SPECIAL ISSUE
Dalcroze Eurhythmics in music therapy and special music education

Article

Dalcroze Eurhythmics in therapy for children with Attention Deficit Hyperactivity Disorder (ADHD) symptoms

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ABSTRACT

This article discusses the application of Dalcroze Eurhythmics in work with children with Attention Deficit Hyperactivity Disorder (ADHD) symptoms. It comprises selected results of a doctoral study on the use of Eurhythmics with six-year-old children with ADHD symptoms, concerning mainly motor activity control and cognitive processes, for instance attention deficit. Quantitative methods were used to collect and analyse the data. The results show that participation in Dalcroze Eurhythmics increased the children's ability to control motor activity or concentrate attention and lessened the tendency to distraction. The implication of this study is that music and its elements have values which are not only musical but, above all, educational and that they influence motoric, cognitive and social development of children both with and without disabilities.

KEYWORDS

Dalcroze Eurhythmics, ADHD symptoms, education and therapy of children

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INTRODUCTION

Émile Jaques-Dalcroze's (1865-1950) Eurhythmics is an integrated system of education through art, focusing on music in particular. The Dalcroze method comprises a very wide range of teaching and learning activities aimed at developing musical understanding – the sensitisation to musical structure, character and the elements of musical works – through bodily movement, incited and supported by music itself, most often improvised by the teacher (Bachmann 2002). A major advantage of the method is its integrity and integrality.

In this case, integrity refers to the inner cohesion of the method itself. Dalcroze Eurhythmics should be understood both in the context of the arts related to it (mainly dance and theatre) and in the context of methodological principles and applied tasks (multilayered and multi-aim), engaging both the mind and the body, activating all the senses and allowing for the simultaneous experience of music and enhancement of all developmental spheres (Bogdanowicz & Durlow 2010). The integrity of Eurhythmics can be also observed in the context of its relationship to psychology, for example to Jean Piaget's concept of cognitive development

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(Bachmann 2002). This mostly concerns the cohesion of accommodation and assimilation processes owing to which human beings are able to adapt through the acquisition of new perceptual, motoric or notional contents and through associating them with what they already know or have already experienced (Bachmann 2002; Birch & Malim 1998; Wadsworth 1998).

On the other hand, integrality refers to the holistic approach to child development, including education and character formation, which is a feature of the method. Due to the integrated use of music, movement and personal experience, Eurhythmics may have a strong and positive influence on the child's behaviour. Therefore, to investigate such claims, this study aims to quantitatively confirm the effectiveness of the Dalcroze method both in education and therapy, and specify the exact range of its possible impact. Unfortunately, despite the clear promise of Eurhythmics and its variety of applications, there is, to my knowledge, no research which confirms its effectiveness in the case of children at various ages or in therapeutic activities. Habron (2014) mentions the studies on the use of the Dalcroze method for adults with HIV/AIDS (Frego 1995). In addition, there are well-known studies on the use of Eurhythmics for seniors, conducted at the Institut Jaques-Dalcroze in Geneva, Switzerland (Gschwind et al. 2010; Kressig et al. 2005; Trombetti et al. 2011).

Based on the results of a doctoral dissertation concerning the effects of Dalcroze Eurhythmics activities on six-year-old children manifesting symptoms of psychomotor hyperactivity, this article summarises Bogdanowicz (2015), *Rytmika Emila Jaques-Dalcroze'a w edukacji i terapii dzieci z symptomami nadpobudliwości psychoruchowej [Emile Jaques-Dalcroze's Eurhythmics in the Education and Therapy of Children with Some Symptoms of Psychomotor Hyperactivity]*, translating the findings into English for the first time.

PSYCHOMOTOR HYPERACTIVITY

Over recent years, our knowledge concerning ADHD (Attention Deficit Hyperactivity Disorder), one of the most frequent behaviour disorders, has developed a great deal.[1] What is known today is that the problems of children with symptoms of psychomotor hyperactivity (called 'learning difficulties' in the past) do not result from educational misconduct, but frequently originate from substantial disorders of a neurobiological, genetic and/or environmental nature. What has undoubtedly been disconfirmed today is treating this disorder as a result of educational misconduct at home or outside it. It is now accepted that diagnosing ADHD requires time and a broad and multifaceted view of the child's behaviour. According to Barkley (2009), many children have the congenital form of this disorder. Barkley emphasises that ADHD is a real developmental disorder consisting of many factors, for example the onset of symptoms in the child's early development, occurrence in many different situations and its influence on the child's abilities to handle the challenges typical of particular developmental stages.

Psychomotor hyperactivity has been included in two international medical classifications:

- Attention Deficit Hyperactivity Disorder (ADHD) – according to the DSM-IV TR classification of the American Psychiatric Association, which functioned until May 2013, and the current DSM-5 classification (APA 2013; Wciórka 2008).
- Hyperkinetic Disorder – according to the International Classification of Diseases and Related Health Problems ICD-10 (Pużyński & Wciórka 2000).

