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Kristina Nugin

INTELLECTUAL DEVELOPMENT OF 3 TO 6 YEARS OLD CHILDREN IN DIFFERENT REARING ENVIRONMENTS ACCORDING TO WPPSI-R TEST

Abstract

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The dissertation is accepted for commencement of the degree of *Doctor philosophiae* in Educational Sciences on December 13, 2006 by the Doctoral Committee of Educational Sciences of the Tallinn University.

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INTRODUCTION

Child's mental development at preschool age is fast. By the time of going to school many children have acquired a primary skill to read, write and count. Thus, one can say that at preschool age child's intellectual development undergoes important changes. Since children differ according to mental abilities, child's intellectual development should always be approached considering the concrete child, his/her individual characteristics.

Observing child's development is important for both parents and day care centre teachers to support his/her development. Many day care centres organise developmental discussions with parents in order to get a better overview of child's development. Observing child development gives information about child's individual characteristics that help further to support the child more at home and at the day care centre. Many parents and teachers are worried about children's school readiness. Some schools have administered tests for applicants to the first grade, therefore these worries of parents and teachers are justified. How does the rearing environment support child's intellectual development? How can the rearing environment be changed to be an effective supporter of child's development?

According to Vooglaid (1999:17) the child cannot be developed, but it is possible to create necessary preconditions for child's development.

Thus, it is important to know which rearing environment conditions predispose child's development.

The issue of talented children in the Estonia society has according to Unt (2005:7) become more and more actual since 1990s. All children have the right to receive an education that corresponds to their abilities, and possibilities for developing their abilities, which depends to a large extent on parents' skills to support their child's development and teachers' skills to take into account children's individual characteristics.

The current study is part of the longitudinal research project "The influence of the day care centre and home's rearing environment and different educational methods on the development of intellect and social competence of preschool children". The grant number of the named study is 4247 and the grant holder is Professor Marika Veisson.

The aim of the current study is to find out what is the intellectual development of 3–6-year-old children like in different rearing environments.

The aims of the study:

- to find out the dynamics of mental development of 3–6-year-old children
- to find out the part of motor and verbal development in the general intellectual development of 3–6-year-old children
- to find out the specificities of intellectual development according to the differences in rearing environments
- to find out whether there are differences between the intellectual development of boys and girls

The study included 3 groups:

1) *Experimental group children* – have participated in the study since 1996. This group is characterised by parents' high interest in their child's intellectual development. These children participate in the current study since 1999, thus, since the child was 3 years old. Parents have received direct feedback about their child's intellectual development and training seminars were organised in order to pass on more general knowledge and info about the regularities of child development. The experimental group children represent in the current study a home environment, which doesn't mean that these children do not attend a day care centre, but that their intellectual development receives more attention from parents. The study did not include those families, who were invited to participate in the study, but who did not wish to do so.

2) *Ordinary group children* – are children who attend the ordinary groups of municipal day care centres. Parents gave their permission for testing in the day care centres under the supervision of teachers. The named group represents the rearing environment of day care centre's ordinary group.

3) *'Step by Step' group children* – are children who attend municipal day care centre groups that work according to the Step by Step methods. Parents gave their permission for testing in the day care centres under the supervision of teachers. The named group represents the rearing environment of day care centre's Step by Step group.

According to the above mentioned the study has the following hypothesis:

- The intellect of 3–6-year-old experimental group children is higher than that of the ordinary and Step by Step group children, since the parents of the experimental group have attended training seminars, have been individually advised, and have received direct feedback about their child's intellectual development;
- The intellect of 3–6-year-old Step by Step group children is higher from the intellect of ordinary group children, since studying takes place in organised centres and special attention is turned to cooperation with parents and to mutual cooperation between children.

OVERVIEW OF TEORETICAL RESEARCH

The current study tries to find out, what is the intellectual development of 3-6-year-old children like in different rearing environments. The theoretical part of the thesis presents viewpoints about intelligence, about the development of 3–6-year-old children and the rearing environment. The intellectual development includes different aspects. Howard Gardner (1983) states, that every child is an individual who has different interests and talents. Intelligence can according to the multiple intelligence theory be manifested in various ways. It is essential to see the distinctiveness of every child and to be able to value it. According to Gottfried, Gottfried, Bathurst, Guerin (1994:167), and Capron and Duyme (1989) the role of parents is to understand in what areas are children stronger and weaker to support their development more effectively. The cognitive class theory of Hernnstein and Murray (1994) posits that intelligence prescribes individual's socio-economic status. Intelligence determines the cognitive class to which a person belongs and this in turn dictates the socio-economic status. The cognitive class theory has been criticised, because it has tried to demonstrate the overemphasised importance of intelligence as the shaper of human life in the society. The task of the rearing environment is to make children interested and to support the wish "to get to know". Fischbein (1980) finds that the rearing environment conditions and stimuli are first and foremost created for supporting child's development. Every environment has elemental factors as well as factors of intentional development. The current work tries to follow the factors of intentional development. The Step by Step program, which tries to shape the rearing environment intentionally, corresponds to the needs of a child and which aim is to develop an active member of the society, who is interested in things-phenomena, is viewed separately. Hansen, Kaufmann and Walsh (1997: 13–29), and Maser (Hea Algus 1997) state that the central place in this program is hold by a development oriented way of teaching, which takes into account that children develop and grow up with a different pace. The central question in preschool education is how to create the best conditions and stimuli in the rearing environment to support children's intellectual development. In preschool age child's verbal, motor, and thought development undergo quick changes; develops also a need to achieve something and to cope.

