INCREASING STUDENTS' ACTIVITY IN PE LESSONS THROUGH THE INTEGRATION OF DANCE

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Abstract

In the paper, a measurement of dance class activity is presented in physical education classes in 4th, 5th and 7th grades. The aim of the research was to identify at which ages and for which personality types of pupils dance could be a beneficial alternative. A further aim was to gather experience on the optimal placement of the accelerometer when measuring dance movement. Dance class activity was measured by an accelerometer, while the 'How do I behave?' self-report questionnaire was used to investigate personality types. Analyses were performed by grade, lesson content and personality type. The results showed that MVPA-values for physical education classes were balanced across grades but the average value of MVPA for dance classes decreased significantly with increasing age. The dance class activity levels of students with non-competitive personality were also higher than those of their older peers. Dance classes can provide an appropriate movement alternative for daily physical activity because dance education integrated into school physical education can impart movement skills that can be a lifelong form of movement for non-competitive personality types.

Keywords: dance in school physical education; alternative, non-competitive forms of movement

1. INTRODUCTION

Dance as a means of human expression has gradually lost its spontaneity. It is increasingly present in today's society is a learnt form. Dance has long been taught in schools as a subject in public education, but with the introduction of the NAT (National Core Curriculum), it first appeared as a classroom subject in the context of *Dance and Drama*. Acceptance of dance as a form of movement has been rather variable, with compulsory teaching always inducing more excellent resistance. It is not the task of this research to decide on the necessity of teaching dance, but we would like to show its place in physical education as a form of meeting everyday needs for movement.

1.1. Background to the introduction of daily physical education

From the 2012/13 school year, daily physical education was introduced in public schools based on Act CXC of 2011 on National Public Education. Of course, it was done in a progressive system, but it still posed a big challenge for schools. It was a problem both in staff and infrastructure to ensure that physical education classes could be fully implemented. To cope with the increased number of classes, the legal framework provided a temporary opportunity to include coaches or instructors (dance) in the physical education classes (Act CXC of 2011 on National Public Education, § 27 (11)), and to give a more significant role to colleagues teaching in lower school classes. Since then, institutions have struggled to provide venues for these lessons (Hamar, 2012; Rétsági, 2014; Csányi et al., 2014).

1.2. The place and potential of dance in everyday physical education

Some alternative sports activities have come to the foreground because of the above-mentioned problems. Based on the 2012 NAT, Hungarian framework curriculum recommendations have been published for each sport (NAT, 2012). Dance was also included in the framework of these recommendations, as the National Act on Public Education (Act CXC of 2011 on National Public Education, § 27 (13)) provided the possibility to replace physical education lessons. The Dance and Movement Framework Curricula (2012) has provided the framework for dance, specifically folk dance, in public schools, either integrated into physical education lessons or appeared as a separate lesson.

Dance movements are also included in the physical education curriculum in the 2012 and 2020 NAT curricula *(Table 1).*

On 1 September 2020, a new content regulation was introduced, in which folk dance is given priority in an ascending system in grades 1-12. *Physical Education and Health Promotion, Physical Education and Folk Games* will be introduced as new subjects in the Physical Education framework curricula (2020), with 32 hours per two grades, where folk dance is optional.

	Framework curricula	
	Physical Education and Sport (2012)	**Physical Education (2020)**
Grades 1-4	Natural movement forms in gymnastic exercises and children's dances	*Physical education and folk games (Folk dance optional)*
Grades 5-8	Sports in an alternative environment (dance)	Gymnastics-type exercises *Physical education and folk games (Folk dance optional)*
Grades 9-12	Gymnastic exercises and dance movements (folk dance)/ Health culture and prevention	Gymnastics-type exercises Rhythmic and aerobic exercises - optional *Physical education and folk games (Folk dance optional)*