The characteristic symptoms of psychomotor hyperactivity are problems with the functioning of attention, hyperactivity and impulsiveness (Borkowska 2008a, 2008b; Cooper & Ideus 2001; Hallowell & Ratey 2004; Kołakowski et al. 2007; Pfiffner 2004; Poland 2001). Researchers seem to agree that the main problem for the majority of children with this disorder is disturbed inhibition of their behaviour (Barkley 2009; Borkowska 2007, 2008a, 2008b, 2011; Kołakowski et al. 2007). According to Barkley (2009), this is a developmental disorder of self-control and self-regulation, associated not only with attentional focus problems and hyperactivity, but also with the inability to manage oneself within the requirements resulting from social norms.

[1] ADHD is one of the most frequent behaviour disorders, although the presented data on its occurrence in the case of children seem to be largely divergent – between 3-7, 9,15 % (Barkley 2009; Kołakowski et al. 2007; Lipowska & Buliński 2008).

Without doubt, the problem of hyperactivity concerns children as young as the pre-school stage, but detecting certain signs of ADHD is possible even in the case of two to three-year-olds.[2] However, diagnosing ADHD at pre-school age is difficult due to it being a period of ongoing developmental changes and to the natural motoric and emotional activity at this age (Barkley 2009; Kołakowski et al. 2007).

In Poland, ADHD diagnosis is usually made no earlier than the age of seven (in compliance with ICD-10), in some particular situations at the age of six. With growing frequency, specialists refer to the DSM IV TR classification, currently DSM-5. Yet they seem to be cautious in examining pre-school children with regard to ADHD and tend to recommend observation of these children and their behaviour. Moreover, the expression 'a hyperactive child' is more often used in reference to the child at pre-school age than the ADHD diagnosis might suggest (Kołakowski et al. 2007; Wolańczyk et al. 1999). However, what cannot be ignored are the signals from kindergarten teachers and parents who draw attention to intensified motoric activity or attentional problems of some children. The latter become particularly visible in the period when the number of complex tasks increases, requiring the right functioning of attention and staying in one place for a longer period. Among other things, children with this disorder or in the at-risk group have problems with focusing on one activity (they start a new one without finishing the previous), obeying rules and instructions or with remembering (Kołakowski et al. 2007). They are also susceptible to attentional distraction.

Despite the lack of complete diagnosis, it is recommended to undertake corrective exercises with such children as soon as possible. Specialists (Barkley 2009; Kołakowski et al. 2007) agree that it is necessary to apply multifaceted, multidirectional support and facilitation of these children's development, taking into account their needs, potentialities and deficits in particular developmental spheres. What they also stress is that in the therapy of hyperactive children all methods which engage motoric capabilities should be applied because they allow children to fulfil the need of movement in a controlled and – what requires highlighting – socially approved way (Kajka & Szymona 2014: 45). Thus, corrective exercises should comprise such fields as sight, hearing, development of speech and reasoning, gross and fine motor skills, and spatial orientation (Franczyk & Krajewska 2006). It is precisely these areas of work that are the focus of Dalcroze Eurhythmics classes for children, because in this setting children move in space, using all their limbs (in locomotor or non-locomotor movements), listen for musical cues and respond appropriately, watch each other or the teacher, mirror or devise gestures, sing and vocalise, and pick up and control materials (such as hoops, balls and scarves) to make creative responses to music. This suggests that the Dalcroze method might be ideally suited to meet the needs of children with ADHD symptoms.

POSSIBILITIES OF APPLYING DALCROZE EURHYTHMICS IN THE CASE OF CHILDREN WITH PSYCHOMOTOR HYPERACTIVITY

According to Borkowska (2008b), children with an ADHD diagnosis present diversified deficits of behaviour control. What is typical of their behaviour, apart from hyperactivity, lack of attention and impulsiveness, is the co-occurrence of many problems in mental functioning. Even though the author's studies were carried out among school learners, these issues are also worthy of attention in the case of children with symptoms of psychomotor hyperactivity at pre-school age. It seems quite likely that some of these problems can be corrected or addressed during Dalcroze Eurhythmics classes, which the results of the undertaken experiment can confirm. The relationship between the mental problems of ADHD children introduced by Borkowska (2008b) and the therapeutic potentialities of Dalcroze Eurhythmics are presented in Table 1.[3]

[2] Some American studies state that children who already at the age of two to three years have problems with hyperactivity, at least in 50% of cases, are at the risk of ADHD diagnosis in later life or are in the at-risk group (Barkley 2009). Some observations have been also conducted with children aged four-and-a-half to six to detect the occurrence of intensive symptoms of ADHD and aggressiveness. Those children who qualified to the next stage of the research were evaluated by psychologists who noticed that 65% of the children met the criteria of an ADHD diagnosis (Barkley 2009: 125).

[3] All tables and figures originate from Bogdanowicz (2015).