OVERVIEW OF EMPIRICAL RESEARCH

PARTICIPANTS

The sample under study was chosen according to three rearing environments: 1) children who attend the Step by Step group, 2) children who attend ordinary groups, 3) experimental group children, who have been longitudinally studied since they were 3 months old. The rearing environments have not been studied separately. The current thesis has presented the theoretical viewpoints of the rearing environment and the 3 groups under study are hypothetical concerning the rearing environment. The studied groups were chosen randomly.

The experimental group children differ, because testing took place at children's home or at the Child Research Centre, not at the day care centre and parents were instantly given feedback about the results of the test, about what the child mastered, what did the child do averagely, and what should definitely be supported in his/her development. The experimental group children did not stay at home, but attended also

day care centres (excl. single cases). The ordinary and Step by Step group parents did not receive direct feedback about child's results, unless they themselves showed interest.

Approval for testing all day care centre children was acquired directly from parents or from teachers who had informed parents about the testing and had received their approval.

The parents of all children under study were given a chance to stay with the child during testing. Of ordinary and Step by Step group parents only a few parents used this chance. We cannot exclude in the current study the possibility that parents practiced certain types of tasks later at home. However, all parents had an equal chance to observe their child's performance. There were also experimental group parents, who sent their child to the testing alone, for the reason that perhaps without the presence of parents the child can perform the tasks better.

There were altogether 551 testings (264 girls, 287 boys). In the Step by Step group there were 110 testings (51 girls, 59 boys). In the ordinary group there were 215 testings (108 girls, 107 boys). In the experimental group 226 testings were carried out (105 girls, 121 boys). The average time for one child to perform the test was 90 minutes.

An overview of the tested children is given in Table 1.

Table 1. *The distribution of the children under study across research groups and ages*

Research group	3 years	4 years	5 years	6 years	All
Experimental group	24	100	63	39	226
Step by Step group	20	36	30	24	110
Ordinary group	29	52	51	83	215

INSTRUMENT

As a method I used the WPPSI-R scale. The Wechsler Primary and Preschool Scale of Intelligence-Revised is a clinical instrument, which is used for measuring the intellect of children aged 3 years to 7 years and 3 months, bringing separately out child's performance and verbal abilities (Wechsler, 1990).

Wechsler (1944:3) has defined intelligence in relation to the environment. It is important for a person to fit to the environment and to manage successfully in this environment.

PROCEDURE

Children were tested individually. Testing one child took averagely 90 minutes. The experimental group children were tested at homes or at the Child Research Centre of Tallinn University. The parents or other accompanying people of the experimental group children stayed with the child during testing. After testing the parents of the experimental group children were given feedback about test performance. Parents had a chance to present questions about the development of their child and to ask for advice. All parents did it. The parents of experimental group children were very interested in what they could teach their children and how to do it.

The ordinary and the Step by Step group children were tested at the day care centres' group rooms or at separate rooms. Only the examiner and the tested child were present in the room, other people were not present at testing.

Children who were tested by the author of the current doctoral thesis were examined at the age of 3 (+- 1 month), age of 4 (+- 1 month), age of 5 (+- 1 month), and at the age of 6 (+- 1 month). Testing took place between August 15 – October 6, 1999 and August 14 – October 12, 2000, 2001, and 2002.

Other children were tested by Professor Marika Veisson; students Ly Sankovski and Kristi Pass; master student Ingrid Tuisk; Silvi Suur (MA), and Riina Rüütelmaa (MA).

Data were analysed with the SPSS program, statistically significant differences between groups were calculated by using LSD and ANOVA analyses.

THE RESULTS OF EMPIRICAL RESEARCH

In accordance with the aims of the study one can state that the dynamics of the mental development of 3–6-year-old childrenis characterised by the following:

- There are percentually more children on the average IQ levels 90–109 and 110–119 (26.0% and 22.8% respectively) than on the high IQ level 120–129 (14.8%). However, unexpectedly 30.6 % of the children had a very high intelligence, with IQ over 130. Thus the IQ distribution does not coincide with the Gaussian curve. The current contingent is characterised by a large number children with very high intelligence. Highly intelligent children can especially be found in the experimental group (40.4%), as follows in the Step by Step group (30%) and in the ordinary group (21.3%). This shows that parents constitute a very important role in children's intellectual development. At the same time the role of the day care centre, where child spends most of his/her day and where his/her development is intentionally directed, should not be underestimated.
- The distribution on performance IQ and verbal IQ levels is not even. Percentually there are more of those children, whose performance IQ was in the range of very high intelligence (IQ 130 and more) – respectively 30.1% – whereas the verbal IQ was on this level only in case of 21.9% of the children. An opposite tendency appeared on the average IQ level (IQ 90–109), where 23.3% of the children belonged according to the performance IQ and 35.7 % according to the verbal IQ. Thus, one can conclude that higher intelligence appeared to be more related to the skills of the performance IQ and average intelligence more with verbal abilities.
- On the general intelligence scale there are percentually more children belonging to the very high IQ level (IQ 130 and more) from the experimental group – 40.4 %, from the Step by Step group 30 %, and ordinary group 21.3 %. The same tendency appeared also in case of the performance IQ and the verbal IQ.
- The Step by Step group is able to create the best conditions for the dynamics of children's intellectual development.
- In case of very highly intelligent 6–year-old children (IQ over 150) it appeared, that intelligence has since the third year of life significantly grown. Thus, in case of a 3–year-old child it is not possible to make very certain conclusions about child's intellectual development in later years.
- Children with very high intelligence can be found in every rearing environment.
- Children's intellectual development in the preschool age is in the formation stage, which means that there are big changes taking place in the intellectual development, to which one should definitely turn attention.