Table 1. Dance-related movement forms in the 2012 and 2020 NAT-related curricula

The law allows for substituting two physical education lessons per week with alternative physical activities. Both lessons can be used for dance, but the involvement of a Basic Art Education Institution is required in this case. However, substituting one physical education lesson per week with dance can be done by employing a qualified dance teacher. The *Dance and Movement* Framework Curriculum for all grades (Dance and Movement Framework Curricula, 1-4; 5-8; 9-12, 2020), designed for 36 hours per year, provides the appropriate framework. The framework curriculum focuses on folk dance teaching because teaching folk dance can deepen Hungarian identity and positively influence the development of social relationships. The link between dance and music is clear, providing students with a musical experience while dancing. Dance develops a sense of rhythm, spatial awareness, posture, movement coordination, and basic skills, thus greatly facilitating other learning processes and impacting everyday life (Jakabné & Fügedi, 2004). Students who participate in folk dance classes, in addition to their conditional skills, which of course all sports develop, achieve better results in coordination skills than students trained in other sports in general (Bányai & Sólymos, 2001). Dance can develop several areas of competence. Thus, in the learning process, the areas of social, physical and mental health education, aesthetic-artistic

awareness and expression, self-awareness and social culture, citizenship and democracy education can be developed (Dance and Movement Framework Curricula, 1-4; 5-8; 9-12, 2020).

The curriculum includes the following thematic units:
- Foundations of the language of movement - Extending the knowledge of dance
- Improving a sense of rhythm
- Music and singing skills related to dance
- Spatialisation
- Folk games
- Knowledge of traditions
- Developing improvisation skills
- Learning and performing choreography
- Collective work on the dances learnt
- Organizing dance workshops and dance events

This suggests that learning dance can provide students with a wide range of knowledge and skills.

1.3. Personality types in the learning process

Contrary to what is generally accepted, not everyone likes to compete. Some research suggests that only 80% of preschool children choose to compete, which tends to decrease with age, influenced by the subject of the competition. Competition can have both positive and negative effects on task performance. It can be seen as an external pressure that can cause anxiety and stress in extreme cases. This significantly impairs the efficiency of movement learning in the initial phase (Csányi, 2020).

Different social cultures, norms and positions produce individuals with different personalities. Among personality traits, we considered success-oriented and failure-avoidant type traits. Atkinson (1964), in his motivational theory, drawing on the theories of Hoppe and David McClelland, found that people with success-oriented personality traits show the greatest achievement motivation in situations with uncertain outcomes because they are motivated by the prospect of achieving success. They mostly choose tasks of moderate difficulty in which they can perform well. Success-oriented people like to participate in competitive situations. In contrast, people with failure-prone personality traits either overcommit them-selves, i.e. set themselves an impossible task, or choose an easy task to ensure that they do not experience failure. They tend to avoid competitive situations and are reluctant to engage in them (Atkinson, 1964).

Of course, all people have failure-avoidant and success-oriented motivation, and the ratio of these motivations affects competition. Some people tolerate even a small amount of excitement poorly, and others are affected by arousal and their performance increases. Performance is therefore dependent on our current arousal level, our genetic endowment and our acquired experiences (N. Kollár & Szabó, 2004).

A competitive type of person can also have two kinds of behavior. Many people are not competitive in all situations but are usually competitive only in acute situations that affect their progress. They are typically better able to cooperate with their peers and even perceive defeat as an experience. This type is described in the literature

as a balanced competitor. The other group is the hypercompetitive type, who can only accept any situation with the ultimate victory. Therefore, they are rarely cooperative, and their social relationships are problematic. In sports, this means that balanced competitors can also prevail in team sports, while hyper-competitors can only dominate in individual sports (N. Kollár & Szabó, 2004).

Some research suggests that competition does not preclude cooperative interaction, contrary to what was accepted in the past. Competitiveness can be taught, i.e. people with a non-competitive personality, i.e. those who avoid competition, can be taught to compete in social situations healthily. In contrast, hyper-competitors, i.e. those who put only themselves first, can be taught to look out for others through social relationships. This is now entirely accepted further to the west, so it is worth approaching our perspective from the same angle. Competition can be classified as constructive if the competing parties are equal, destructive if they are not (Fülöp, 2000).

