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Motor commitment time in primary education first and second cycle physical education sessions

El tiempo de compromiso motor en las sesiones de Educación Física del primer y segundo ciclo de Educación Primaria

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Abstract

The main objectives of this study were to describe the most common type of sessions in physical education classes depending on the type of students groupings and to analyze the time available for practice (TCM) depending on the type of meeting, school year or when students practice the first, second and third year of primary education. This study involved 264 children who were studying in the first, second and third year of primary education. A total of 176 physical education sessions were recorded by observation tool TiPEF which showed excellent reliability (Cohen's Kappa = 0.95 to 0.99). The sessions where a cluster of large group used were the most used (33.5%) and sessions where the clusters were in groups of 4, 8 and 12 participants were the least used (5.7% each). The mean duration of TCM for all sessions analyzed was 21.4 ± 3.8 min / session, meaning that 67.2% of the time bound for other tasks that did not involve driving practice. The freshmen were the most TCM arranged by session and the third year the least ($p < 0.01$). In sessions after recess and early in the afternoon TCM having students was higher ($p < 0.01$) than in the last session of the morning and afternoon. It can be essential that educational institutions and physical education teachers perform specific actions to increase the TCM at these ages.

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Keywords

Motor control; practice time; methodology; effective teaching.

Resumen

Los principales objetivos de esta investigación fueron describir el tipo de sesiones más habituales en las clases de educación física en función del tipo de agrupamientos de los alumnos y analizar el tiempo de compromiso motor (TCM) en función del tipo de sesión, curso escolar o la hora de práctica en alumnos de educación primaria. En este estudio participaron 264 niños y niñas. En total se registraron 176 sesiones de educación física mediante la herramienta de observación TiPEF que mostro unos valores excelentes de fiabilidad (Kappa de Cohen = 0,95-0,99). Las sesiones donde se utilizó un agrupamiento de gran grupo fueron las más utilizadas (33,5%) y las sesiones donde los agrupamientos fueron en grupos de 4, 8 y 12 participantes fueron las menos utilizadas (5,7% cada una). La duración media del TCM para todas las sesiones analizadas fue de 21,4 ± 3,8 min/sesión, lo que supone que un 67,2% del tiempo se destino a otras tareas que no implicaron práctica motriz. Los alumnos de primer curso fueron los que más TCM dispusieron por sesión y los de tercer curso los que menos ($p < 0,01$). En las sesiones de después del recreo y a primera hora de la tarde el TCM que tenían los alumnos fue mayor ($p < 0,01$) que en la última sesión de la mañana y de la tarde. Puede resultar imprescindible que las instituciones educativas y los profesores de educación física realicen acciones específicas encaminadas a aumentar el TCM en estas edades.

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Palabras clave

Acción motriz, tiempo de práctica, metodología, enseñanza efectiva.

Introduction

Physical activity (AF) practiced regularly in childhood produces significant benefits on physical and psychological health and behavior of school children (Pate and Sirard, 2000; Steinbeck, 2001). For this reason, the analysis of AF from an early age has become one of the main topics of discussion in the context of public health (Marcus et al., 2006; Strong et al., 2005). Previous studies determined that the performed physical activity practice and the level of physical fitness in childhood may be closely related to the present and future health, the rises of suffering from cardiovascular disease, respiratory disease, mental, musculo-skeletal,

as well as the risk of suffering from obesity (Olds, Tomkinson, Leger y Cazorla, 2006; Ortega, Ruiz, Castillo and Sjostrom, 2008; Ruiz et al., 2009). In this sense, some authors determine that the activity associated with the school physical education, along with the lifestyle, may play an important role (Chillón, Ortega, Ferrando and Casajús, 2011; Yanci, Reina, Los Arcos and Cámara, 2013; Yanci, Los Arcos, Grande, Gil and Cámara, 2014).

