

Comparison of Locomotor Movement Skills in 8-9 Years Old Children Coming from Two Areas of Thessaloniki with Contrasting Socioeconomic Status

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ABSTRACT— *The purpose of the present study was to examine the movement skills of 100 elementary school children, aged 8 and 9, coming from two socially and financially distinctive areas of Thessaloniki. The children's mobility performance was assessed using the Test of Gross Motor Development (TGMD) developed by Ulrich, which evaluates six different locomotor skills. The children's performances were compared in relation to the area they inhabit, the educational background of their parents and their participation in sport clubs. The statistical analysis of the data was carried out using a t-test and an analysis of variance (one-way Anova). It was found that there are statistically significant differences in the scores of children on the basis of their school of origin, while no statistically significant differences were observed concerning children's participation in sport clubs. Furthermore it has been found that there is a relation between the mobility performance of the children and their maternal educational background and none with their father's educational background. The mobility performance scores of children originating from the less privileged socially and financially area, were higher thus leading us to assume that a free physical activity of ludic nature provides richer motor experiences than an organized athletic activity.*

Keywords- movement skills, different socio-economic areas, Ulrich (TGMD)

1. INTRODUCTION

A fundamental movement skill (FMS) is an organized series of basic movements that involve the combination of movement patterns of two or more body segments. FMS may be categorized as locomotor, stability or manipulative movements (Gallahue, 2002). Their acquisition, along with the development of kinetic control, ensures the accuracy and the efficiency of some basic and some specialized movements (Gallahue, 2002). These specific skills are developed when children are in a young age and through a wide variety of games, dances and recreational activities. These activities allow children to interact, explore their environment and get acquainted with a variety of skills (Buschner, 1994; Belka, 2004). The period between two and seven-eight years old (fundamental movement phase) is considered the ideal time for the development and acquisition of the FMS control by the child. This will allow the child to discover his/her environment in relation to his/her body movement and use the movement as a means of acquiring knowledge and approaching new kinetic experiences (Graham, 1987; Belka, 2004; Pappa, 2005; Thomas, Lee, & Thomas, 1988; Gallahue & Ozmun, 1998; Chatzipanteli A. et al, 2005; Mandigo, Francis, Lodewyk, 2007). These skills are considered to develop in a continuum and steadily progress from an initial to a fundamental and, finally, to a mature stage, according to Gallahue's division (Mandigo, Francis, Lodewyk, 2007).

The development and consolidation of FMS in school through the subject of physical education foster children's participation in sports and in after school physical activities. It has been pointed out repeatedly that the fundamental motor skills learned at a young age lay the foundations of future involvement in physical activities or sports, which promote a healthy lifestyle and improve health and quality of life as far as their adult age (Hardy, et. al., 2009; Lubans, et. al., 2010). It is a common belief that fundamental movement skills and recreational physical activity are

associated with childhood (Fulton, et. al., 2001; Okely, et. al. 2001, Booth & Patterson, 2001; McKenzie, et. al., 2002; Fisher, et al., 2005).

The acquisition of FMS depends on multiple internal and external factors (biological, psychological, social, motor, cognitive). Environmental factors, opportunities to participate in physical activities, encouragement and teaching are considered the most important factors, as these enable the children to transit from the initial to the mature stage of mastering movement skills (Gallahue, & Ozmun, 2002; Hardy, et. al., 2009).

Moreover, Ulrich (2004) highlighted a significant correlation between the movement ability of parents and the participation of children 5-10 years old in organized sports activities (Tsapakidou, et.al., 2013).

Furthermore, social factors appear to have an important influence on the acquisition of the examined skills. Notably parent's socioeconomic status (Gustafson & Rhodes, 2006; McPhillips & Jordan-Black, 2007), the standard of living in their area of residence, changes in their education environment, differences in origin (Lejarraga et. al., 2002, Gustafson & Rhodes, 2006) and other environment-related factors can have an effect and subsequently single a child out for his (over- or underdeveloped) skills comparing to his/her peers (Graf et. al., 2004, Khatzistefanou 2006; Greier, et. al., 2013).

It has been found that a high socioeconomic status is more related to the girls' than the boys' performance when dealing with primary school pupils (8-12 years old). (Booth, et. al., 1999; Booth, et. al., 2004; Hardy, et. al.2009).

