

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

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Received: July 2, 2012

Accepted: July 23, 2012

Published: August 25, 2012

doi:10.5430/wje.v2n4p20

URL: <http://dx.doi.org/10.5430/wje.v2n4p20>

Abstract

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

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

1. Introduction

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

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

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

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

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

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

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

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

2. Method

2.1 Design

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

2.2 Subjects

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

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

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

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

2.3 Description of the seven days in the project

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

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

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

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

2.4 Temperament questionnaire

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

2.5 Observation

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

2.5.1 Scales for behavior variables

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

2.5.2 Observation of the degree of physical activity

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

2.5.3 Observation of motor agitation

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

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

2.5.4 Observation of verbal agitation

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

2.5.5 Observation of emotion

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

2.5.6 Observation of communication

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

2.6 Reliability

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

2.7 Analysis

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

3. Results

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

<Table 1 about here>

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3.1 Physical activity

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

hardly any difference considering physical activity.

< Figure 1 about here>

3.2 Motor agitation

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

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

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

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

<Figure 2 about here>

3.3 Verbal agitation

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

< Figure 3 about here>

3.4 Neutral emotion

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

< Figure 4 about here>

3.5 Positive communication

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

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

<Figure 5 about here>

3.6 Negative communication

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

< Figure 6 about here>

4. Discussion

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

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

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

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

4.1 The study's power and limitation

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

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

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

4.2 Conclusion

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

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

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

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

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

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

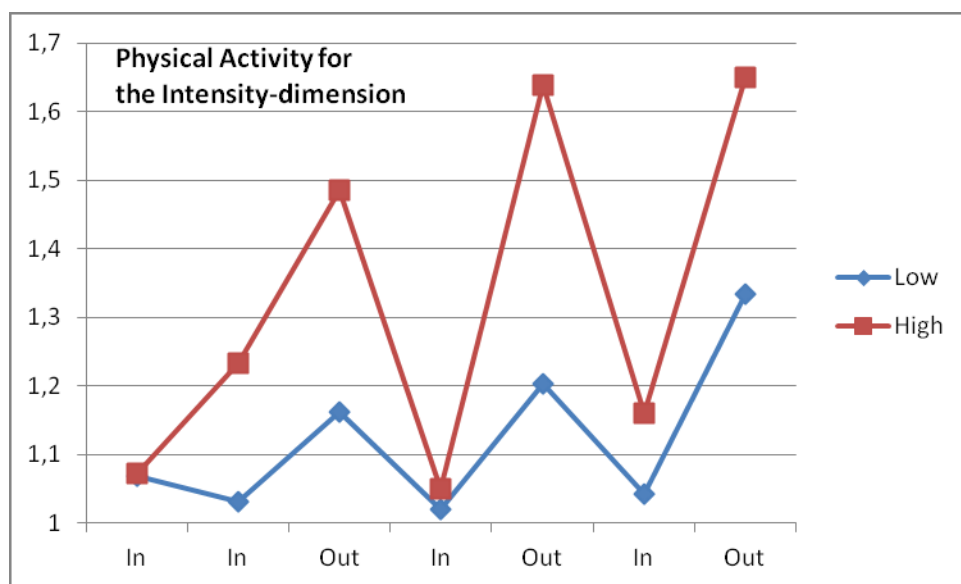


Figure 1. Average level of physical activity per day for the groups within the Intensity-dimension.