> The motives of success and failure are also related to different aspects of competition. Hypercompetition cannot be associated with either success-seeking or failure-avoidance based on our results. However, the *Achievement Motives Scale* (Lang & Fries, 2006) showed that as the level of self-improvement competition increased, the strength of the success-seeking motive increased, and the likelihood of the presence of failure decreased. Thus, the more a person is characterized by self-improvement competition, the more they are characterized by success orientation and the less by failure avoidance. Self-development competitors may have a high success orientation because they are motivated to achieve challenging goals through self-development and growth. Consequently, they may attribute their success to their abilities, which is a characteristic of success-oriented individuals (Gyömbér et al., 2012). A further finding is that the more likely a person is to be a failure-prone person, the higher the likelihood of competitive avoidance, and the lower the likelihood of success orientation is. These relationships were also observed for the subscales of competitive avoidance. Given that both failure avoidance and competition avoidance exhibit an averting, distancing tendency, it is not surprising that they are related. Those who avoid competitive situations because of their insecurity or because they are unmotivated do not set themselves goals that challenge them, because they do not enjoy overcoming challenges. (Fodor & Mihalik, 2017, p. 13)

1.4. Research using the accelerometer

The role of physical activity in the school physical education classroom is becoming increasingly valued and has a decisive impact on physical and mental development. Physical education classes aim to achieve goals in three areas: cognitive, affective and psychomotor (Csányi & Révész, 2015). Thus, its effectiveness can be judged by the results achieved in these three areas. One of the outcomes in the psychomotor domain is the level of physical education classroom activity.

The most effective measure of physical activity available in everyday life is the accelerometer, which can also measure physical activity in physical education

classes. The ActiGraph wGT3X-BT is commonly used to take these measurements. The ActiGraph wGT3X-BT (*Figure 1*) is a waterproof sensor device measuring 3.3x4.6x1.5 cm and weighing 19g.

Figure 1. ActiGraph wGT3X-BT, URL: https://s3.amazonaws.com/actigraphcorp.com/ wp-content/uploads/2018/02/15145811/activity_monitors_GT3XPlus.pngGJ2lHgGro-P06N3WNF14oOWel5KMaHNSSYWR4vwaf8phSmd_FRZ6-vk&usqp=CAU

The device can be worn on the ankle, waist, upper arm and wrist (*Figure 2*).

Figure 2. ActiGraph wGT3X-BT worn on the waist, URL: https://encrypted-tbn0.gstat-ic.com/images?q=tbn:ANd9GcSVJqJuL2UxwlMXmGJ2lHgGroP06N3WNF14oOW-el5KMaHNSSYWR4vwaf8phSmd_FRZ6-vk&usqp=CAU

The accelerometer gives the level of physical activity expressed as a % and is categorised as Sedentary, Light, Moderate, Vigorous, Very Vigorous. Physical activity is defined as a percentage of MVPA (Moderate to Vigorous Physical Activity, hereafter MVPA), obtained by dividing the minutes of moderate to vigorous physical activity by the time of measurement. The accelerometer measures: activity duration, frequency, intensity, step count, step frequency, velocity change, movement type classification, body position, energy expenditure, displacement along three axes: x, y, z, axis. When setting up the meter, the user can set epoch values (density of data recording, from 1 to 60 sec); cut-points (which give low, medium and high activity scores according to age); positioning (ankle, hip, upper arm, wrist).

Accelerometers have been used in studies across all age groups (Dencker & Andersen, 2008; Csányi, Uvacsek, Gergely, Tihanyiné Hős, Rácz & Vári, 2012; H. Ekler, Nagyváradi, Csányi & Kiss-Geosits, 2013; Horváth & H. Ekler, 2017; Rüll & Protzner, 2019). In most of the studies we reviewed, the measuring device was placed on the hip. Very few studies were found in which the device was placed on the ankle in addition to the hip. It was concluded that lower intensity movements could be measured more accurately in terms of displacement with the devices placed on the ankle (Anderson et al., 2016).

The studies have also shown that different activities and environmental changes affect physical activity levels, resulting in children being twice as active on week-days than on weekends (Uvacsek et al., 2010; Csányi et al., 2012). When examining the adjustment of the epoch value, it has been found that it is worth taking age into account, as the younger someone is, the more frequent displacements occur (Uvacsek & Tóth, 2014; Horváth & H. Ekler, 2017). Accelerometers have also been used to measure various dance movements (Rüll & Protzner, 2019; Tóth & Protzner, 2019), which have confirmed that dance movements meet the daily movement needs of adults.