The motor and verbal development of 3–6-year-old children within the development of general intelligence took place in the following way:

- The general intelligence of 5–year-old children undergoes on the scale of performance IQ and verbal IQ through big changes. Intelligence increases 8–10 points. At the same time the intelligence of 4–year-old children compared to 3–year-old children decreases. The reason for this may be the stress that children have due to entering the day care centre. The day care centre is a new house, has different rooms, unknown grownups and children, different smells and voices, with what the child has to cope. Stressed children are not able to acquire new knowledge and skills; instead the child concentrates on adaptation and on so to say "survival". This helps to explain also the decline of intellectual development in case of 4–year-old children. The rapid intellectual development phase of 5–year-old children can also be explained with their psychological maturation level. The thinking level of 5–year-old children is higher – they can generalise better, see connections, group, count, and have developed the concept of quantity.
- In case of all age groups the performance IQ of children was higher from that of the verbal IQ. Thus, the performance IQ, which is related to children's motor development, is in case of 3–6-year-old children more developed from the verbal IQ. One can say when considering the current sample that children were enabled to develop more activities with hand than self-expression. Children should be offered more possibilities to tell stories, talk, discuss.

The characteristics of intellectual development according to the rearing environment differences by subtests were the following:

In the current study the experimental group appeared to be statistically better from the Step by Step and ordinary group in terms of five subtests. These were picture completion, information, arithmetic, object assembly, and similarities.

The experimental group appeared to be better only from the ordinary group in the vocabulary subtest.

The experimental group and Step by Step group appeared to be statistically significantly better from the ordinary group in three subtests: geometric design, comparison and block design.

In the mazes subtest there were no statistically significant differences between the research groups.

The characteristics of the intellectual development of boys and girls were the following:

- When looking at all research groups and all age groups together, there is a statistically significant difference between boys (N=286) and girls (N=263) in case of the performance IQ (p=.006). Thus, one can say that in general boys are less skilled in fine motor movements and perceiving the picture as a whole. This significantly important difference is due to the motor IQ differences of 3-year-old boys and girls. One can state that there are no significant differences in the performance IQ in case of 6-year-old boys and girls.
- At the age of 6 there are no statistically significant differences in the intellectual development of boys and girls. This shows that boys and girls are in intellectual development equal and it should certainly not be concluded that boys develop more slowly – in case of intellectual development it appears to be not true.

DISCUSSION

The hypothesis set in the current research work found proof:
The experimental group children achieved better results, since besides the children's institution they are also very strongly stimulated by their family. The experimental group children have together with parents been to the testing for 3-20 times. The testing informs parents about the developmental level of their child, what the child can do and about what should the child learn and practice next. The parents of the experimental group children have always received advice about how to predispose child's further development from the examiners when they bring their children to the testing. Once a year a training course was organised for the parents of the experimental group children, where they listened to lectures about child development and received literature about child development. Thus, the experimental group parents have received constant support for taking care of their children and therefore the rearing environment of the experimental group children at home is more advantageous for development. Although home influences preschool children's intellectual development, one can argue that the day care centre, where the child spends most of his/her day too has a big role to play. A well organised and planned group room and the activities in the group are important factors that direct children themselves to explore and to try out. More attention should be turned to the everyday possibilities for exploring and discovering in activity centres of the ordinary group.

I stress especially the importance of cooperation between preschool children's institutions and home.

IQ predictability

My study confirms the fact that in preschool age children's intellectual development undergoes big changes. Children, whose IQ by the age of 6 was 150–160 points, had not yet reached the same level at the age of 3–4. For example, two children had at the age of three an IQ of 103 and 108, which shows that a child who is at the age of 3 an ordinary average preschooler, can by the age of 6 be intellectually much more developed compared to peers. More generally, 5–year-old children go through very big changes in their intellectual development, whereas the period before it has not been able to forecast and predict the intellectual development. Therefore no determining decisions about children's intellectual development

should be made before entering school. It is important to monitor child's interests and whether these interests are stable or change fast, and rather to support child's development of interests.

At the age of 6–7 the issue of school choice becomes relevant. Preparation for school examinations means practicing and learning certain skills, which also brings forth the problem of pre-teached children. The knowledge and skills of these children surpass the average results at school examinations; however, at later age they have problems with studying, since the learning skill has not developed out enough. The choice of school is a decision every parent has to make, however, hereby it would be appropriate to consult the day care centre teacher of the child.