Parents of higher education level seem to be better informed concerning the benefits of sports and physical activity and tend to encourage their children to take part in sporting activities (Kimm, et. al., 2002). Moreover, a number of other studies have also reported a positive correlation between the parents' level of education (and not their income) with the promotion of a healthy lifestyle for their children (Crawford, et. al., 1995; McNutt, et. al., 1997; Kimm, et. al., 2002; van der Horst, et. al., 2006)

Thus, it is becoming obvious how significant FMS are for children's' motor development and to what extent environmental factors affect their development. This study focuses on the analysis of the environmental factors and their relation to the locomotor movement skills. The purpose of the present study was to compare how children of age 8 to 9 performed in basic locomotor movement skills (running, galloping, hopping, jumping, leaping and sliding) in relation to the socioeconomic status of the area they reside in, their parents' level of education as well as their participation in after-school activities.

2. METHOD AND PROCEDURE

2.1 Sample

The sample consisted of 100 pupils aged 8 and 9, from which 54 were boys and 46 were girls. Children came from two clearly different public elementary schools of Thessaloniki. Those particular schools were selected with the aim to compare two contrasting in terms of social and financial background areas. The majority of the participants in the low socioeconomic status area originate from Roma families. These families do not follow the nomadic lifestyle of many Roma people; they are permanent residents and have been integrated in the social life of the area. Thus, the differences observed in comparison with children representing areas of high social and financial status fell into the categories of social, financial and environmental factors. The target group was selected in the age of 8 and 9 because at this age children have efficient movement control and perception and the FMS have already been taught to them (Malina, 1991).

2.2 Procedure

The examination was conducted in a suitably arranged space of the yard of each school and the field measurements were carried out by the researchers in person.

2.3 Assessment Tool

For the assessment of children's motor skills Ulrich's Test of Gross Motor Development-Second Edition (TGMD-2, 2000) was used. This test was an assessment tool that measured the gross motor development of children between 3 and 10 years old. It was conducted individually and required children to perform twelve FMS in a specific manner, establishing for each skill three, four or five performance criteria. The maximum time allotment for the test ranged from 15 to 20 minutes and the examination was carried out individually for each child or in some cases, in small groups of two or three.

Each skill was performed twice by each child and in each trial the children were assessed by the examiner who either marked (1) when the skill was performed correctly or marked (0) for each criterion that was not performed correctly or was not performed at all. The total scores of locomotor skills in both trials were summed up and the values were then interpreted based on standard norms, which define the level of children's gross motor development.

2.4 Validity and reliability of the test

The validity and reliability of the test have long been established and they have been used in a large number of studies concerning both standard population children and disabled children (Simons, et. al., 2008; Houven, et. al., 2010; Sun, et. al., 2011). The validity and reliability of the test has been confirmed in Greece by a major study conducted by Evaggelinou, Tsigilis and Papa (2002), which involved 644 children.

The reliability coefficient between different measurements was 0.96 for the subtest of locomotor skills.

2.5 Description of the Test

The test was composed of two subcategories: a) locomotor skills and b) manipulation skills. In this study we chose to assess the locomotor skills which included 6 particular trials: 15m running, 10m galloping, 5m hopping, 10m leaping, horizontal jump, 10m sliding.

2.6 Statistical Analysis

For the statistical analysis of the results we used the software package SPSS 19. We applied a t-test for independent samples to detect any statistical differences concerning the locomotor movement skills children of the two schools, as well as for the quantitative analysis of the locomotor skills in relation to gender and to the children's after-school participation in sports clubs.

Moreover we carried out an analysis of variance (Anova) for the process of data concerning the association of locomotor movement skills with the parents' level of education.

The significance level was set to $p=0.05$ in the conducted statistical analyses.

3 RESULTS

Concerning the parents' level of education and sports activity:

Children coming from the first school with higher socioeconomic status differed significantly from their peers in the second school concerning their paternal education level, $t= 7.8$, $df = 98$ and $p=0.000<0.005$. The fathers of the first school had in their majority (62%) attended tertiary education institutions, while the fathers of the second had in their majority (72%) secondary education studies. Specifically, as it can be seen in Table 1, the first school (school A) has children from families with higher socioeconomic status, while the second school (school B) hosts children of lower status.