1.5. Research history

In 2017, we surveyed 311 participants in physical education and dance classes. Our results showed that dance class activity is higher in grades 2 and 3 than physical education class activity. Physical education and dance class activity levels were balanced in the fifth grade. In the higher grades, physical education activity increased while dance activity decreased (*Table 2*). We conclude a shift in activity between the two movement genres around the lower and upper-grade boundaries based on these results. This conclusion was reached even though the fourth-grade results did not support it, as the student composition of the fourth grade was critical and could not be considered authoritative. The fourth and fifth grades were selected as the sample for our current study to support this conclusion, and we have added the seventh grade as well. We were able to measure the effects of achievement-motivation in these grades, i.e. the choice of grades was not relevant from this point of view.

Grade	Lesson	MVPA (%)	Sig. (2-tailed)
Grade 1	P. E.	51.6693	0.000 *
	Dance	41.3672	
Grade 2	P. E.	41.7993	0.051 *
	Dance	45.0322	
Grade 3	P. E.	36.2343	0.011 *
	Dance	39.8746	
Grade 4	P. E.	40.3565	0.000 *
	Dance	33.1867	
Grade 5	P. E.	43.2306	0.922
	Dance	43.4209	
Grade 6	P. E.	43.9538	0.000 *
	Dance	38.3544	
Grade 7	P. E.	46.4263	0.000 *
	Dance	33.1330	
Grade 8	P. E.	48.8642	0.000 *
	Dance	30.5496	

Table 2. Comparative MVPA values for physical education and dance classes by grade

Another finding of our previous research was that students who like dancing and dance classes have a higher MVPA from the fifth grade onwards than their peers who like dance classes less or not at all (*Figure 3*). We hypothesized that students who prefer dance classes are more likely to have failure-avoidant personalities and thus avoid competitive situations. For them, dance movement forms may represent an adequate movement opportunity during adolescence, which usually has a negative impact on activity levels.

Figure 3. Preference for dance lessons in the light of MVPA values (*Reiner et al.,* 2020)

2. OBJECTIVE AND HYPOTHESES

We aimed to find out whether it is true that, as we have found in our previous research, the activity level (MVPA) of students changes between lower and upper school when comparing physical education lessons and dance lessons. We were also looking for answers to which types of movement represent a greater activating force for pupils with different personality types, at which ages.

Also, based on our previous research experience, we asked ourselves what is the optimal point of accelerometer placement (hip or leg) for dance movements while respecting the rules of the measurement protocol. We also aimed to collect data to decide this.

At the start of the research, we assumed that.

H1 - After the fifth grade, there is a shift between the previously equalised activity levels of dance and physical education classes in favour of physical education.

H2 - The activity levels in dance classes of those who reject competition (failure) are higher.

3. METHODS

3.1. Research location, time and sample

Our research was conducted in the Derkovits Gyula Primary School in Szombathely. The data collection took place in the spring semester of 2019/2020, in February and March. 111 students participated in our research from the fourth, fifth and seventh grades. Of the 111 students, 54 girls (48.65%) and 57 boys (51.35%) participated (*Table 3*).

Grade	Boys	Girls	Altogether
Grade 4	20	16	36
Grade 5	21	21	42
Grade 7	16	17	33
Altogether	57	54	111

Table 3. Distribution of students participating in the research by grade and gender

3.2. Tools for data collection

Our research used two instruments to collect data: the accelerometer and the questionnaire.

The accelerometer used was the ActiLife wGT3X-BT. We chose this device because the periods measured were relatively short (45 minutes of class time) and because the sample was made up of children, and we needed to collect data at a high frequency. The density of data recording (epoch values) was set to 1 second. The sensory meter was worn on the left hip during PE lessons and on the left hip and left ankle during dance lessons. The data obtained were evaluated using standard cut-point values defined by Freedson Children (2005) and the placement protocol.

As a second data collection instrument, we used the 'How do I behave?' questionnaire (Tóth, 2005). The questionnaire consists of 22 questions, to which the children had to answer yes or no. The questionnaire was filled in twice, once for the preferred activity and once for the non-preferred activity. The questionnaire provides information about the level of demand and the attitude of the pupils towards performance, which allows us to distinguish between success-oriented pupils, i.e. those who prefer competitive situations (hereafter referred to as competitive) and failure-avoidant pupils, i.e. those who avoid competitive situations (hereafter referred to as non-competitive). The questionnaire included questions such as:
- I prefer to do it when it is mainly up to me what it turns out to be.
- It's easy for me to stop and forget about it.