Although at preschool age it is hard to predict, what the child's intelligence will be like by the age of 6, it is possible to draw direct parallels between intelligence and school readiness. Kogerman (2003) found, that those children, whose intelligence was higher, were better prepared for school. The contemporary school demands to large extent congnitive skills like reading, writing, counting, generalising, telling stories, etc., therefore it is rather clear that school readiness correlates with child's level of intellectual development. The development of a child is holistic. In the current study I do not study child's social, physical, and emotional development, although these development aspects are also important in case of a child who is entering school.

The day care centre

It appeared in the current study that the Step by Step program suits preschool age children very well. Although at the age of 3 the intellectual development of Step by Step group children was lower compared to other research groups, until age 6 their intellectual development was characterised by a continuous increasing tendency, which shows that the corresponding program is in every way adequate for supporting children's intellectual development. Why such a difference in intellectual development appeared with ordinary group children, is a factor that needs further analyses. In both cases we are dealing with state day care centres and the preparation of teachers is the same, except for the specific training of the Step by Step program. Consequently, it is very important for the day care centre, how the study- and educational work is organised and how it is administered. In case of preschool age children it is very important that children could express their thoughts and feelings in a way that other children would listen and would share their experiences. The daily morning groups in the Step by Step program are one chance for that. I also think that it is very important that activities take place in activity centres, which allow children to choose themselves an activity and work in small groups, where they can themselves help one another when needed. The existence of different activity centres and changing them according to the needs of the group makes studying more diverse. For example, the cooking centre and the science centre, which give children important knowledge and skills besides the doll corner, building corner, shop game or hear-dresser game. The diversity of activity centres demands also from the teacher a consistent planning of activities to the corresponding centres. Thus, from the point of view of children's intellectual development I consider it very important that day care centre teachers would consciously change and improve the activity centres in the group room. As children grow, the group room and the activity possibilities must change too. Development is a process and if the group room does not change, it also doesn't support development, since every process demands certain changes. The Step by Step program puts a lot of emphasis on involving parents to the day care centre's life; however, I must note here that in ordinary groups there is constant cooperation with parents too. One possibility for cooperation between the teacher and the parent is the developmental talks that day care centres organise, which shouldn't be only a one-sided informing. One-sided informing means teacher's notes and observations about the child, of which the teacher informs the parent. Namely, the parent must also inform the teacher. The parent should also make notes and observations about the child, which can then be discussed with the teacher. The behaviour of one and the same child at home and in a collective can be very different. Finding time for home and the day care centre's demands, expectations, and problem solving is necessary for creating a corresponding rearing environment for the child. My point of view is that differences in intellectual development between the ordinary group and the Step by Step group are mostly due to the characteristics of the activity centres, to which the Step by Step program pays considerably more attention than the ordinary groups. The rearing environment is a very powerful supporter of development and it is essential that a day care centre teacher could use in the group all possibilities that predispose children's development.

Siimsoo (2002) studied the intellectual development of 1st grade students in different school environments: the municipal school and private school and found that the development of children who attend a private school is significantly more stabile and consistent. It was found in the same study that preschool teaching and developmental activities are very important in children's intellectual development, since the development of mentally more highly developed children at school is more stabile. It appeared from the study that the mental development of children going to private schools was steadier. Private schools are chosen by parents who have certain preferences, who value children's education very highly. Drawing parallels with the current study, a question arises, whether the same is true about the choice of Step by Step group by the parent. The Step by Step group can also be chosen by parents, who value education highly and find that the Step by Step program is best for their child. Since the Step by Step group children had a significantly lower intellectual level at the age of 3 or entering the day care centre, one can presume that this program is chosen by parents who value education. The impact of the program itself, of course, shouldn't be underestimated.

Boys and girls

Suur (2001) and Sankovski (2003) found in their studies that there were no statistically significant differences between the intellectual development of 4–6 and 6–7-year-old boys and girls.

Kogerman (2003) reached a similar result and found that intellectual development is very closely related to school readiness.

The current study revealed that there were no statistically significant differences between the intellectual development of 6-year-old boys and girls, which shows that before school boys and girls are equal in terms of intellectual development. The biggest difference appeared between boys and girls at the age of 3, when in case of the performance IQ there was an 11 IQ point difference between boys and girls. Thus, when parents bring their children to the day care centre, and even before entering the day care centre, they should pay special attention to the fine motor development of boys, who are rather unskilful in that compared to girls.

When analysing the differences of boys and girls in the experimental group, the verbal IQ of 6–year-old boys appeared to be 11 points higher compared to girls. Thus, it is possible to say that by the age of 7 the home rearing environment influences especially the verbal development of boys. I hereby stress that the point of view of parents and teachers, as if boys were on a lower intellectual development level compared to girls, does not seem to be true. The home rearing environment has especially positive impact on the verbal development of boys. However, the home rearing environment has an important role also in the increase toward higher intellectual development by the age of seven, which shows, that the relative importance of parents compared to the day care centre should not be underestimated.