Table 1: Fathers' Level of Education in each school

	Primary Education	Secondary Education	Tertiary Education
School A	0	38%	62%
School B	22%	72%	6%

Similarly statistically significant differences were observed concerning the education level of the children's mothers ($t= 7.2$, $df = 98$ and $p= 0.000<0.005$). The mothers of school A had a high percentage of tertiary education studies (42%) while none of the mothers of school B attended a tertiary education institution (Table 2).

Table 2: Mothers' Level of Education in each school

	Primary Education	Secondary Education	Tertiary Education
School A	0	58%	42%
School B	26%	74%	0

The two groups of children had statistically significant differences concerning their participation in sport clubs, $t=-4.87$, $df=98$ and $p=0.000<0.005$. Children coming from school A participated in sport associations at a percentage of 76% (38 children), while a mere 32% (16 children) of the school B children were members of a sports club (Chart 1).

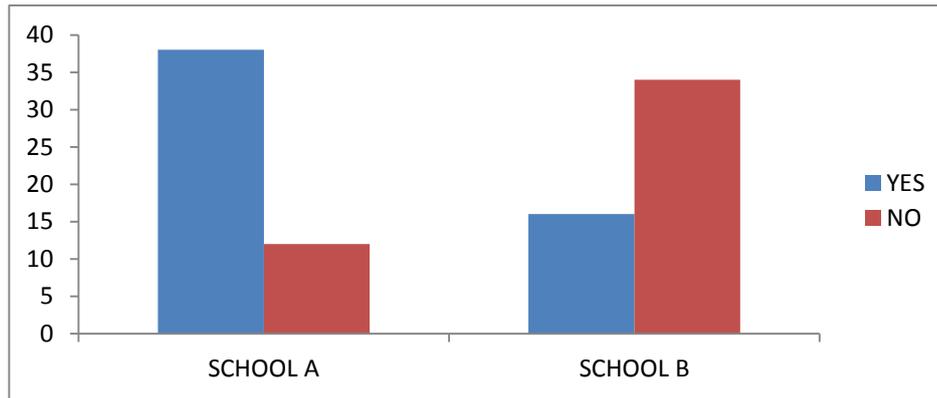


Figure 1: Children's participation in sports clubs in each area

Comparison of locomotor movement skills:

The results follow a normal distribution, thus we applied independent sample t – test parametric control so as to establish the differences of the two groups regarding their locomotor movement skills. The results show that there is statistically significant difference between the two schools, $t=-5.723$, $df=98$ and $p= 0.000<0.005$. The means and the standard deviations in the children's scores for each school are shown in table 3.

Table 3: Means and standard deviations in the children's scores for each school
Motor skill performance

School attendance	Means	Standard Deviation
School A	14.38	38%
School B	16.36	72%

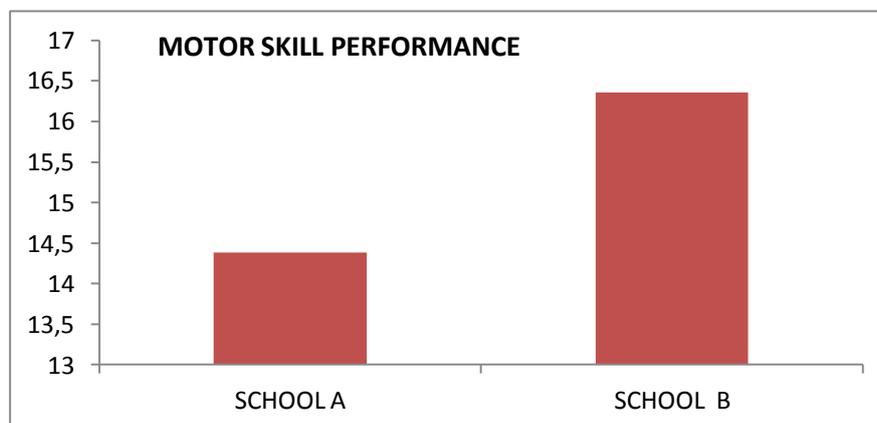


Figure 2: Differences of the two groups concerning their motor skill performance

No statistically significant differences were found in the children's performance regarding their paternal education level according to the analysis of variance (ANOVA) since its outcome was $p= 0.031>0.005$, while statistically significant differences were found in the children's performance regarding their maternal level of education, $p=0.001<0.005$.