3.3. The research process

We started our research with the research ethics licence 2019/407. The school principal authorised the research, and the students' parents filled in a consent form. Before the study period, we conducted pilot tests. The school uses group breaks, so the measurement dates were planned with this in mind. Three separate schedules were made for the apparatus placement. Physical education classes were split by grade, dance classes divided by class, and different teachers taught the two different classes. Based on the previous research experience, we used the same method to assign numbered accelerometers to students. The students wore the same device in the same type of class.

A separate schedule was made to test the placement of the accelerometer, where a student wore two accelerometers simultaneously, one on the waist and one on the ankle. Before each measured lesson, the meters were laid out and given to the children during a roll call. After the first week, the recording of the sensors went smoothly and quickly. We backed up the data each day and then set up the accelerometers for the next day.

Due to the local infrastructure, part of the PE lessons is held in the gym and part in the corridor. The choice of teaching material is also adapted to the location. In practice, the gym is usually used for sports games and circuit work, while the corridor is used for problem-solving and circuit work related to the gymnastics material. In order to adapt to the location of the PE lessons and the wide range of the curriculum, we measured two lessons for each student, both in the gym and in the corridor. We also measured two dance classes, which were conducted in the dance hall.

Some students wore accelerometers on both their waists and ankles during dance classes.

The total number of hours measured with the accelerometer was 42. The activity values of the 111 students in the sample were recorded six times per individual. For our study of wearing accelerometers on different body parts, measurements were taken during dance classes. Based on our present study, we wanted to suggest the placement of the accelerometer.

We were able to take the measurements before the epidemic, and the questionnaires were filled in online by the students during the digital lessons.

3.4. How the data is processed

After examining the normal distribution of the data (*Figure 4*), a paired t-test was used to compare the physical education and dance class activity of the same grade. To compare the activity values of different grades, a two-sample t-test analysis was performed. And multivariate analysis of variance was used to examine the effect of several factors on physical activity.
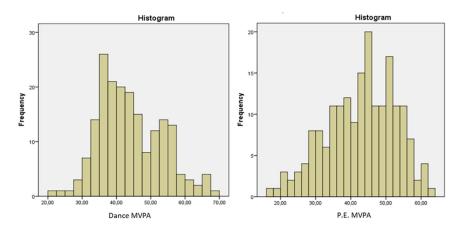

Figure 4. Normal distribution of data in the light of MVPA values

Based on the 'How do I behave?' questionnaire, we formed groups of competitive and non-competitive students. We then analysed the group's physical education and dance class activity scores using a two-sample t-test.

IBM SPSS 26 Statistics was used for statistical calculations. Differences were considered significant at $p < 0.05$.

4. RESULTS

4.1. Activity values in PE and dance classes

The average value of the physical education lesson activity (MVPA) is 42.8707%. The values per grade differ only minimally from the average of the three grades. Grade 5 has the highest MVPA with 43.0839% (*Figure 5*).

The average value of the dance class activity (MVPA) is 43.6787%. The MVPA values decrease in the higher grades. From 47.4148% in grade 4 to 39.4028% in grade 7 (*Figure 5*).
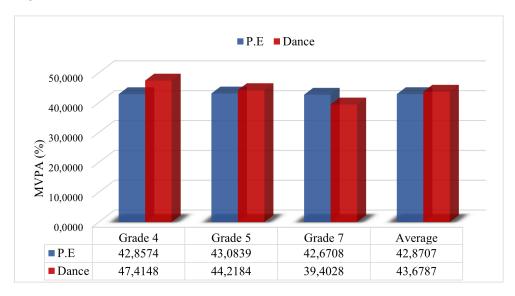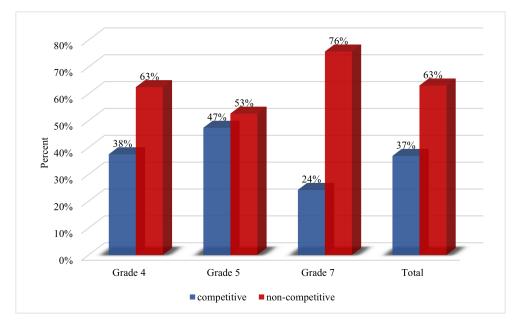

