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Theses of doctoral (Ph.D.) dissertation

The effect of an intervention program on school readiness, in the aspect of learning and movement skills

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## INTRODUCTION

Nowadays one of the most urgent methodological challenge: adapting to the changing demands of child population. There are more and more children and students in public education system whose solution to their educational situation – due to, or without their special demands – means a great task for teacher society. (Atkinson és mtsai, 2005, Kolozsváry, 2002; Kopp, 2006; Kálmán és Könczei, 2002).

According to experience, it is a more and more common problem in our country, that without special educational needs - yet along with some partial skills – children begin their school carrier immature, in the aspect of school. (Lakatos, 2000).

Researches show, that to promote successful school life, maturity is very important (Guernsey és mtsai, 2014), however, it is still a matter of debate that what are the criteria of being “ready” for school (Apró, 2013; Kende és Illés, 2007).

Legal regulators (the 2011. CXC. law about public education, and the 20/2012. EMMI regulation about the operation of educational institutions and the names of public education institutions) have a term, but compulsory education often deviates from maturity in a pedagogical-psychological point of view. Compulsory education is a previously given category based on age, the time of the beginning of school carrier, that doesn't necessarily mean that the child – either in a cognitive way, or a psychological-emotional, social, movement way – is prepared for the pressure of the school (Vekerdy, 1989).

Testing maturity and readiness for school, along with learning skills has been in the focus of researches for a long time. More and more studies are about to reveal the connection, according to which the appropriate level of movement skills can be an indicator of neurological maturity, and therefore learning skills (Marton-Dévény, 2005; Blythe, 2006, 2009; Blythe és mtsai, 2017).

Because of these facts, many suggest that checking movement and its results can indicate the level of expected learning skills, and therefore can be a good measurement of maturity for school. MABC-2 Checklist can be a great equipment for this purpose (Schoemaker és mtsai, 2003, 2012; Rácz, 2012; Montoro és mtsai, 2015), its application in the field of rating co-ordination disorders for parents and teachers has already spread abroad, the validating in Hungary has become actual.

It can also be set out that it is movement development which is the instrument of neurological development along with the improvement of learning skills.

So we can say that everything basis is: movement. If there is a derogation in human specific movement pattern, there is a solution for the correction of the problem. Movement therapy and movement improvement methods offer an appropriate solution for these cases.

In Hungary the most common movement improvement procedures are Basic Therapy, some forms of Sensory Integration Therapy, the DSGM therapy and the reflex correction method (INPP®) (Moldoványi, 2015).

All movement improvement procedure's common denominator that they evidence the fact - that is well known among sport experts - that movement is the basis of all learning procedures (Blythe, 2006). In our view in a lot of cases the background of learning disorders are movement based learning system differences (the disorder of balance system, orientation disorder in space and time, body image disorder, persisting infantile reflexes, immature lateral, etc.), that are obstacles to normal movement development. If the movement development is restricted then the delay of neurological development is also guaranteed. These three areas – movement development- neurological development- the improvement of learning skills – are inseparable, they can only be interpreted as a whole, yet the examination of movement skills don't get–coordination in the first place – enough emphasis when detecting learning disorders and school readiness.

The most common psychological development disorder in public education institutions that is also listed under discipline and behaviour disorders is ADHD (Attention Deficit Hyperactivity Disorder). Its relevance is major, according to certain researches it affects the Hungarian child population's 3-12%, which means about 70 000 children diagnosed with ADHD (Gyarmathy, 2002; Velő és mtsai, 2013). On the basis of these data it can be stated that there are only a few teachers in Hungary who doesn't come across ADHD in their everyday lives. When diagnosing ADHD the DSM.IV. TR. (2001) system assesses among three factors: hyperactivity/over-movement, inattention and impulsivity. However it doesn't come clear that behind hyperactivity/over-movement children with ADHD have learning disorders because of co-ordination problems, concentration problems and movement difficulties (Selikowitz, 2010; Millichap, 2009; F. Földi, 2004). So the ADHD condition is rather complex, the presentation of the disorder is essential to understand the current child population's difficulties at school.