As stated in the Real Decreto 126/2014 of 28 February, whereby the basic curriculum of primary education is established (BOE, 2014), the Eurydice report of the European Commission published in 2013 estimated that up to 80% of children of school age only participate in physical activities at school. As reported, physical education plays a fundamental role in the formation of children in this age group (Yanci, Los Arcos, Reina, Gil and Grande, 2014). However, the number of weekly sessions of physical education in primary grades in the Spanish education system is two, with a theoretical duration of 50 min per session (100 min/week) clearly lower time than other subjects taught in the same stage and even lower to the recommendations of several researchers who claim that primary education schools should teach more than 150 minutes of physical education per week (Koplan, Liverman and Kraak, 2005; Pate, Davis, Robinson, Stone, Mckenzie, and Young, 2006).

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Also, previous studies in this area say that the time of theoretical practice in physical education classes does not correspond to the available time for practice (time when students can perform motor action) or the time of motor commitment (TCM, real-time practice or effective practice time in which students complete driving practice) (Olmedo, 1998) and that the total amount of actual practice of children in school is related to the characteristics of the physical environment, availability, condition of facilities (Sallis et al., 2001), type of sessions raised (Olmedo, 1998; Calderón and Palao, 2005), organization and structure of tasks or the motivational climate of the class (Calderón and Palao, 2005; Pieron, 2005; Silverman, 2005; Solmon, 2003). Considering that, from the point of view of effective teaching, it has been claimed that students who spend more time doing good practices tend to learn more (Rink, 2003), it may be important to know the time of motor impairment in physical education sessions and analyze how they influence organizational aspects (hours, types of tasks etc.).

In this way the objective of this research were: 1) to verify the reliability of the observation tool called Time spent in the Practice of Physical Education (TiPEF) designed for this study, as a notational system for observing, coding and analyzing time motor involvement in physical education sessions, 2) describe the most common type of sessions in physical education classes depending on the type of grouping students and 3) to analyze the time motor impairment depending on the type of meeting, school year or when students practiced in the first, second and third year of primary education.

Material y methods

Participants

This study involved 264 children who were studying in primary education during the 2013-14 school year in the first (EP1, n = 98), second (EP2, n = 102) and third (EP3, n = 64) course (6-9 years) in a public school. All participants performed two sessions of physical education each week with a theoretical duration of 50 min per session, supervised and directed by the teacher of physical education of the school. The risks and benefits of participation in the study were explained to all participants and their families. All parents or legal guardians signed the required informed consent. The study was approved by the School Council the educational center. The study met with the Declaration of Helsinki (2013) and was approved by the local Ethical Committee.

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Procedure

In total 176 sessions of physical education were recorded (from October to May) led by the specialists of the school, of which 81 sessions corresponded to the EP1 group, 68 to the EP2 and 27 to the EP3. Because of the schedule of the school, participating students had no physical education sessions in the first two hours of the day (09: 00-09: 50 and 09: 50-10: 40 h). These first two hours, at the discretion of the management team and because of organizational aspects, were reserved to students of fourth, fifth and sixth year of primary education. Table 1 shows the hours of teaching physical education, the number of sessions recorded in each time slot and the percentage relative of the total session analyzed.

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Table 1. Time of teaching, number of sessions in each time slot and a percentage of the total number of physical education sessions recorded.

Time	Session of the day (SD)	Number of sessions	Percentage (%)
09:00-09:50	SD1	0	0
09:50-10:40	SD2	0	0
10:40-11:10	Break	-	-
11:10-12:00	SD3	49	27.8
12:00-12:50	SD4	52	29.5
12:50-14:50	Lunchtime	-	-
14:50-15:40	SD5	52	29.5
15:40-16:30	SD6	23	13.1
Total	SD1-SD6	176	100.0

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For recording data an observational tool called invested Time in the Practice of Physical Education (TiPEF) was designed. The observation tool TiPEF consisted of four criteria (course, practice time, session type and timing of motor impairment) and 19 categories (Table 2). All categories are exhaustive and mutually exclusive. For the record of the time of motor impairment it was considered only the time in which the students could perform some motor action within the physical education lesson. Were excluded commuting times to the the sports hall, the time in the locker room and the time spent on various explanations and interruptions by the teacher where there could not make driving practice.