	Grade 4	Grade 5	Grade 7	Average
P.E	42,8574	43,0839	42,6708	42,8707
Dance	47,4148	44,2184	39,4028	43,6787

Figure 5. Average MVPA values per grade for physical education and dance classes

4.2. Distribution of personality types

According to the results of the self-awareness questionnaire (*Figure 6*), out of 111 students, 37% are competitive (success-oriented), and 63% are non-competitive (failure-avoidant). In the fourth grade, the distribution of scores is the same as for the entire sample. In grade 5, 47% of students are competitive, and 53% are non-competitive. The difference between the two personality types is most significant in the seventh grade (24% competitive, 76% non-competitive).
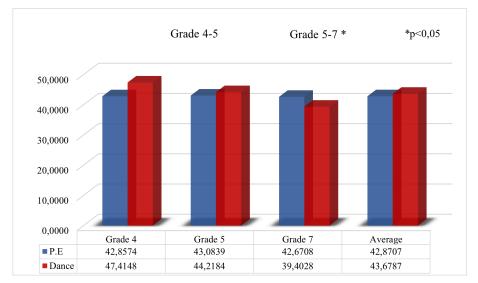
Figure 6. Percentage distribution of personality types by grade

5. EVALUATION OF RESULTS

5.1. Comparison of activity levels in dance lessons and physical education lessons by grade

We compared the MVPA values of dance and physical education classes by grade (*Figure 7*). In grade 4, there is a significant difference (df=58, p=0.010) in favour of dance classes (47.4148%) compared to physical education classes (42.8574%). In grade 5, there are almost identical values (PE = 43.0839%; dance=44.2184%). In the seventh grade, the activity value of the physical education class (42.6708%) is significantly higher (df=60, p=0.005) than the MVPA value of the dance class (39.4028%). There is no typical difference between the physical education lesson activity values of the fourth (42.8574%), fifth (43.0839%) and seventh (42.6708%) grades. There is no significant difference between grades four (47.4148%) and five (44.2184%) when comparing dance class activity scores. There is a significant difference between the fifth (44.2184%) and seventh (39.4028%) grades (F=0.173, df=145, p=0.000). The seventh grade's dance class activity value is lower than that of the fifth grade. Thus, after the fifth grade, the value of dance class activity decreases.

	Grade 4	Grade 5	Grade 7	Average
P.E	42,8574	43,0839	42,6708	42,8707
Dance	47,4148	44,2184	39,4028	43,6787

Figure 7. Distribution of MVPA values for physical education and dance lessons by grade

5.2. Comparison of dance class activity values by personality type

Students were divided into two groups based on the 'How do I behave?' questionnaire (*Figure 8*). The competitive type students' dance MVPA was 41.1818%, and the non-competitive type students' dance MVPA was 45.0597%. The non-competitive type students' scores were significantly higher (F=0.115, df=193, p=0.011) than the competitive type students' scores.
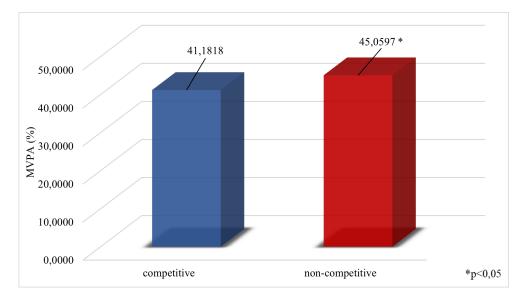