## **THE TOPIC AND GOAL OF THE RESEARCH**

The aim of the treatise is primarily an intervention program, the INPP® the introduction of the reflex correction method's effect on movement development in connection with movement skills and school readiness, among kindergarten pupils about to go to school. The topic is based on educational science, however the examined field shows interdisciplinary with its connection to psychology and sports science.

Using the problems of school maturity and immaturity as a starting point, the thesis shows the close connection of movement and learning skills, it wishes to prove the importance of improvement and development of movement in the formation of the appropriate level of learning skills.

In addition we would like to explore the MABC-2 Checklist movement condition task list- which is widely used abroad- to judge co-ordination disorders, to raise consciousness to ADHD, and to a wide range of learning difficulties parallel with coordination and psychological disorders in the background.

The research has begun with the statement that the reflex correction method (INPP®) used as an intervention program has a basic idea according to which if we place the persisting infantile reflexes under inhibition we give a chance to adulthood reflexes and the development of other, human specific movement patterns, and with these we give a chance to complete neurological development procedures and improvement of learning skills (Blythe, 2006, 2009).

## **THE RESEARCH**

The research's questions are the following:

- Q1: Can the learning problem connected coordination disorder be detected?
- Q2: Do the disorders within movement skills and persisting infantile reflexes indicate school immaturity in the case of kindergarten pupils, both in movement and cognitive fields?
- Q3: Is the INPP® reflex correction method an effective movement improvement method in correcting coordination and learning disorders? Is it true that only a five time per week improvement can be effective?

- Q4: Can the 1 year program of the INPP® reflex correction method offer a solution for children with under-improvement in movement, coordination disorders to reach school readiness?
- Q5: To what measures is MABC-2 Checklist valid in judging coordination skills?
- Q6: Can the low level of learning and movement skills be detected behind ADHD?
- Q7: Do the pre,- peri-, and postnatal harms mean a risk for movement skills and therefore for school maturity?

Hypothesis of the research – are the following according to the questions:

- H1: Kindergarten pupils who performed poorly in the movement tests had learning skills under the national average;
- H2: Kindergarten pupils with existing infantile reflexes performed worse in other movements tests as well than those who lacked these reflexes, their learning skills were also under the national average;
- H3: Groups developed five times per week with the intervention program had better movement and learning skills than those, who only had three times per week or none at all;
- H4: As a result of the intervention program the pupils who performed poorly in the first measurement in movement skills, by the time of the end of term testing reach a much greater improvement in movement and learning skills than the ones without development.
- H5: The MABC-2 Checklist is in accordance with the Basic Therapy/INPP's movement based tasks.
- H6: Children with the symptoms of ADHD have more underdeveloped movement and learning skills that expected as their age.
- H7: The existence of pre,- peri,- and postnatal harms is higher in those who performs less successful in movement tests.

The choosing of the sample was made without a probability expert sampling. The reason for this is that the basis of the successful outcome of the research is that the involved kindergartens should follow a common educational program. It is also important that they attend the same development sessions and PE sessions with the same structure so that the sample isn't deformed neither in a movement, nor in a learning way.

Moreover fitting into the group has some other criteria as well so that the intervention effect could be examined:

- Only those children could be involved in the test whose at least on parent has signed the agreement attached to the research information sheet.
- It was also important that the children taking part in the research could not take part in any other programs or PE programs.

With taking all these into account we were able to find the “Pátyolgató” kindergarten in Páty. Pest County. We have involved three senior groups of the nursery school. We have divided the groups into two research (1. research group N=25; 2. research group N=25) and one control group (N=23). All together we had 73 pupils for the test. At the beginning the average age of the pupils was 5.66 (+/- 0,44 years), average height: 117 cms (+/- 5,7 cms), average weight: 21 kgs (+/- 3,9 kgs).