No statistically significant differences were found in the children's scores between boys and girls, $t=-0.602$, $df=98$ and $p=0.549>0.005$. Furthermore, no statistically significant differences were found in the children's scores between those who participate in sports clubs and those who do not, $t=-0.75$, $df=98$ and $p=0.45>0.005$.

4. DISCUSSION -CONCLUSION

In this study we tried to assess the locomotor movement skills of children aged 8-9, choosing our sample from two areas of the same municipality but with dissimilar socioeconomic status. The results have shown significant differences between the two schools concerning the parents' education level. Moreover, children studying in the school from a more enhanced environment participated in more after-school sports clubs.

According to the findings of Koutedakis and Bouziotas (2003), children participating in organized after-school physical activities achieve better scores in movement skills compared to the children abstaining from such activities. In our study, however, children of the school with higher percentage of involvement in after-school sporting clubs did not achieve better scores compared to the children who did not participate in organized physical activities of any kind. A possible explanation lies in the fact that the children who do not take part in organized sports clubs get involved in after-school fun activities such as free outdoor play in their neighborhood. This assumption can be backed by the findings of Cleland & Gallahue in their 1993 study, according to which experiences from after school activities are highly important for the motor development of a child. The same opinion concerning the benefits of free after-school play and its positive contribution in the development of movement skills is also confirmed by Brockman (et. al., 2011). In a research conducted by Trost (et. al., 1997), it was found that indeed an efficient way of increasing young people's physical activity is their involvement in activities of their local society which also has the advantage of easy access (Trost, et. al., 2008; Beets, et. al., 2009; Merriman, 1993; Ward & Bar-Or, 1986; Fjortoft, 2004). After-school physical activity assists not only movement skills but also the overall physical fitness (Cleland, et. al., 2008).

The results of this research showed that children's performance is not influenced by their paternal education level, while influenced by their maternal level of education, maybe due to the fact that mothers tend to spend more time with their kids, especially when they are in a younger age (Williams, et. al., 2000; Venetsanou & Kampas, 2010; Tsapakidou, et. al., 2013). A positive correlation with the parents' level of education has been recorded in many studies (McNutt, et. al., 1996; Crawford, et. al., 1995; Gustafson, Rhodes, 2006). Higher socioeconomic status has been found in greater correlation with the girls rather than with the boys in kindergarten and elementary school population (4-6 years old and 8-12 years old respectively) (Booth, 1999; Booth, et. al., 2004).

According to Cleland and Gallahue, (1993), parents of young children should guide and encourage them, in an effort to provide their children a wide range of movement opportunities which can contribute to the development and promote the acquisition of movement skills (Tsapakidou, et. al., 2013). However, in another study it has been observed that the parents' instigation to their children to be physically active did not have the desired results (Sallis, et. al., 1992; Gustafson, Rhodes, 2006). An interesting finding according to our demographic elements was that children, whose parents acquire a higher educational level and financial status, are under more pressure to commit themselves to long hours of studying (foreign languages, computer etc.) and therefore have less free time and feel more tired, factors which adversely affect their involvement in physical activities, other than their routine training in a sports club. On the contrary, the children whose parents' socioeconomic and educational status is low, their struggle for survival and the lack of stimulation by their family environment adversely affect their participation in organised sporting activities leading the children to devise other ways to play and develop their movement skills. These children spend more time playing than studying their homework (Duncan, et. al., 1994; Goodway & Branta, 2003; Chatzistefanou, 2006). The majority of the sample population coming from the low socioeconomic status school, for the most Roma children, follow this findings. Our results contradict the findings of Chatzistefanou (2006) and those of Marmeleira, & Abreu (2007), Semoglou (et. al., 2008), which pointed out that the Roma children have lower levels of motor development as opposed to the local ones. The divergent outcome of our study may be attributed to the fact that Roma children of our sample do not come from nomadic Roma families. In reality, this fact gives these children an advantage in that they have a permanent residence, hence are more likely to be successfully integrated into society, to spend a lot of their free time playing in the streets of their neighborhood. Thus, despite the fact that they lack opportunities to participate in organized sports activities, they score higher in their motor skills.

In conclusion, this research highlights the key role that play should have in every child's life. This study marks the importance of child's inalienable right to enjoy many hours of daily free play, regardless of its nationality, its gender, and the socioeconomic status of its family, as play constitutes an important activity during childhood and is of vital and substantial significance for his/her overall development.

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