The Step by Step program considers the gender features of boys and girls a lot, because in this rearing environment the differences between boys and girls are non-existent, except for 3–year-old children, who enter the day care centre. In case of 3–year-old children boys appeared to be less skilled in the area of the performance IQ, which had an impact also on the general IQ result. At the same time no differences appeared between the verbal development of 3–year old boys and girls. The Step by Step program is successful in considering the gender aspect to provide equal possibilities for the intellectual development of boys and girls, taking into account both verbal and motor development. The Step by Step program offers children activities for playing and studying, considering the needs of both sexes. I would also like to mention the fact that the Step by Step program is able to guarantee the rearing in intellectual development by the time a child is 6 years old. This indicates that this rearing environment supports children's intellectual development in every way.

Comparing the ordinary group boys and girls one can state that it is very hard to make conclusions about gender differences, since the intellectual development in the ordinary group is in general rather uneven across age. Five-year-old boys are 5 IQ points better from girls at verbal development, but at the age of 6 the verbal development of boys is 5 IQ points lower. In case of the general IQ and performance IQ there were no big fluctuations. Thus, when studying the current sample, it is possible to state that in the ordinary group more attention should be paid to the verbal development of boys. The ordinary groups lack such well planned activity centres for everyday study work as the Step by Step groups have. This may create gender imbalance when the activities are carried out simultaneously together with the whole group. In large groups

girls wish to chat and express themselves verbally more and boys stay at the background. The same tendency can also be called forth by teachers' preference to give more verbal tasks to girls. This problem could be solved by organising work in groups with 4–5 children, where all children should get a chance to express themselves verbally.

The current study also gave an answer to the questions, why is the intellectual development of boys considered to be slower in our society than that of girls. I have often heard the attitude that – oh, he is a boy, boys acquire school readiness later, boys are inattentive, etc. When analysing the development of boys and girls according to the Wechsler IQ levels, it appears that there is an equal number of boys and girls on the highest level (IQ 130 and more). However, in the average group (IQ 90–109) there are 8.7% more boys than girls. On levels 110–119 and 120–129 there are more girls. In general, in terms of the current sample the intellectual development of boys and girls is equal, although some deviations appear in the distribution into IQ levels.

When analysing the performance of boys and girls in subtests, there are no statistically significant differences. When all research groups and age groups were studied together, the only statistically significant difference ($p < .05$) appeared in the picture completion subtest. In this subtest girls turned out to be better. This difference was due to the difference in ordinary group boys' and girls' picture completion subtest performance, since in other research groups no statistically significant differences appeared in the picture completion subtest.

Home as a rearing environment

The current study revealed that the home rearing environment has an important role to play in supporting the child's intellectual development. The experimental group differed from other research groups because the IQ value of 40.4% of the children in this group proved to be 130 or higher. Thus, it can be stated that the home rearing environment supports child's intellectual development. Since the WPPSI-R scale measures performance IQ and verbal IQ, it can be concluded that home pays more attention to the fine motor development and the verbal development of the child. The one to one action between a grownup and a child in the preschool age is extremely important. The grownup communicates with the child, instructs him/her, encourages, supports, helps and teaches. This ensures the age relevant verbal and motor development of a child. Cooperating creates a feeling of security and a favourable rearing environment. In the day care centre there are 18–24 children per one grownup, which obviously doesn't guarantee that the grownup would have enough time to communicate and to deal with each child individually. However, at the day care centre peers have a social function, whereas from communicating with each other one learns to stand for oneself, to make compromises, to solve conflicts, to create friendships, and to learn to know oneself and others. In order to make the child feel secure at the day care centre, the home must prepare the child for the day care centre. From home the child receives social and cognitive skills. The latter are important too, because children are able to evaluate each other's skills competently. 4–5-year-old children can give quite adequate evaluations about their peers in the group, who does what well. Parent is the one who helps the child to see the strong sides and supports child's development. The day care centre is an institution that supports education and teaching, which means that home's role in teaching and educating the child doesn't end when child enters the day care centre, but it is done in cooperation with the day care centre.

It appeared in the current study that the experimental group turned out to be statistically significantly better from the Step by Step group and ordinary group in the following performance IQ subtests: object assembly and picture completion. This shows that home supports the current sample especially in performing puzzle-type tasks, and perceiving the whole, where the child has to find a missing detail on pictures. Thus, it is possible to assume that one watches more pictures and picture books at home together with children and analyses what can be seen on the picture.

On the verbal IQ scale the experimental group appeared to be statistically significantly better from the Step by Step and ordinary group children in the following subtests: information, arithmetic, and similarities. Performing the mentioned tasks presumes that the child thinks logically, sees cause-effect relations, has a comparing skill, knows concepts of quantity, concepts of number, and has a generalising skill. One can conclude here, that the home rearing environment has a very big role to play in child's cognitive development. Supporting child's development at home gives significantly better results than just relying on

the day care centre. The contemporary day care centre must realise its role as the supporter of home rearing environment, offering parents related literature, lectures, seminars, materials for supporting child's development and when needed also counselling.

In conclusion it is possible to say that both the home rearing environment and the rearing environment in the day care centre have an important place in child development. A supporting home rearing environment creates better possibilities for child's intellectual development compared to the day care centre. At the same time it appeared from the study that child's intellectual development depends also on the day care centre's rearing environment. The better organised are the physical environment and the study- and free time activities at the day care centre, the better a child intellectually develops. Emphasis should be put especially to the Step by Step program, which supports child's intellectual development.