In all three groups we have done tests at the beginning and at the end of the year to set out the actual level of learning and movement skills. For the learning test we have done the short DIFER test with them (Nagy és mtsai, 2004) referring to six basic skills (social skills weren't part of the test), for the movement check we applied the INPP's reflex test (Blythe, 2006), and the Basic Therapy's exploratory test (Base Therapy Foundation, 2009). Moreover at the beginning of the year as a teacher evaluation of movement disorders, the kindergarten teachers filled the MABC-2 Checklist (Henderson and Sugden, 1992). Children showing ADHD symptoms were examined with the help of DSM-IV. TR. Diagnostic handbook (2001), ADHD's symptom scale was filled by parents and teachers, and there was also a parent history survey (Base Therapy Foundation, 2009) these all supported the research, in order to filter out the pre-, peri-, and postnatal harms.

The first research group – in accordance with research goals – has received the INPP®'s intervention program five times per week (118 meetings/year, average attendance: 93 meetings), the second research group received three meetings per week (66 meetings/year, average attendance: 51 meetings), the control group hasn't taken part in any intervention meetings.

We analysed the results of the research with the help of SPSS 22.0 statistics program, with which we could perform not only descriptive procedures, but non-parameter, one and more variable distinctive tests. (Mann-Whitney U-test, Wilcoxon-test, Kruskall-Wallis-test, Discriminant-analysis).

## RESULTS

Current research has been carried out in a comprehensive, longitudinal test, in which the main aspect was to prove that the movement and learning skills' appropriate or maybe low levels are in accordance with each other, and the measurement of these at a young age (especially in kindergarten) can pre-indicate school readiness. We also wanted to support school maturity by examining the effect of an intervention program (the INPP®'s reflex correction method) which is very rarely referred to in scientific literature.

Before the beginning of the research – laying on the scientific literature – we have assumed that in the sample, the senior kindergarten pupils underdeveloped in movements were underdeveloped in learning skills as well compared to the national average (**H1**). 41,13% of children underdeveloped in movements skills performed under the national average in the six basic skills test at the beginning of the year. It can be shown that they got lower percentages compared to the whole sample's average. The weakest results came out in writing movement and in drawing conclusions from experience. Based on the results the hypothesis has been *partly proven*.

We have also assumed that those senior kindergarten pupils had some remained infantile reflexes will perform weaker in movement and learning skill tests than those who haven't got any persisting reflexes (**H2**). This hypothesis can completely be accepted on the basis of the results, as it was *proven* that those children who have some infantile reflexes perform worse in movement tests than those haven't got any persisting infantile reflexes. The same can be told about the result of learning skill tests, as out of six basic skills, those who had infantile reflexes in four of these performed the worst compared to the national average. So 36,4% of children with persisting infantile reflexes have learning difficulties and 60% have movement problems.

The hypothesis (**H3**) was the following: „The development both in movement and learning skills are better in the group who took part in the intervention program five times per week than those who took part three times per week, or didn't take part at all.” On the basis of the received results we can state that children who took part in the intervention program (research group 1. and 2.) achieved significantly better results in the end-of- school year movement tests compared to the ones at the beginning of the year, meanwhile, in the case of the control group there are no such differences. There is a certain development, but not as significant, as in the other research groups' cases. So the movement development of the developed groups were significantly better than of the other group. However there is no real difference in effectiveness whether the children had five or three meetings per week. If we examine the learning skill tests'

beginning-, and end of year results, we can say that the intervention program has a more moderate effect on learning skills. So this hypothesis of ours has only *partly be proven*, as in the movement skills the developed groups indeed improved more intensively, but we cannot tell the difference between the five times per week and three times per week meeting groups, and our prediction hasn't confirmed us in the question of learning skills.