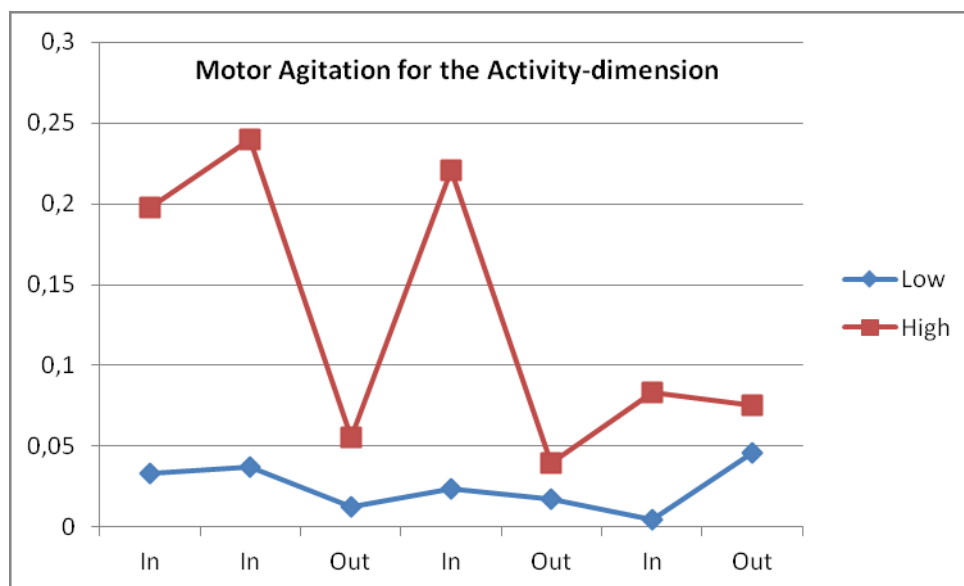


Figure 2. Average level of motor agitation per day for the groups within the Activity-dimension.

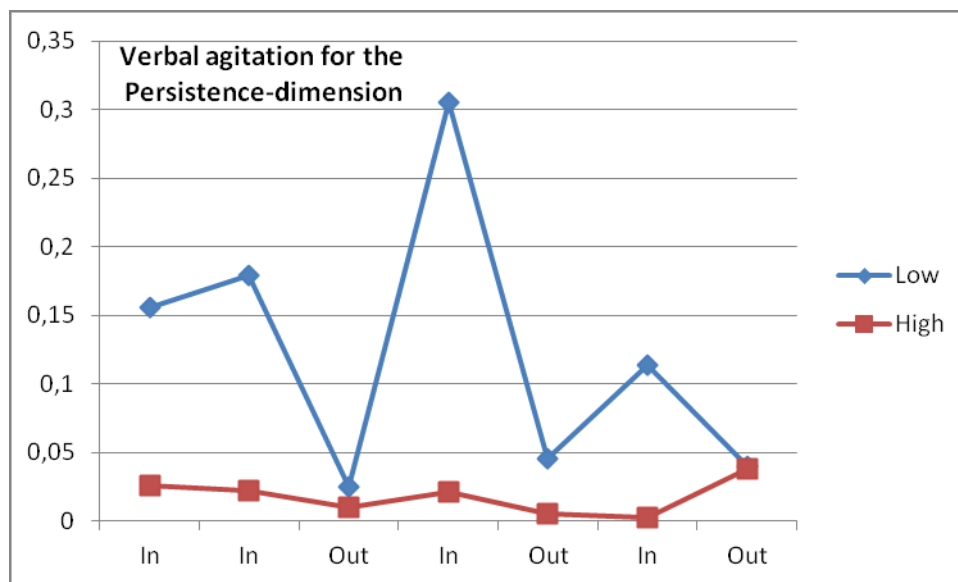


Figure 3. Verbal agitation for the groups within the Persistence-dimension.