The innovativeness of the study and the practical outcomes – the study results presented in the current theses give guidelines necessary for effective pedagogical practice.

I stress the result that in case of the intellectual development of 6-year-old children there were no statistically significant differences between boys and girls. This result is important to know in case a question rises about school readiness. The development of a child should be seen holistically. In case of school readiness it is important to take into account child's physical, emotional, and social development. The intellectual development level of boys and girls is equal, thus it is a myth that the intellectual development of boys is slower.

Important is also the result that the intellectual development of children who participated in the Step by Step program is steadily increasing. The Step by Step program pays a lot of attention to the day care centre's rearing environment, to the activity centres in groups, and to cooperation with parents. The Step by Step program principles are also valued in ordinary groups, but it is important to change activity centres, innovate, cooperate with parents and create a rearing environment as a process in a constant and planned way.

Since the intellectual development of the experimental group children was in many subtests the best, more emphasis should in many day care centres be put to cooperation with parents. The day care centre supports education at home, which means that the parent has the first responsibility in guiding child's development. The day care centre should counsel parents more, how and what to do with a child in a certain age and how to teach children and study together with them. Conditions created by the rearing environment and external stimuli are very important in shaping the day care centre's rearing environment for preschool age children, since when studying the rearing environments on the bases of children's intellectual development, it appeared that in a deliberately shaped rearing environment the intellectual development of children is more even and fast.

In addition to the concrete study results a number of questions appeared, to which the current study does not give answers. Since one task of science is to ask questions, the current theme could continue with finding answers to the following questions: How does the social development of boys and girls take place? What should the training and counselling system of parents be like? What makes the rearing environments of day care centres different? What conditions in the rearing environment predispose child's development? The current study showed that the intellectual development of children in different rearing environments has different levels.

3–6-AASTASTE LASTE INTELLEKTUAALNE ARENG ERINEVATES KASVUKESKKONDADES WPPSI-R TESTI ALUSEL

Kokkuvõte

Käesolev uurimistöö on osa longituuduuringust “Lasteaia ja koduse kasvukeskkonna ning erinevate kasvatusmeetodite mõju koolieeliku intellekti ja sotsiaalse kompetentsuse kujunemisele”. Uurimuse grandi number on 4247 ja grandihoidjaks professor Marika Veisson.

Uurimistöö eesmärk on selgitada, milline on 3–6-aastaste laste intellektuaalne areng erinevates kasvukeskkondades.

Uurimuse alaeesmärgid: välja selgitada
- 3–6-aastaste laste vaimse arengu dünaamika;
- 3–6-aastaste laste motoorse ja verbaalse arengu osa üldintellektuaalses arengus;
- intellektuaalse arengu eripärad vastavalt kasvukeskkonna erinevustele;
- võimalikud erinevused poiste ja tüdrukute intellektuaalses arengus.

Uurimistöös osales 3 gruppi.
1) Katserühma lapsed on osalenud uuringus alates aastast 1996. Seda rühma iseloomustab lapsevanemate suur huvi oma laste intellektuaalse arengu vastu. Käesolevas uuringus on need lapsed alates aastast 1999 ehk siis lapse kolmandast eluaastast. Lapsevanemad on saanud otsest tagasisidet oma lapse intellektuaalse arengu kohta ning korraldatud on koolitusseminare üldisemate teadmiste ja lapse arengu seaduspärasuste edastamiseks. Katserühma lapsed esindavad käesolevas töös kodust kasvukeskkonda, mis ei tähenda, et need lapsed ei käi lasteaias, vaid seda, et nende intellektuaalsele arengule pööratakse vanemate poolt suuremat tähelepanu. Uuringusse ei ole kaasatud neid peresid, kellele tehti ettepanek uuringuga liituda, kuid kes ei soovinud osaleda.
2) Tavarühma lapsed on need, kes käivad munitsipaallasteaedade tavarühmades. Lapsevanematelt on saadud õpetaja vahendusel nõusolek laste testimiseks lasteaias. Antud rühm esindab lasteaia tavarühma kasvukeskkonda.
3) Hea Alguse rühma lapsed käivad munitsipaallasteaedades Hea Alguse metoodika järgi töötavates rühmades. Lapsevanematelt on saadud õpetaja vahendusel nõusolek laste testimiseks lasteaias. Antud rühm esindab lasteaia Hea Alguse rühma kasvukeskkonda.

Sellest lähtuvalt olen esitanud uurimistöö hüpoteesid:
- katserühma 3–6-aastaste laste intellekt on kõrgem kui tavarühma ja Hea Alguse rühma lastel, sest katserühma lapsevanematele on korraldatud koolitusseminare ja neid on individuaalselt nõustatud, nad on saanud otsest tagasisidet oma lapse intellektuaalse arengu kohta.
- Hea Alguse rühma 3–6-aastaste laste intellekt on kõrgem tavarühma laste intellektist, sest õppimine on organiseeritud keskustes ning erilist tähelepanu pööratakse koostööle lastevanematega ja laste omavahelisele koostööle.