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Table 2. Codification of notational system observation tool TiPEF

Academic course
EP1: 1st course of primary education
EP2: 2nd course of primary education
EP3: 3rd course of primary education
Type of session
T1: Individual tasks
T2: Tasks in pairs
T3: Tasks in threes
T4: Tasks in groups of 4
T5: Tasks in groups of 5
T6: Tasks in groups of 6
T8: Tasks in groups of 8
T12: Tasks in groups of 12
T20: Large group tasks > 20
Practice time
SD1: classes from 09:00-09:50
SD2: classes from 09:50-10:40
SD3: classes from 11:10-12:00
SD4: classes from 12:00-12:50
SD5: classes from 14:50-15:40
SD6: classes from 15:40-16:30
Time of motor commitment (TCM)
TCM: driving time available for practice (in minuts) where students have option to do motor action during the session.

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In order to analyze the reliability of measurement, an observation protocol was made. Each of the criteria and categories were described with the greatest possible clarity and detail leaving no room for ambiguity. The aim was to make the most of the later work of the observers when viewing sessions and record each and every one of the variables analyzed (Pradas, Floría, González-Jurado, Carrasco and Bataller, 2012).

To assess the quality of data, two observers made encoding the first 9 sessions (3 sessions per school year). Prior to registration, observers participated in a training course of 15 h and training on the use of observation tool TiPEF. Thus an indicator referring to the variable inter observer was obtained. In addition, a single observer performed the complete record of the sessions.

Statistic analysis

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS® Inc, version 21.0, Chicago, IL, USA) for Windows. The results are presented as mean ± standard deviation (SD), minimum and maximum. To determine the normality of the data the Kolmogorov-Smirnov test was used and parametric or non-parametric statistical techniques were carried out according to the results. To observe the rate of inter-observer agreement Kappa of Cohens rate was calculate, expecting coefficients greater than 0.70. The results of the number of sessions depending on the type of work performed (groupings) in the same are presented in absolute values (frequencies) and percentage (%). To determine the difference in TCM among different courses (first, second and third), different slots and session types depending on type of groupings were calculated using a one-way ANOVA with a pos hoc analysis of Bonferroni. Statistical significance was accepted at $p < 0.05$.

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Results

The values obtained in the reliability of the different observations for course academic criteria, type of session, time of practice and time of motor impairments were optimal, yielding a range in Cohen Kappa statistic of 0.95-0.99 in the inter observer analysis.

Sessions where a cluster of large group was used were the most used (59 sessions, 33.5%), and sessions where the clusters were in groups of 4, 8 and 12 participants were the least used (10 sessions each 5.7%). Sessions where individual tasks were performed were 17 (9.7%) (Table 3). The mean duration of TCM for all sessions analyzed was 21.4 ± 3.8 min / session (range 10-30 min / session). Students in the first three years of primary education placed a time of physical activity of 42.8% of the total time that theoretically was available to them, which means that 67.2% of the time was spent on other tasks that do not they involved

driving practice. Table 3 shows the results of TCM per session depending on the type of task used. No significant differences in the length of time that students disposed depending on the type of grouping were observed.

Table 3. Number of sessions, percentage of total motor impairment and time (min) in the different session depending on the type of tasks used.

Sessions	Analyzed sessions	Percentage (%)	TCM (min)	Max.	Min.
Individual task	17	9.7	22.8 ± 2.2	17	27
Tasks in pairs	23	13.1	21.5 ± 3.8	16	29
Tasks in threes	11	6.3	21.5 ± 4.6	14	29
Tasks in groups of 4	10	5.7	21.4 ± 3.2	17	27
Tasks in groups of 5	12	6.8	19.5 ± 4.4	12	25
Tasks in groups of 6	24	13.6	21.5 ± 3.8	12	27
Tasks in groups of 8	10	5.7	20.3 ± 3.2	13	24
Tasks in groups of 12	10	5.7	20.2 ± 2.4	16	24
Large group tasks > 20	59	33.5	21.5 ± 4.3	10	30

TCM = time motor impairment, Max = maximum, Min = minimum.

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As shown in Figure 1, the TCM was significantly different ($F(2) = 8.89$, $p < 0.01$) for age groups. The freshmen had the most practice time per session and third years the least.