Mental problems of children with ADHD	Aims of the Dalcroze-based intervention
deficits in motoric inhibition reaction to the STOP signal earlier induced by a stimulus, lower concentration on a task	developing the abilities to concentrate attention on instructions and details – the use of exercises developing fast and controllable psychomotor reactions (inhibition and incitation exercises) which are adjusted to the child's abilities (the length of the task, differentiation)
lower readiness to motoric reaction	shaping of motoric reactions to musical signals and elements – the use of inhibition and incitation exercises and exercises sensitising the children to rhythm, tempo, dynamics and articulation
deficits in attention stability	improving the attention functions – the use of diverse tasks engaging personal experience and adjusted to the child's abilities with the aim of stabilising attention
lower ability concerning the inhibition of automatic reactions and difficulties in initiating some intentional reactions	organising children's activities aimed at constructive actions – the use of exercises developing correct psychomotor reactions, visual and movement coordination and the skill of organising movement in space
deficits in attentional divisibility and operational memory	improving attention and memory (motoric and spatial) – the use of concentration exercises, developing movement coordination and the ability of simultaneous listening and reacting
susceptibility to distraction	lowering the susceptibility to distraction – the use of personal and creative experience
deficits in planning and control of motoric performance	developing the abilities to control motoric activities and predict behavioural consequences – the use of exercises developing correct psychomotor reactions and supporting performance in a group

Table 1: Selected problems in mental functioning of children with ADHD which can be corrected or addressed due to participation in Eurhythmics classes based on Jaques-Dalcroze's method

All activities in Eurhythmics-based classes enhance the organisation, improvement and control of psychomotor functions, including behaviour. Without doubt, the integral use of movement (which stems from the child's natural needs) *and music* (which, in Jaques-Dalcroze's method, organises the movement) offers an opportunity for enhancing attentional functions and leads to shaping self-control, such as the skills of holding on, listening and realising planned actions. What seems most significant is that this results in the simultaneous acquisition of the skills of collaboration and co-creation in a team (Brunner-Danuser 1984).

Self-control, naturally acquired in Eurhythmics classes, is currently one of the most difficult tasks for children of pre-school age. The problem does not concern only children with psychomotor hyperactivity symptoms or with an ADHD diagnosis. Today, more frequently than ever, children are exposed to an unlimited number of various (not always positive) stimuli. Therefore, there is the need for quietness, for shaping concentration skills and for reducing experiences related to technological advancement, gadgets and an overload of toys. What can be enhanced instead are the art-related impressions – sensing and experiencing art in all its forms. In the case of Eurhythmics, applying exercises in which movement is strictly associated with music and which require concentration skills or make use of the child's free activeness (Klöppel & Vliex 1995) enables them to fulfil the need for movement, providing better control of the child's own activity.

However, a question may be raised whether classes involving several simultaneous stimuli (music, the teacher's voice, the signal to which one should react) overburden children's nervous systems and, as a result, have a negative influence on them.[4] Although hyperactive children like movement-based classes very much, some tasks may intensify their hyperactivity, emotional stimulation or their lack of attentional control. In order to learn more about potential positive and negative influences, some experimental studies

[4] Studies showed that children with ADHD do not have problems with filtering information – they distinguish important contents from unimportant ones. The difference consists in the fact that they are unable to keep focused on a task for a longer period (Barkley 2009: 61).

were undertaken involving classes based on the Dalcroze method.

The aim of this quantitative study was to specify the effectiveness of the course based on Dalcroze Eurhythmics in enhancing the development of the motoric and cognitive sphere of six-year-old children from the 'ADHD risk group' and in improving their social functioning. This evaluation was made on the basis of an analysis of observable changes in the children's behaviour.

RESEARCH METHODOLOGY

The main research problem was specifying the dependence between the application of the course design based on Dalcroze Eurhythmics and the changes in the motoric, cognitive and emotional-social development of six-year-old children manifesting the symptoms of psychomotor hyperactivity. The detailed research problems were organised according to particular developmental spheres. It was anticipated that the children's participation in the Eurhythmics classes would considerably contribute to some positive changes in the following areas:

- development of the motoric sphere (problem I, hypothesis I) – the detailed problems concerned e.g. the control of motoric activity, the improved ability to control the body and increased precision of body movements;
- shaping the cognitive sphere (problem II, hypothesis II) – the detailed problems concerned e.g. the focus of attention, the improvement of the conscious and fast psychomotor reaction to given signals, the control of behaviour with regard to completing the activity undertaken;
- emotional-social development (problem III, hypothesis III) – the detailed problems concerned e.g. the children's functioning in a group, the ability to collaborate in a team, the conscious control of their own behaviour and improved emotional self-control.

In order to test these hypotheses, the method of pedagogical experiment was used with the application of the technique of simultaneous groups: experimental and control. The generally applied course of pre-school education (comprising also music and movement classes or music sensitisation classes) in kindergartens in the town of Cieszyn was enriched with a new factor – additional classes based on Dalcroze Eurhythmics. The comparison of both groups was the basis for evaluating the effectiveness of the new course. At the initial examination, the groups were equivalent as regards age, sex proportions, (urban) environment and the results of the simplified version of Conners Scale (only children with manifested symptoms of psychomotor hyperactivity were qualified to both groups). The variables and their indicators are presented in Table 2:

Variables		**Indicators** (the required behaviour features)
Independent	**Dependent**	
The author's course based on Dalcroze Eurhythmics	changes in the development of motoric sphere	- controlling motoric activity - refraining from purposeless running
	changes in the development of cognitive sphere	- ability to focus the attention on details - focusing the attention on commands and instructions - lesser susceptibility to distraction - not making mistakes resulting from carelessness - conscious and fast psychomotor reaction - completing the undertaken activity
	changes in the development of emotional-social sphere	- collaboration with the group - obeying the rules while playing - ability to predict the consequences of one's own behaviour - lesser emotional lability

Table 2: Independent variable, dependent variables and indicators

The following research tools were used in the studies:

- Conners Scale for Parents and Teachers (Wolańczyk et al. 1999) in the simplified version (Klöppel & Vliex 1995), used as a screening tool to select children with symptoms of psychomotor hyperactivity in order to establish the examined groups. The examined group (N = 61) was selected out of 210 six-year-olds;

- Scale of Psychomotor Hyperactivity Symptoms (Hebel & Bogdanowicz 2004), as well as the author's own tools prepared for the needs of the research and aimed entirely at the observation of the experimental group.[5]

The classes were conducted in integrated groups once a week for eight months, with each class lasting 30-40 minutes. The main topic of the course was *The Adventures of Winnie the Pooh and his Friends*, around which the music and movement activities were designed. The sessions were conducted by qualified Dalcroze Eurhythmics teachers, working alone: the author (five groups) and another teacher (two groups). Six-year-old children were observed, 31 in the experimental group and 30 in the control group.[6]

The course designed for the needs of the experiment and based on the main assumptions of the Dalcroze method takes into account the major aspects of the pre-school age child's psychomotor development as well as the behaviour qualities which are typical of children with symptoms of psychomotor hyperactivity and which can be corrected during classes conducted according to this method. Among other things the following should be mentioned: fulfilling the need for movement, shaping the lateralisation of motoric functions, facilitation of motoric coordination, stimulation of sight and hearing functions (development of perception), memory enhancement and facilitation of attention-related functions (mainly focus, support, divisibility and selectiveness), improvement of social functioning in the field of collaboration and communication, and the facilitation of the child's emotional development (handling difficult situations, the ability to take decisions, emotional control, and enhancing self-esteem).

"It should be remembered that there is no method which would reduce the level of mobility of a hyperactive child, his/her energy can be only managed or directed" (Kołakowski et al. 2007: 137). Klöppel and Vliex (1995) emphasise that in the case of these children applying simple, clear rules and a well-specified lesson structure is of crucial importance; this provides an opportunity for behaving in compliance with requirements that are adequate to the situation. Therefore, the suggested course assumed the most effective management of the excessive activeness of children with symptoms of psychomotor hyperactivity was to direct them towards constructive activities so that they could better control and modify their (especially socially unacceptable) behaviour.[7]

Measurement was carried out in both groups in the initial and final stages of the experiment with the application of the same scale (Hebel & Bogdanowicz 2004). Data analysis was based on the quantitative data, which were statistically processed with the use of SPSS Windows Version 14 (licence: University of Gdańsk). The applied statistical analysis was ANOVA Repeated Measures (Ferguson & Takane 2001) with the intergroup factor of the examined groups and the intragroup factor of the measurement at the pretest and retest stage.

RESULTS

This section presents variation analysis results of two observed qualities of behaviour selected from the whole experiment. These indicate how most of the examined qualities of children's behaviour were analysed. What will be focused on is summarising the analysis of the effects of the remaining behaviour qualities (with the use of Hebel & Bogdanowicz's Scale) on the basis of Fisher's z-correlation test and the overall effect of the conducted experiment based on Student t-test. [8]

Motor activity control assessed by Hebel and Bogdanowicz's Scale of Psychomotor Hyperactivity Symptoms

The judgement whether the child with the symptoms of psychomotor hyperactivity belongs to the ADHD risk group is difficult and should be done with regard to specific developmental qualities of the child at pre-school age, including emotional excitability and mobility. The natural need for movement and intensive motoric activity at pre-school age, which are adequate to the situation, are considered so-called normal behaviour. The intervention was aimed at appropriately directing the children's excessive motoric activeness towards socially accepted activities.

With the use of Hebel and Bogdanowicz's five-

[5] The relevance and reliability of Hebel and Bogdanowicz's Scale has been statistically verified in taxonomic Ward's cluster analysis with the use of Euclidean distances as distance measure between the positions (Hornowska 2001).

[6] Children's participation in the experiment took place after obtaining written, informed consent of their parents.

[7] A detailed description of the course implemented in the experimental studies can be found in Bogdanowicz (2015).

[8] For a broader discussion of all the results, see Bogdanowicz (2015).

grade scale (2004), the intensity degree of the occurrence of children's increased motor activity (always, nearly always, often, sometimes, never) was observed, taking into account intervention or an adult's help. The obtained results of the Scale concerning motor activity control were subjected to variation analysis. They are presented in Tables 3 and 4.