Uurimistöös püstitatud hüpotees leidis kinnitust
Katserühma lapsed saavutasid paremad tulemused, kuna peale lasteasutuse stimuleerib neid lapsi väga tugevasti ka perekond. Katserühma lapsed on koos oma vanematega käinud testimas 3–20 korda. Testimine annab lapsevanemale informatsiooni, milline on tema lapse arengutase, mida laps oskab ja mida peab järgmiseks õppima ja harjutama. Lastega testimas käies on katserühma laste vanemad alati saanud testijalt nõuandeid, kuidas laste edasist arengut soodustada. Kord aastas on katserühma laste vanematele korraldatud koolitus, kus nad kuulavad loenguid lapse arengust ning saavad kaasa kirjandust lapse arengu kohta. Seega on katserühma laste vanemad saanud pidevalt toetust ja tuge tegelemiseks oma lastega ning katserühma laste kodune kasvukeskkond on seetõttu laste arenguks soodsam. Kuigi kodu mõjutab eelkooliealise lapse intellektuaalset arengut, võib väita, et väga suur osa on ka lasteaial, kus laps valdava osa oma päevast veedab. Hästi organiseeritud ja planeeritud rühmaruum ja tegevused rühmas on oluliseks faktoriks, mis suunavad lapsi ise uurima ja ise katsetama. Rohkem peaks tähelepanu pööratama tavarühma igapäevastele võimalustele uurimiseks ja avastamiseks tegevuskeskustes. Rõhutan eriti koolieelse lasteasutuse ja kodu koostöö olulisust.

Lähtuvalt uurimuse eesmärkidest võib väita, et 3–6-aastaste laste vaimse arengu dünaamikat iseloomustab järgnev.

- Keskmistesse IQ tasemetesse 90–109 ja 110–119 kuulub protsentuaalselt rohkem lapsi (vastavalt 26,0% ja 22,8%) kui kõrge intelligentsusega laste tasemesse (IQ 120–129; 14,8%). Väga kõrge intelligentsusega lapsi, kelle IQ on üle 130, on mitte ootuspäraselt 30,6%. Seega jaotuvus IQ tasemetesse ei ühti Gaussi kõveraga. Antud kontingenti iseloomustab väga kõrge intelligentsusega laste suur arv. Eelkõige leidub väga kõrge intelligentsusega lapsi katserühmas (40,4%), järgnevalt Hea Alguse rühmas (30%) ja tavarühmas (21,3%). See näitab, et lapsevanematel on väga oluline roll laste intellektuaalses arengus. Samas ei tohiks alahinnata lasteaeda, kus laps veedab suure osa oma päevast ja kus lapse arengut sihipäraselt suunatakse.
- Tegevuse IQ ja verbaalse IQ jaotuvus IQ tasemetesse ei ole ühtlane. Protsentuaalselt on rohkem neid lapsi (30,1%), kelle tegevuse IQ jääb väga kõrge intelligentsuse tasemesse (IQ 130 ja üle); verbaalne IQ jäi sellele tasemele vaid 21,9%-l lastest. Vastupidine tendents ilmneb keskmises IQ tasemes (IQ 90–109), kuhu jaotub tegevuse IQ järgi 23,3% ja verbaalse IQ järgi 35,7% lastest. Seega võib väita, et kõrgem intelligentsus on enam seotud tegevuse IQ oskustega ja keskmine intelligentsus enam verbaalsete võimetega.
- Katserühmast kuulub kõige kõrgemasse IQ tasemesse (IQ 130 ja üle) üldintelligentsuse skaalal protsentuaalselt kõige rohkem lapsi (40,4%), Hea Alguse rühmast 30% ja tavarühmast 21,3%. Sama tendents ilmnes ka tegevuse IQ ja verbaalse IQ puhul.
- Hea Alguse rühm suudab luua parimad tingimused laste intellektuaalse arengu dünaamikaks.
- Väga kõrge intelligentsusega 6-aastaste laste puhul (IQ üle 150) selgus, et intelligentsus on alates kolmandast eluaastast oluliselt tõusnud. Seega ei saa kolmeaastase lapse puhul teha väga kindlaid järeldusi lapse intellektuaalse arengu kohta hilisemas eas.
- Väga kõrge intelligentsusega lapsi leidub igas kasvukeskkonnas.
- Eelkoolieas on laste intellektuaalne areng kujunemise järgus; see tähendab, et intellektuaalses arengus toimuvad suured muutused, millele tuleks kindlasti tähelepanu pöörata.