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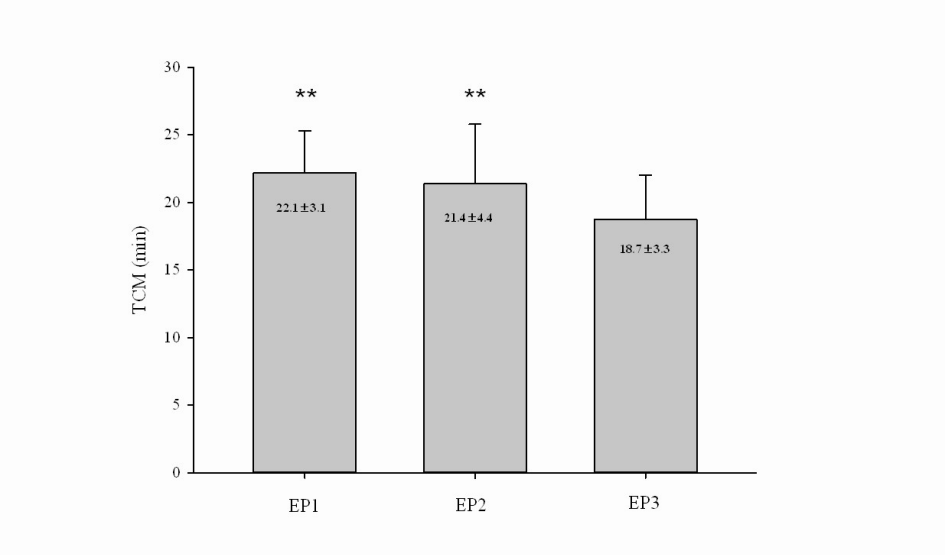

Figure 1. Time of motor commitment (TCM) per session in physical education classes depending on the different courses. EP = primary education, ** significant differences ($p < 0.01$) with the EP3 group.

Figure 2 shows the results obtained as to TCM at different times of the day. As can be observed in sessions after recess (22.1 ± 2.9 min / session) and early evening (23.3 ± 2.9 min / session) time available for practice was higher ($F(3) = 12.73$, $p < 0.01$) than in the last session in the morning (19.8 ± 4.5 min / session) and afternoon (18.9 ± 3, 4 min / session).

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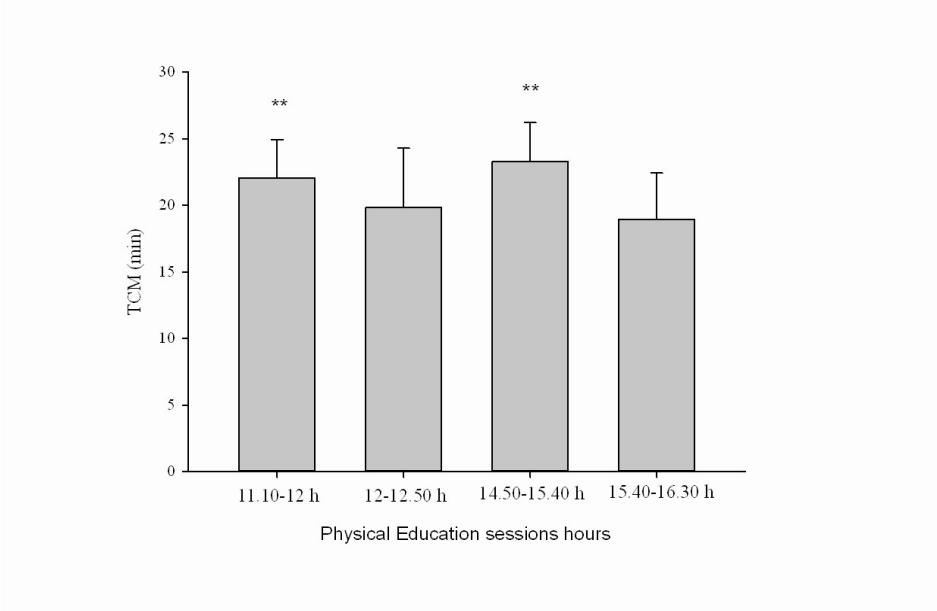

Figura 2. Time of motor commitment (TCM) per session in physical education classes depending on the time of day in which they function.