Figure 8. Distribution of dance class MVPA scores by personality type

5.3. Comparison of dance class activity values by personality type, by p-value

The comparison by personality type was further broken down by grade (*Figure 9*). The dance class MVPA of the non-competitive students in the fourth grade (52.7409%) is significantly higher (F=0.190, df=51, p=0.022) than the dance class activity value of the competitive students (46.4339%). There is no significant difference in the fifth grade. The dance class MVPA of non-competitive students in the seventh grade (40.5735%) is significantly higher (F=0.117, df=62, p=0.034) than the dance class activity of competitive students (35.8906%).
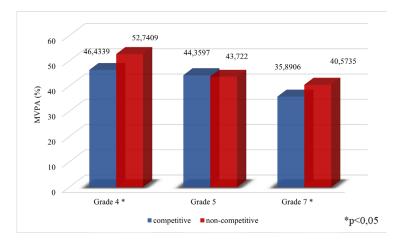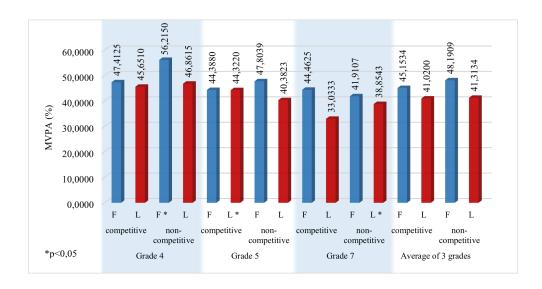

Figure 9. Distribution of dance MVPA score by grade, by personality type

5.4. Comparison of dance class activity values by personality type, grade, gender

The comparison by personality type, by year group, was further disaggregated by gender (*Figure 10*). In the fourth grade, the activity score of non-competitive boys (56.2150%) is significantly higher (F=0.118, df=28, p=0.016) than the activity score of competitive boys (47.4125%). There is no significant difference between the activity scores of girls. In the fifth grade, the activity value of non-competitive boys (47.8039%) is higher than the activity value of competitive boys (44.3880%), with no significant difference between the two values. The MVPA value of competitive girls (44.3220%) is significantly higher (F=1.613, df=35, p= 0.040) than the MVPA value of non-competitive girls (40.3823%). In the seventh grade, the activity value of competitive type boys (44.4625%) is higher than the activity value of non-competitive type boys (41.9107%). The MVPA of non-competitive girls (38.8543%) is significantly higher (F=0.799, df=31, p=0.010) than the MVPA of competitive girls (33.0333%). In all grades, irrespective of personality type, boys' movement activity values in dance class are significantly higher than girls' activity values. Averaged over the three grades, the MVPA value for non-competitive boys (48.1909%) is higher than the MVPA value for competitive boys (45.1534%), with no significant difference. There is no difference between girls' values by personality type.

Figure 10. MVPA value per dance class by gender, type of person, grade

5.5. Examining the impact of multiple factors on dance class MVPA values

In the multivariate analysis of variance, we examined the interaction of several variables (*Table 4*). After controlling for one factor, dance class MVPA was significantly influenced by "gender" (F=26.257, df=1, p=0.000), 12.5%; "grade" (F=6.985, df=2, p= 0.001), 7.1%; and personality type ("questionnaire") (F=7.430, df=1, p= 0.007), 3.9%. When two factors are taken into account, personality type ("questionnaire") and "grade" (F=5.633, df=2, p=0.004) have a mutually reinforcing effect on dance class MVPA (F=5.633, df=2, p=0.004), which together influence the scores in 5.8%. The combined effect of 'gender' and 'year' shows a trend. The combined effect of the three factors also shows a trend. They affect the MVPA values obtained by 3.1%.

The dependent variable is the MVPA value per dance class					
Origin of the variance	Deviation square amount	Degree of freedom df	Average squared deviation	Test Statistics F	p- value	Partial Eta - square
Gender	1965.307	1	1965.307	26.257	0.000 *	0.125
Question-naire	556.130	1	556.130	7.430	0.007 *	0.039
Grade	1045.683	2	522.842	6.985	0.001 *	0.071
Gender x Question-naire	14.824	1	14.824	0.198	0.657	0.001
Gender x Grade	363.823	2	181.912	2.431	0.091	0.026
Question-naire x Grade	843.232	2	421.616	5.633	0.004 *	0.058
Gender x Question-naire x Grade	436.925	2	218.463	2.919	0.057	0.031
Error	13697.447	183	74.849			
Altogether	**391967.458**	**195**				
*p < 0,05						