	Significance test	
	F(1;59)	*P*
Group	3.785	0.056[A]
Measurement	167.796	< 0.001***
Measurement*group	20.740	< 0.001***

Key: F(1;59) – Fisher-Snedecor F distribution
p – probability of type I error calculated for F distribution
*[A] p<0.10 (the tendency level); ***p<0.001*

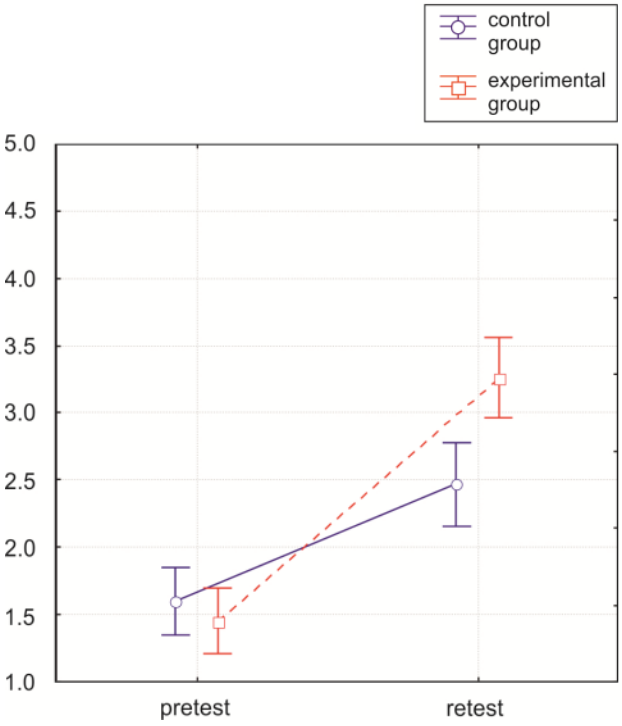
Table 3: Motor activity control according to Hebel and Bogdanowicz's Scale – variation analysis results

	Significance test	
	F(1;59)	*P*
Pretest	0.737	0.394
Retest	13.607	< 0.001***

Key: F(1;59) – Fisher-Snedecor F distribution
p – probability of type I error calculated for F distribution
****p<0.001.*

Table 4: Motor activity control according to Hebel and Bogdanowicz's Scale – the results of post-hoc comparisons in ANOVA model

With regard to the level of motor activity control, both groups (experimental and control) were equal at the pretest (F[1;59] = 0.737; p = 0.394). Statistically significant differences appeared at the final examination (F[1;59] = 13.607; p < 0.001). It should be emphasised that at the retest (control examination) both groups achieved positive effects (the results significantly higher than before the experiment), which means that after eight months – along with the growing age – children presented higher maturity in their psychomotor development. In spite of not introducing the Eurhythmics course, the change in the control group might have resulted from all the educational and correctional undertakings applied at home and in kindergarten as well as from biological maturing of the central nervous system. However, what is important in the context of the conducted experiment is the significant difference (at the retest) between the groups in favour of the experimental one. Thus, the positive changes turned out to be much bigger in the group in which the experimental course involving Eurhythmics had been implemented (significant difference, p < 0.001). The results comprised in the tables are illustrated in Figure 1. No significant difference between the groups can be noticed at the pretest and a substantially better result can be seen of the children's motor activity control in the experimental group at the retest. These changes may be associated with the participation of the experimental group in the additional Eurhythmics classes.



Key: The vertical bars indicate 0.95 confidence intervals
1.0 - 5.0 – the average level of the observed behaviour

Figure 1: Motor activity control – the results of Hebel and Bogdanowicz's Scale

Enhancement of the ability to focus attention assessed according to Hebel and Bogdanowicz's Scale of the Symptoms of Psychomotor Hyperactivity (2004)

Qualities of behaviour which were subjected to evaluation included the ability to focus attention on details during kindergarten activities of various types (e.g. manual work, listening, watching, manipulative and constructive games). This involved observing whether and to what extent the child needs encouragement or external help in fulfilling the task. These results resemble the results of the analysis concerning motor activity control. No significant difference was indicated between the groups at the beginning of the experiment ($F(1;59) = 0.404$; $p = 0.527$) and a statistically significant difference between the groups was confirmed after the completed experiment ($F(1;59) = 9.815$; $p = 0.003$) (Table 6).

Also noteworthy was the main effect of the measurement ($F(1;59) = 112.663$; $p < 0.001$). Both groups achieved significantly higher results after the experiment than before – as well as the effect of the examined group ($F(1;59) = 4.834$; $p = 0.032$) and the measurement–group interaction ($F(1;59) = 9.436$; $p = 0,003$) (Table 5).