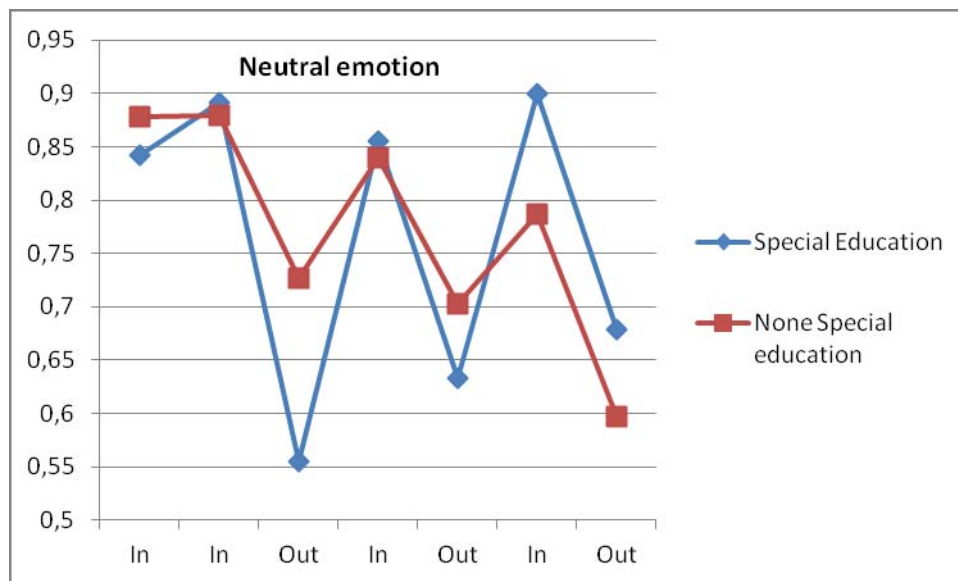


Figure 4. Neutral Emotion for the Special Education-variable

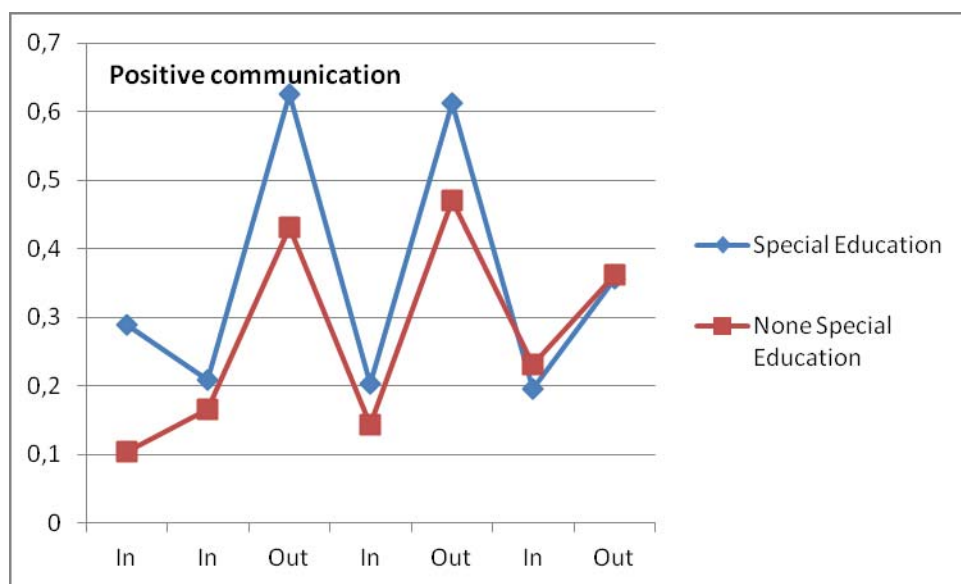


Figure 5. The average of positive communication for each day for the variable of special education.

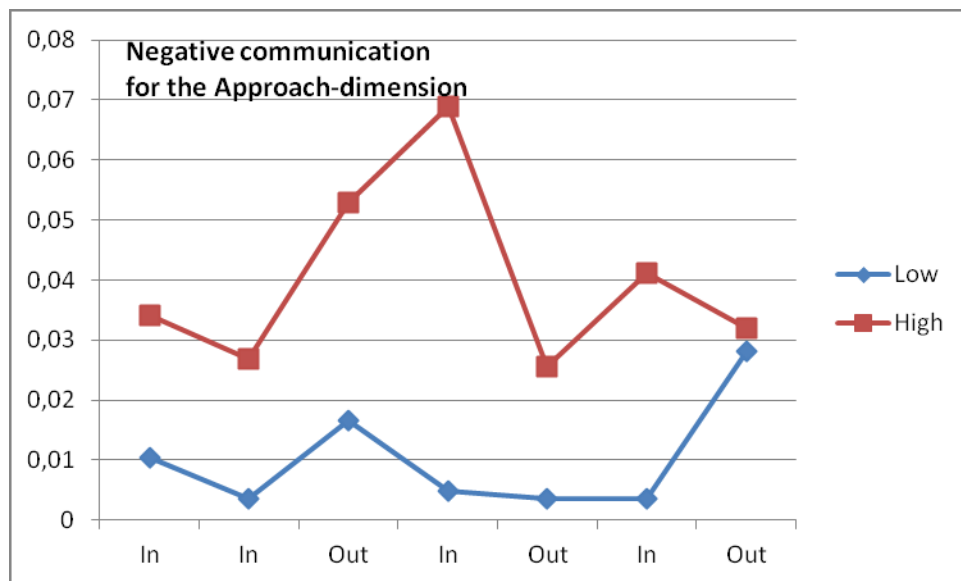


Figure 6. The average of negative communication per day for the Approach-dimension.