spaces on human well-being (physical and mental well-being). Referring to Kaplan (Attention Restoration Theory) the article presents various projects to enhance physical activity amongst habitants of all ages in woodlands and green spaces. The cooperation of local governments and organisations (health sector) is emphasized.

O'Brien and Morris (2009): Active England. The Woodland Projects (United Kingdom).

This report analyses the usage of five forest projects between 2005 and 2008. (These projects took place as a part of the Active England programme. This programme's aim is to increase the populations' sports activities. In total, 241 projects were subsidised.) The authors note that the number of visitors has strongly increased during these years. Interviews with visitors revealed two main reasons for visiting the Forest Projects: visitors appreciate the possibility of meeting other people, and they like to live more actively and to improve their health. The people benefit from their visits in various ways: they meet others, get in touch with nature, improve

their physical and mental well-being and generally, they have fun. All in all, the visits of the Forest Project lead to a more active lifestyle. Some visitors also report about losing weight and an increased self-confidence. Project staff complain about time problems extending the outreach work because they are already fully engaged with delivering and running the projects. However, staff regard the outreach work as a crucial factor for reaching the target groups of the Active England programme.

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Sullivan, Kuo and Depooter (2004): The Fruit of Urban Nature: Vital Neighbourhood Spaces (USA).

The authors observe 59 outdoor common spaces (758 observations) to explore the possibility that the presence of trees and grass may be a predictor for a vital neighbourhood with a high grade of social interactions. First, the observations showed that green common spaces are more frequented by inhabitants than barren spaces. Single persons as well as groups visit green spaces significantly more often than grey spaces. Furthermore, the study focuses on occurring social interactions within the green environments. The authors suppose that green spaces influence social contact among neighbours. This hypothesis is corroborated by the data; there are 83 percent more social interactions within green spaces compared to barren

spaces. This does not depend on age or gender of the neighbours. Thus, green environments are more vital than barren spaces. Design and composition of the green common spaces did not have any influence on the neighbours' behaviour.

Wells and Evans (2003): Nearby Nature: A Buffer of Life Stress Among Rural Children (USA).

The present research analyses the buffering effect of nature on life stress among children. The authors analyse the data of 337 children (aged 9,2 years) living in five rural areas in New York. The data include a standard parent-reported measure of children's psychological distress as well as the children's own ratings of global self-worth. The naturalness of the environment was rated using the "naturalness scale". The scale consists of items regarding the amount of nature in the window view, the number of plants indoors and the quality of the outdoor yard. The frequency of children's stressful life events was rated using the "Lewis Stressful Life Events Scale", e.g. questioning "How often do you argue with your parents?", "How often were you made fun of by other kids?". Response options were "a lot", "sometimes" and "never". The analysis shows that the presence of nature strongly buffers the impact of life stress on children and furthermore enhances the children's well-being. The effect increases in proportion to nearby nature and appears to be greater for those children experiencing the highest levels of life stress.

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