	Significance test	
	F(1;59)	*P*
Group	4.834	0.032*
Measurement	112.663	< 0.001***
Measurement*group	9.436	0.003**

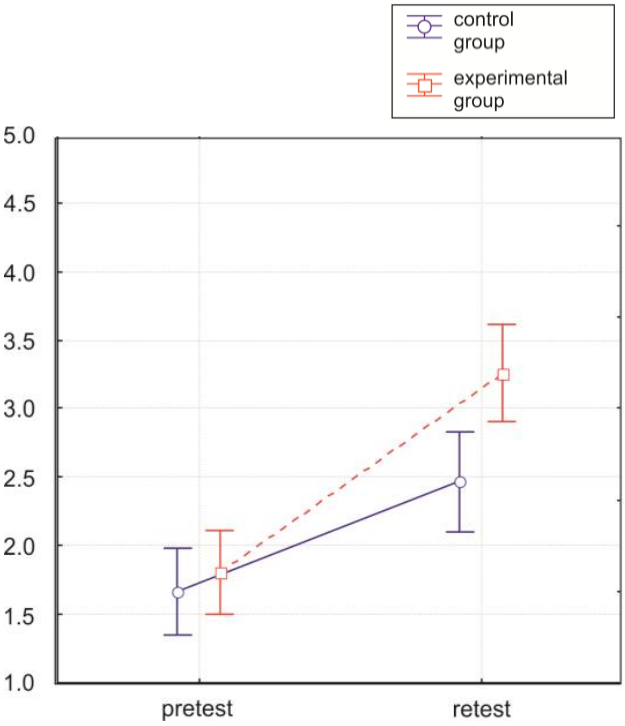
Key: F(1;59) – *Fisher-Snedecor F distribution*
p – *probability of type I error calculated for F distribution*
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 5: Ability to focus attention on details according to Hebel and Bogdanowicz's Scale – variation analysis results

	Significance test	
	F(1;59)	*P*
Pretest	0.404	0.527
Retest	9.815	0.003**

Key: F(1;59) – Fisher-Snedecor F distribution
p – *probability of type I error calculated for F distribution*
** $p < 0,01$

Table 6: Ability to focus attention on details according to Hebel and Bogdanowicz's Scale – the results of post-hoc comparisons in ANOVA model



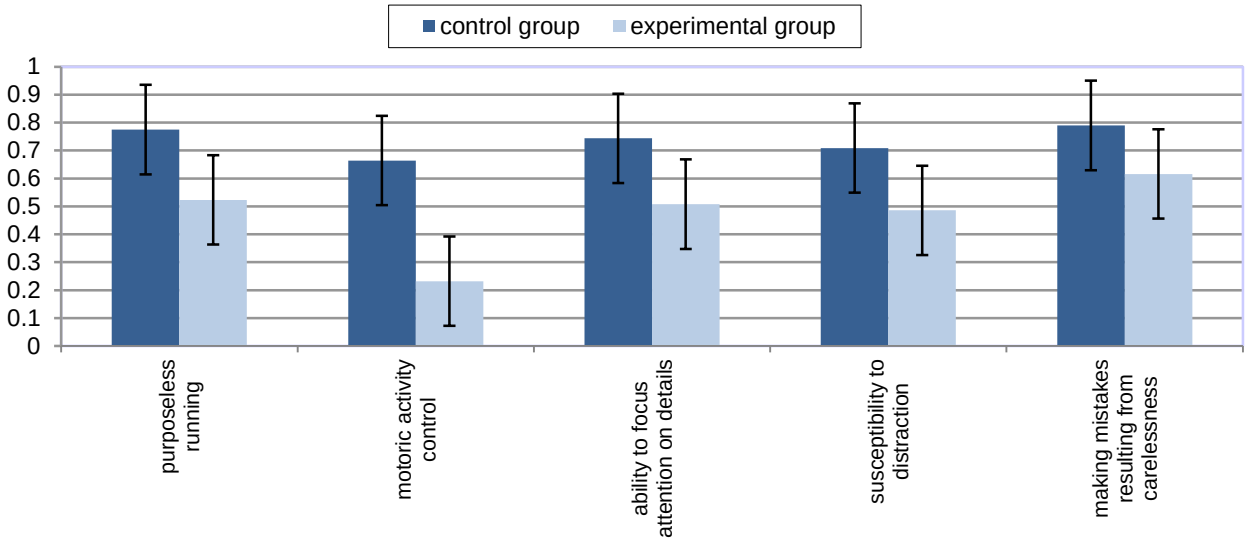
Key: The vertical bars indicate 0.95 confidence intervals
1.0 - 5.0 – the average level of the observed behaviour

Figure 2: Ability to focus attention on details – the results of Hebel and Bogdanowicz's Scale

What can be seen in Figure 2 is that the change which occurred in the experimental group is significantly higher than the change in the control group. The children from the experimental group who had previously showed inability to focus attention on details improved their performance. These changes can be associated with the participation of children from the experimental group in the additional Eurhythmics classes.

Comparing average pretest-retest correlations in both examined groups with the use of Fisher's z coefficient

Figure 3 comprises a presentation of the behaviours of which average correlations were analysed, showing statistically significant differences between the groups. Fisher's Z-test was used to compare the power of two correlations in independent samples (whether the dependency between the child's behaviour after the course and before the course is different in the control group from the behaviour in the experimental one) and it showed that only in a few evaluated behaviours the correlation between the pretest and the retest was significantly weaker in the experimental group than the control one. This means that in these cases the implemented course brought about the initially assumed positive effect in the experimental group (after the experiment the unwanted behaviour was weaker). This involves the following qualities: "purposeless running" and "motor activity control" as well as those in which the differences in correlations between the groups are visible at the level of tendency: "ability to focus attention on details", "making mistakes resulting from carelessness" and "susceptibility to distraction". This is likely the result of taking part in additional Eurhythmics classes during which the children had the possibility of organising their activeness and of fulfilling their strong need for movement.