The next hypothesis (**H4**), according to which as an effect of the intervention program – those senior kindergarten pupils who performed poorly in the first test, achieve a greater improvement by the time of the end-of-year test in learning and movement skills than those, who didn't receive improvement sessions – *has been partly proven*. If we compare the beginning and end-of year movement and learning skill results of those who were underdeveloped in movement, we can say that except the relation vocabulary- there is a significant difference ( $p < 0,05$ ) between the first and second testing, as the developed children with movement disorders (28 ps.) performed much better in the output tests than in the input ones. The performed Wilcoxon-test results show that those who performed less successfully in the first movement tests, but later were developed (five or three times per week) performed significantly better in every movement test by the end of the year, while in the case of the control group the only development could be detected in the Galant reflex. In the learning skill tests – even if not every basic skill's case – the developed groups show significant improvement, but not the ones with movement disorders in the control group. There is some improvement in their case as well, but not as significant as in the developed. We still have to examine our results with certain reservations as the research also shows that the control group had the best learning input and output results, and proportion wise this group had the fewest children with movement disorders (5 ps.).

In the next hypothesis (**H5**), we assumed the MABC-2 Checklist is in accordance with the Basic Therapy/INPP's movement checking tasks, this is also *proven*. The discriminant-analysis Wilks' Lambda result's significance level shows that there is no difference between the two variables (MABC-2 Checklist's results- movement test results) in the aspect of discriminant, so the results of MABC-2 Checklist and the categories of movement tests performed by them are in accordance with each other. So the children whom we categorized as ones with movement difficulties on the basis of the tests, were categorised the same by the teachers according to the results of the MABC-2 Checklist's statements, this is also relevant in the case of the other two categories (no movement difficulties, endangered). All in all the sample based on the MABC-2 Checklist's task list can be stated well categorized in 81,2%, according to the movement tests.



Our **H6** hypothesis, in which we wanted to show the matters of ADHD in a wider perspective is the following: „The movement and learning skills of children with ADHD are underdeveloped than expected for their age”. It has been proven by the results of the research that the group with ADHD symptoms had the most moderate learning skills in percentage, compared with the results of the whole sample, the ones with movement difficulties, ones with infantile reflexes, but they aren't the most underdeveloped group in the case of movement problems (they are in the average in that case). There are only 7 in the ADHD group (out of 19) who were categorized with movement difficulties by the MABC-2 Checklist. This also shows that even though they have some movement problems, these are not as specific about them as the underperformance in learning skills. So this hypothesis *is only partly proven*. The last hypothesis (**H7**), which says that the existing pre,- peri,- and postnatal harms are more often in groups with movement difficulties than in ones with good movement skills *wasn't proven*, as out of 32 who were underdeveloped in movement skills, were only few who had such a problem. What is more, the surveys came back from the parents partly completed. So proving the hypothesis became impossible and pointless.

## **SUMMARY AND SETTING OUT FOLLOWING RESEARCH DIRECTIONS**

In the examination of school maturity besides psychological, cognitive and social skills, the status of movement is more thoroughly emphasized (Szerencsés, 2015), this is very pleasing, because as a result of our research – which was carried out in a small sample, but with children whose skills develop normally- we can say that phenomena of school readiness is more closely related to movement skill differences than to learning skills. The senior kindergarten pupils' movement development in the research was often behind the expected, and they had movement disorders.

Taking all these into account we think that checking and testing movement status and applying movement development programs in public education are important. INPP® reflex correction method can be good for this as it is time-saving and doesn't require a lot of equipment.

On the basis of the school readiness tests we think that the cause of the lack of movement checking is that there is no such movement skill test with which we can get reliable results, with little time, and without being an expert. In our view MABC-2 Checklist could be a great help

and support for teachers and pedagogical workers and experts to detect movement skill differences and disorders.

It would be worth discussing in the future that instead of turning the children into “school-prepared”, schools into “child-prepared”. It is important to think about what schools can do in order to help students who are not mature for school, but are in school mandatory age. What kind of solution can public education system offer to improve movement skills of children who start school when they are still immature for it. Is it possible to change the structure of education so that these aspects can come forward? Can such a movement developing method be introduced to school system with which this goal can be achieved? Is there a chance that these ideas become compulsory in public education?

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