3–6-aastaste laste motoorse ja verbaalse arengu osa üldintellektuaalses arengus

- Üldintelligentsuses, tegevuse IQ ja verbaalse IQ skaalal toimub 5-aastaselt lastel suur muutus. Intelligentsus suureneb 8–10 palli võrra. 4-aastaste laste intelligentsus võrreldes 3-aastaste lastega aga hoopis langeb. Selle põhjuseks võib olla stress, mis tekib lastel seoses lasteaeda minekuga. Stressis lapsed ei ole võimelised omandama uusi teadmisi ja oskusi, vaid laps keskendub kohanemisele ja nn "ellu jäämisele". See põhjendab ka intellektuaalse arengu langust 4-aastaste laste puhul. 5-aastaste laste intellektuaalse arengu kiiret faasi võib seletada ka laste psüühilise küpsemise tasemega. 5-aastased lapsed omavad kõrgemat mõtlemise taset – nad osakavad paremini üldistada, näha seoseid, grupeerida, loendada, välja on kujunenud hulga mõiste.
- Kõikide vanusegruppide puhul osutus laste tegevuse IQ kõrgemaks kui verbaalne IQ. Seega on laste motoorse arenguga seotud tegevuse IQ 3–6-aastastel lastel enam arenenud kui verbaalne IQ. Antud kontingendi puhul võib väita, et lastele on võimaldatud enam käelist tegevust kui eneseväljendust. Lastele peaks rohkem pakkuma võimalusi jutustada, rääkida, arutleda.

Intellektuaalse arengu eripärad vastavalt kasvukeskkonna erinevustele alatestide kaupa

- Katserühm osutus Hea Alguse rühmast ja tavarühmast statistiliselt paremaks viies alatestis: pildi kokkupanemine, informatsioon, aritmeetika, pildi täiendamine ja sarnasused.
- Katserühm osutus paremaks ainult tavarühmast sõnavara alatestis.
- Katserühm ja Hea Alguse rühm osutusid statistiliselt oluliselt paremaks tavarühmast kolmes alatestis: geomeetrilised kujundid, võrdlus ja klotsi kokkupanek.
- Labürindi alatestis statistiliselt olulised erinevused uurimisgruppide vahel puudusid.

Poiste ja tüdrukute intellektuaalse arengu eripärad

- Kui vaadelda kõiki uurimisgruppe ja vanusegruppe koos, tuleb poiste (N=286) ja tüdrukute (N=263) vaheline statistiliselt oluline erinevus välja tegevuse IQ puhul (p=.006). Seega võib väita, et poisid on üldiselt nõrgemad just peenmotoorikas ja tervikliku pildi tajumises. See oluline erinevus on tingitud poiste ja tüdrukute tegevuse IQ olulisest erinevusest 3-aastaste laste puhul. Võib väita, et 6-aastaselt poiste ja tüdrukute tegevuse IQ oluline erinevus puudub.
- 6-aastaselt poiste ja tüdrukute intellektuaalses arengus statistiliselt olulised erinevused puuduvad. See näitab, et poisid ja tüdrukud on intellektuaalses arengus võrdsed ning kindlasti ei tohiks esineda suhtumist, et poisid arenevad aeglasemalt – intellektuaalse arengu puhul see ei kehti.

Töö innovaatilisus ja praktiline väljund. Dissertatsioonis esitatud uurimistulemused annavad kätte orientiirid, mis on vajalikud efektiivseks pedagoogiliseks praktikaks.

Rõhutan tulemust, et 6-aastaste laste puhul ei esine intellektuaalses arengus erinevusi poiste ja tüdrukute vahel. Antud tulemust on oluline teada, kui tekib küsimus koolivalmidusest. Lapse arengut tuleb vaadelda kui tervikut. Koolivalmiduse puhul on oluline arvestada lapse füüsilise, emotsionaalse ja sotsiaalse arenguga. Intellektuaalse arengu tase on poistel ja tüdrukutel võrdne, seega on müüt, et poiste intellektuaalne areng on aeglasem.

Oluline on ka tulemus, et Hea Alguse programmis osalenud laste intellektuaalne areng on ühtlaselt kasvav. Hea Alguse programm pöörab suurt tähelepanu lasteaia kasvukeskkonnale, tegevuskeskustele rühmas ja koostööle lastevanematega. Hea Alguse programmi põhimõtteid väärtustatakse ka tavarühmas, kuid on oluline, et tegevuskeskuste vahetamine, uuendamine, koostöö lastevanematega ja kasvukeskkonna loomine kui protsess oleks pidev ja planeeritud.

Kuna katserühma laste intellektuaalne areng oli mitmetes alatestides parim, siis peaks enam lasteaedades rõhku pöörama koostööle lastevanematega. Lasteaed on kodust kasvatust toetav, mis tähendab, et lapsevanemal on esmane vastutus oma lapse arengu suunamisel. Lasteaed peaks enam nõustama lapsevanemaid, mida ja kuidas vastavas vanuses lapsega teha, kuidas lapsi õpetada ja nendega koos õppida. Kasvukeskkondi laste intellektuaalse arengu foonil vaadeldes selgus, et sihipäraselt kujundatud kasvukeskkonnas on laste intellektuaalne areng ühtlasem ja kiirem.

Lisaks konkreetsetele uurimistulemustele tuli esile rida küsimusi, millele antud töö vastuseid ei anna. Kuna teaduse ülesandeks on ka küsimine, siis võiks jätkuda vastuste otsimine järgmistele küsimustele. Kuidas toimub sotsiaalne areng poistel ja tüdrukutel? Milline võiks olla lastevanemate koolitamis- ja nõustamissüsteem? Mille poolest erinevad lasteaedade kasvukeskkonnad? Millised tingimused kasvukeskkonnas soodustavad lapse arengut? Käesolev uurimus näitas, et erinevates kasvukeskkondades laste intellektuaalne areng on erineval tasemel.

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