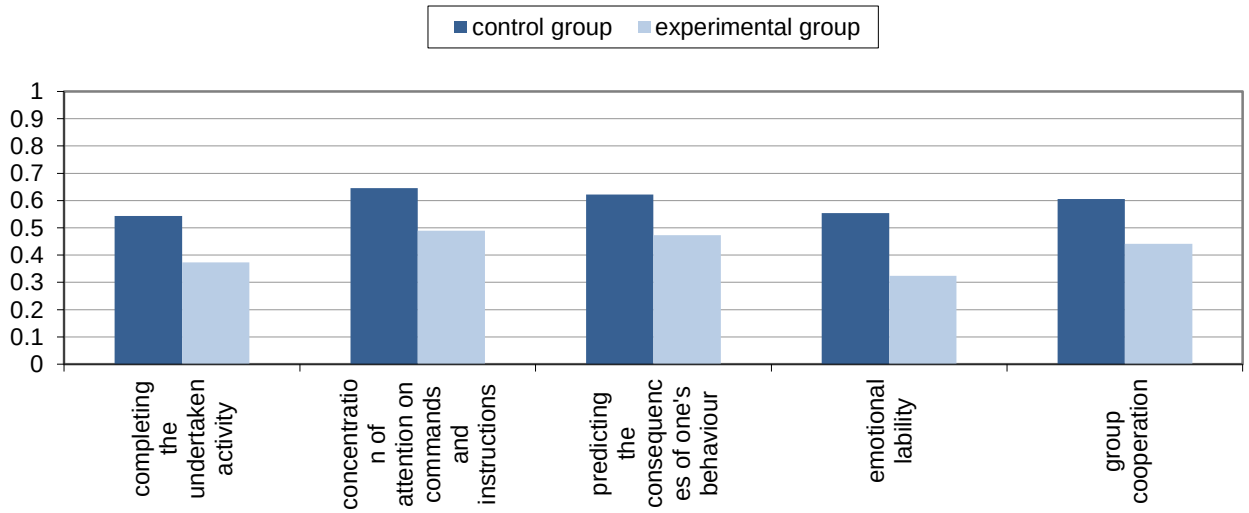


Key: Vertical bars depict 95% confidence intervals for the correlation coefficients. The diagram includes the data only for the scales of significantly different correlations in the compared groups.

Figure 3: Pretest-retest correlation in each group (according to Fisher's Z-test)

Due attention should also be drawn to distinct (though statistically insignificant) differences in correlations between the groups with regard to the other qualities of behaviour which were assessed. These concern some important aspects of the functioning of a child with psychomotor hyperactivity symptoms, such as: completing the undertaken activity, concentration of attention on commands and instructions, predicting the consequences of one's behaviour (especially important in group activities), group cooperation and emotional lability (Figure 4). The conducted variation analysis concerning the behaviour qualities mentioned in Figure 4 showed a significantly higher final result of the experimental group. However, the differences in average correlations based on Fisher's coefficient are trends which did not reach statistical significance.

Table 7 presents the results illustrated in Figure 3 and 4.



Key: The diagram includes results only for the scales of different but statistically insignificant correlations in the compared groups

Figure 4: Pretest-retest correlation in each group (according to Fisher's Z-test)

Behaviour subjected to measurement	Group		Significance test	
	control (*N* = 30)	experimental (*N* = 31)		
	r	*r*	*Z*	*p*
Purposeless running	0,775***	0,523**	1,661	0,048*
Motoric activity control	0,634***	0,232	1,897	0,029*
Ability to focus attention on details	0,744***	0,508**	1,481	0,069[a]
Making mistakes resulting from carelessness	0,790***	0,616***	1,308	0,095[a]
Susceptibility to distraction	0,709***	0,486**	1,314	0,094[a]
Completing the undertaken activity	0,543**	0,373*	0,803	0,211
Concentration of attention on commands and instructions	0,645***	0,489**	0,860	0,195
Predicting the consequences of one's behaviour	0,622***	0,473**	0,795	0,213
Emotional lability	0,554**	0,324[a]	1,068	0,143
Group cooperation	0,606***	0,441*	0,849	0,198

Key: N – sample size; r – Pearson's linear correlation coefficient; Z – Z test statistics of standard normal distribution; p – probability of type 1 error estimated for F test statistics;

[a] *p < 0.10 (level of statistical tendency). * p < 0.05; ** p < 0.01; *** p < 0.001.*

Table 7: Pretest-retest correlations in both examined groups (according to Z-Fisher test)

The conducted analysis supports a significant improvement in the behaviour of six-year-old children manifesting symptoms of psychomotor hyperactivity in the motoric and cognitive spheres.