Table 4. Effect of several factors on MVPA values in dance classes

5.6. Results with different accelerometer placement protocols

For some of the dance lessons, we placed the devices on the students in two different ways. We compared the results of accelerometers worn on the waist and on the ankles (*Figure 11*). Ankle-worn devices showed significantly higher (df=170, p=0.000) values (49.0638%) than waist-worn devices, where the mean MVPA was 40.7352%. The results obtained show that the point of placement of the devices matters in movement forms such as dance.
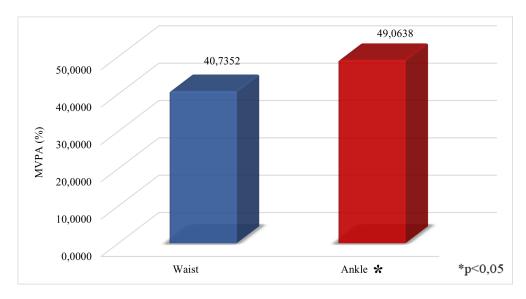

Figure 11. MVPA values measured at different accelerometer locations

6. SUMMARY

Based on the results of our research, our first hypothesis - that after the fifth grade, there is a shift between the previously balanced activity levels of dance and PE classes in favour of PE - was confirmed.

From the results obtained, we can conclude that the MVPA values of the physical education classes at each grade also show a levelling off with age. In contrast, for the MVPA values of dance classes, the measured activity values of the fifth (44.2184%) and seventh (39.4028%) grades differ significantly (F= .173, df=145, p= 0.000), with the seventh grade showing a slightly lower value.

Our second hypothesis is based on the preliminary research findings: the dance class activity of those who refuse to compete (failure-avoidance) is higher. This hypothesis was also confirmed.

The present study results show a generally significant difference in favour of the activity level of students of the non-competitive personality type (competitive 41.1818%, non-competitive 45.0597%, F=0.115, df=193, p=0.011). Based on the results and supported by data, it is confirmed that dance classes with self-expressive dance

movement forms can provide an appropriate movement alternative to the more competitive movement forms more common in physical education for students who reject competition (failure-avoidant) in the realisation of daily exercise. The significance of the results obtained is that dance education integrated into school physical education can provide movement skills that can be a lifelong form of movement for people with a non-competitive personality (in higher grades and especially for girls).

At the start of our research, about the protocol for accelerometer testing, given the specificities of dance movement, the question of which accelerometer placement (on the hip or ankle) seems to be the most appropriate for dance movements was raised.

Based on our previous research experience, the usual device placement raised several questions. During dance movements, sudden large displacements are more likely to be found in the movement material of junior grades (folk games, jumps). In the dance material of 10-14-year-olds, these large movements are less frequent in the dance lessons of 1 hour per week. This fact, together with the literature review we read, which showed the accuracy of the ankle device for slower movements, seemed appropriate to us to place the device on the ankle, as allowed by the measurement protocol. The measured values of the two placement protocols show a significant difference: the value measured at the ankle (49.0638%) is significantly higher than the value measured at the waist (40.7352%) (df=170, p=0.000). Considering the movement characteristics, it can be stated that the measurement results seem to be more realistic for the ankle-mounted devices. (Of course, the measurement results were evaluated with special settings for the placement of the devices.) Due to the planned duration of the study and the limited number of devices, the ankle-mounted devices were not used in the physical education classes. Of course, for similar types of exercise in physical education classes, more accurate values would likely be obtained if the devices were not placed on the waist. Further research is needed on the relationship between actual performance levels and ankle placement.

In the present study, we did not investigate the effect of teacher personality on children's performance, and the influence of this on children's performance may be worth investigating further.

The results of our research clearly show that dance can be a valuable element of the physical education classroom movement curriculum, especially for pupils who are averse to competition, to increase their activity levels, and we, therefore, recommend its inclusion in the physical education curriculum according to the possibilities of the Framework Curricula (2020).

Regarding the positioning of the accelerometer, we can make the following recommendation: for movements of lower intensity, in further research, it is preferable to place the measuring device on the ankle, taking into account the requests of the positioning protocol.

The aim of physical education in schools is for all students to find a form of physical activity that they enjoy and are highly active in, thus establishing a positive lifelong relationship with physical activity. Our research has found that for non-competitive students, dance may be an ideal alternative form of physical activity where these principles are met, as MVPA scores are higher for non-competitive

students at all grade levels. It is essential to highlight that dance has a positive impact on the individual and the community in addition to physical activity. Furthermore, it is also beneficial that dance classes can bridge some of the gaps caused by the lack of infrastructure and staff in daily physical education.

Overall, we can say that dance, taking into account the aims of physical education, has a place in school physical education and its use should be encouraged and strengthened.

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