** Significant differences ($p < 0.01$) with the session 12-12,50 h and with the session 15,40-16,30 h.

Discussion

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The main objectives of this study were to describe the most common type of sessions in physical education classes depending on the type of clusters of students and to analyze the time of motor commitment depending on the type of meeting, school year or time of practice in students of first, second and third year of primary education. It was done through the observation tool TiPEF that showed optimal reliability values. Despite the potential importance of driving time practiced in physical education sessions, this is the first study to examine this issue from the point of view of the influence of age and the time of day in which they conduct classes.

In this study sessions where they carried out a large group grouping were the most used (33.5% of all sessions) and sessions where the groups were in groups of 4, 8 and 12 participants were the least used. Sessions where individual tasks performed were significant (9.7% of all sessions). In scientific literature, there is controversy about the effectiveness of the different types of clusters in the learning of primary school students. While Silverman,

Subramaniam and Woods (1998) state that individual alumni organization delivers a better quality of implementation of the proposed tasks, Hastie, Calderon Palao and Ortega (2011), in a more recent study, argue that the group organization may be more effective for motor learning.

Although the results of our study do not allow us to clarify this aspect, the data show that the analyzed physical education teachers use various types of organization in terms of clusters in physical education sessions. To our knowledge, the variety of groupings of students in primary education can promote the acquisition of different competencies derived from uniqueness of each. Primary education students that we studied had 42.8% of the total time that theoretically available to them, which means that more than half of the theoretical time of physical education sessions (67.2% of the time) went to other tasks that did not involve driving practice. Students in our study did not conduct more than 45 weekly minutes of driving practice in physical education classes. This is far from the recommendations made by several investigations (Koplan et al., 2005; Pate et al., 2006) and which states that students should participate in a time greater than 150 minutes per week of physical education. Because all motor skills requires a minimum implementation period to master (Olmedo, 1998), we must provide our students enough practice time so that they can achieve the objectives and competencies. Also, considering that increased practice time in physical education classes can be beneficial to the process of teaching-learning (Rink, 2003) can be crucial that educational institutions and physical education teachers perform specific actions to increase the TCM at these ages.

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In this sense, some researchers argue that the type of grouping and the type of tasks performed may affect the time of practice in physical education clases (Calderón and Palao, 2005; Pieron, 2005; Silverman, 2005; Solmon, 2003). In contrast, in our study, no significant differences in the length of time that students placed depending on the type of grouping (large group, small group or individual organization) were observed. However, differences depending on the time of day in which the meeting was conducted were obtained. This is the first study we have found where the influence of this aspect is discussed in TCM in physical education sessions. In sessions after recess and early in the afternoon the TCM was higher

than in the last session in the morning and evening. This should be considered by the management teams of schools in order to ensure equitable TCM in different courses and not to favor / disadvantage one of the groups involved.

Furthermore, the TCM was significantly different for age groups. Some studies suggest that the characteristics of the students can determine the type and amount of practice that takes place in physical education sessions (Hastie et al., 2011; Olmedo, 1998; Silverman et al., 1998). Contrary to what might be expected, the freshmen had the most practice time per session and third year the least. Thereby, future studies may be interesting to analyze what are the reasons for which the older students have less TCM. The peculiar characteristics of physical education in schools (transfer of students from the classroom to the gym or sports center, the time to change clothes or organizational structure of the class) make the practice time insufficient in many cases (Olmedo, 1998) and differences between different age groups.

The results obtained in this study should be taken with caution as this research has some limitations. On the one hand, the organizational structure of the center as well as the profile of teachers teaching physical education could have influenced the results. On the other hand, we have only analyzed the first three years of primary education so that these results can not be extrapolated to higher courses.

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Conclusions

TiPEF observation tool is a reliable way to measure the type of sessions depending on the grouping of students and time of motor impairment in the sessions of physical education in primary. Sessions where a cluster of large group used were the most used and sessions where the clusters were in groups of 4, 8 and 12 participants were the least used. As for the time of motor impairment, no differences depending on the type of grouping were observed but depending on the age group (younger had more time for driving practice) and meeting times (longer practiced after recess and the first afternoon session).

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