DISCUSSION

The statistical analysis of the research results, carried out as a part of my doctoral dissertation, allows us to conclude that there is a relation between the participation of six-year-old children with symptoms of psychomotor hyperactivity in Dalcroze Eurhythmics classes and the improvement of some selected disturbed functions and unwanted behaviour of these children. Yet, conducting such an experiment is not easy, as in Poland there are no studies in this field which could indicate the direction and range of research activity. Although the authors who explore Dalcroze Eurhythmics suggest using it in many cases and provide important methodological guidelines to help in correcting the disturbed functions or behaviour, these instructions are founded on their – undeniably valuable – personal experience rather than scientific research. This situation necessitates treating the results of the conducted experiment as a starting point for further observation of the efficiency of Dalcroze Eurhythmics and its applications in education and therapy.

Such an analysis of behavioural problems and their correlation with the desired behaviour resulting from the participation in classes is not sufficiently precise and the formulated conclusions constitute only a suggestion for interpreting the obtained results. Fisher's Z-coefficient (Francuz & Mackiewicz 2005) is a conservative method recommended for comparing the power of correlation in large samples (N > 100). Still, this method has elicited some important, and the most evident, effects of the experiment and focused on those aspects of the impact of Dalcroze Eurhythmics which are associated both with the possibility of correcting unwanted behavioural qualities typical of psychomotor hyperactivity and with educational or therapeutic support.

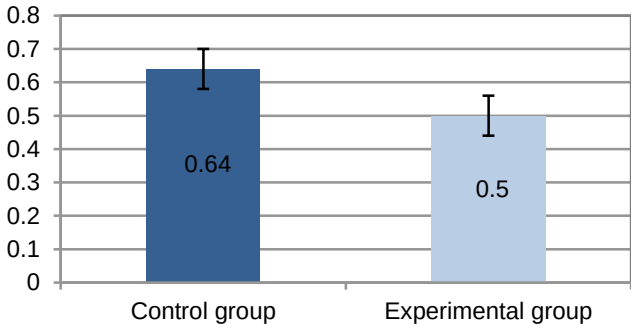
In order to illustrate the general effect of the conducted experiment, all behaviours were analysed simultaneously, which provided an overall image of the results. This aim was achieved by comparing the average correlations between the pretest and retest in the control and experimental groups by the application of Student's t-test (Ferguson & Takane 2001). This comparison showed that the average correlation in the control

group (r = 0.64) is significantly stronger than in the experimental group (r = 0.50) (t(19) = 4.82**). The result of this analysis is presented in Table 8 and Figure 5.

Group	Average correlation	Standard deviation	Significance test	
			t	*P*
Control	0.64	0.15	4.824	< 0.001***
Experimental	0.50	0.16		

Key: t – test statistics of Student's t-distribution;
p – probability of type I error calculated for t test statistics
**** p < 0.001.*

Table 8: Comparison of the results of average pretest-retest correlation in the groups (Student's t-test)



Key: Vertical bars depict 95% confidence intervals for average correlations.

Figure 5: Average pretest-retest correlation in the groups (Student's t- test)

Such an arrangement of results entitles us to suppose that the general assumption concerning the positive influence of classes based on Dalcroze Eurhythmics on the behaviour of children with symptoms of psychomotor hyperactivity is correct. After the experiment, the behaviour of children in the experimental group was significantly changed for the better, although the relation is moderate.

CONCLUSIONS

After the experiment, many questions have been raised which still remain unanswered. The use of the same tasks in a different place, with different children and by a different teacher (with a different approach to piano improvisation) may bring different results – both positive and negative.

What seems the greatest value of the Dalcroze method is the cohesion of its various aspects and the application of various exercises, which engage multisensory personal experience, and which take into account the harmonious development of the body and mind in all developmental spheres. In the experiments and tests in neuropsychological examination conducted by Borkowska (2008b) and dedicated to the processes of attention and reaction inhibition of school-age children with ADHD, "no data was obtained concerning single selected functions because each task required a complex structure of mental activity" (Borkowska 2008b: 298). This is similar to what takes place in Eurhythmics classes. Each exercise and task requires the integral involvement of different functions and is a personal, multisensory experience.

It is hard to unequivocally indicate the benefits resulting from the application of Eurhythmics because – in the area of pedagogical influences – it is difficult to obtain certainty that the achieved positive effects are triggered entirely by participation in classes conducted according to one method. In this situation, some attention ought to also be paid to the variety of other educational activities in which children engage at kindergarten and at home.

This study has indicated that taking part in Dalcroze Eurhythmics classes contributes to better functioning of children with symptoms of psychomotor hyperactivity. This occurs owing mainly to the tasks (fulfilled by children) which are of due significance for appropriate psychomotor development (the skills of organising one's own activity and facilitating particular perceptive-motoric and executive functions) as well as for the development of social competencies and emotional self-control. Still, this contribution takes place to the same extent as other educational influences observed in kindergarten.

The originator of Eurhythmics stated that "the child's intensive experiencing should be released and the intensive excitement of the spirit should be transformed into organised activities" (Jaques-Dalcroze 1945/81: 129, trans. Ewa Bogdanowicz). It is impossible to eliminate the reasons for inappropriate behaviour in children with symptoms of psychomotor hyperactivity but, owing to appropriate interventions, these children can become accepted and self-aware participants in games and classes in a social group (Klöppel & Vliex 1995).

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