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## ORIGINAL

### THE RECESS SCHOOL SPACE AND TIME AS A HEALTHY OPPORTUNITY

### EL RECREO ESCOLAR COMO OPORTUNIDAD DE ESPACIO Y TIEMPO SALUDABLE

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## **ABSTRACT**

The purpose of our pilot study was to measure objectively the amount of moderate to vigorous PA (MVPA) children engaged over a week and to identify how much of it was carried out during recess time. The sample comprised 36 children aged 11 to 12 from a school in the province of Toledo in Spain. PA was measured with the accelerometer GT1M. Most of the children did not meet the PA recommendations for health. In relation to the amount of MVPA achieved during recess time, our study suggests that recess time represents an important load of the total amount of children's MVPA registered per day.

**KEYWORDS:** physical activity, recess time, school, children, accelerometer.

## RESUMEN

El propósito de nuestro estudio piloto fue medir de forma objetiva la AF saludable de la población infantil a lo largo de una semana e identificar cuanta de la misma se realizaba dentro del tiempo dedicado al recreo escolar. La muestra estaba compuesta por 36 niños de 11 a 12 años de una escuela de la provincia de Toledo en España. El instrumento utilizado fue el acelerómetro. La mayoría de los niños y niñas no cumplían las recomendaciones de AF saludable. En relación a la cantidad de AF saludable realizada en los recreos durante la semana, ésta presentó un peso importante.

**PALABRAS CLAVE** actividad física, recreo escolar, educación primaria, acelerómetro.

## 1. INTRODUCTION

The scientific community has been focused on describing the health benefits of the PA practice during the whole vital cycle (elderly population, adults, adolescents and infants) considering that an active lifestyle in early ages could reduce the risks of having health problems in an adult age (e.g. Sallis & Patrick, 1994). Cavill, Biddle and Sallis (2001) set the current international recommendations for a healthy PA practice, establishing that children and adolescents should engage in 60 min of PA from moderate to vigorous (MVPA) on all/ most days of the week. Besides, the American Heart Association (Pate et al. 2006); Pate & O'Neill, 2008) indicated that half of the daily PA recommendations (30 min of MVPA) had to be carried out within the school curriculum.

Sallis (1995) established a two level classification on young's PA influences: personal and environmental levels. Ridgers, Stratton, Fairclough and Twisk (2007) displayed that school had been considered traditionally as the key environment to promote the PA among young people and how the physical education was acting as a background. In a typical day, we find that children and adolescents have two key environments to practice PA: at school and after school. Within school, we might distinguish two main moments for PA practice: the physical education lesson and the recess time. In the Spanish Educational system, the recess time takes around 30 min per day, so it is a total of two and a half hours per week. International studies have described shorter recess times varying from 20 to 102 minutes (Mota et al. 2005; Ridgers, Stratton & Fairclough, 2005; and Vestraete, Cardon, DeClercq & Bourdeaudhuij, 2006). Recess time presents an excellent opportunity to practice MVPA but only limited studies have focused on it (Ridgers, Stratton & Fairclough (2006) and Martinez, Contreras, Lera & Aznar (2012)). However, studies from Cavill et al. 2001; Corbin, 2002; Harmand, 2008; Luengo, 2007; Ridgers et al. 2007 and Stratton, 1996) have pointed out the recess time possibilities for increasing the PA level in school.

This study is focused on describing the achievement of 11 and 12 years old children's PA international recommendations, and also, to analyze PA levels during the recess time for a week. These results will help us to obtain a more real vision of the action possibilities that the recess time and the school could offer in promoting children's PA levels.

## **2. METHOD**

### **2.1. Sample**

The study comprised a convenient sample of children from the third cycle of primary education from the Fernando de Rojas Public School in the town of La Puebla de Montalbán, Toledo, Spain (n=52). All students were measured with an accelerometer to obtain their weekly PA levels. The study obtained an experimental mortality rate of 16 individuals due to the fact that they did not accomplish with the accelerometer inclusion criteria that stated a minimum of 10 registered hours per day (Riddoch et al. 2004). The resulting sample from this study was 36 students (20 boys and 16 girls), aged between 11 and 12 years old ( $X = 11,03 \pm 0,17$  SD). The study was approved by the school Council and parental consent was obtained prior data collection. Moreover, all parents received an information document about how to use the accelerometer.

### **2.2. Procedures and materials**

PA was measured during 7 consecutive days (Thursday to Wednesday or Friday to Thursday) using the MTI accelerometer, model GT1M activity monitor. All children wore the accelerometer in an elastic waistband on the right hip during the daytime, except while bathing or during other aquatic activities. Verbal and written instructions for care and placement of the monitor were given to both, children and their parents. GT1M is a lightweight (27 grams) and small (4.5 x 3.5 x 1.0 cm), single plane (vertical) accelerometer. Movement in a vertical plane is detected as a combined function of the frequency and intensity of the movement, while an electronic filter rejects motion outside the range of normal human movement. Validation studies examining this accelerometer suggested that is a valid and reliable measurement of children's PA with highly significant correlation ( $r = 0.86$ ) with energy expenditure assessed by indirect calorimetry, as well as a high degree of inter-instrument reliability (Brage Wedderkopp, Franks, Andersen & Froberg, 2003; Trost, 1998). For data to be considered valid two criteria were established: a minimum of data for a period of 4 days including one weekend day, and a minimum of 10 registered hours of data per day. Count ranges for the various activity intensities were: 0 to 499 for sedentary, 500 to 1999 for light, 2000 to 2999 for moderate, 3000 to 4499 for vigorous and 4500 - 32767 for very vigorous activities according to Andersen et al.(2006) To analyze the accelerometer data, Kinesoft software, developed specifically for the Actical and Actigraph accelerometers, was used. The outcome variables were expressed as average intensity (counts/minute) and amount of time (minutes/day) spent at different PA-intensity categories. Therefore, we calculated how many minutes of sedentary, moderate, vigorous

and very vigorous activity children achieved during week. We excluded from the analysis bouts of 20 continuous minutes of activity with intensity counts of 0, considering these periods to be non wearing time (Riddoch et al. 2004) To obtain the MVPA minutes, we added up the minutes of PA from moderate, vigorous and very vigorous (Andersen et al., 2006). Achievement of daily PA recommendation was calculated and we also focused on how many minutes of MVPA were achieved during the recess time.

### 2.3. Statistical analysis

Statistical pack SPSS v. 19 was used in this study. Normality tests, symmetry and kurtosis were conducted. Mean  $\pm$  SD was used to describe the physical characteristics and all PA variables. Independent t-tests were used to examine gender differences and Pearson's correlation was used to correlate PA recess time and total daily PA. The significance level was fixed in  $p < 0.05$ .

## 3. The results

We have structured the results analyses around two sections: Firstly, the PA recommendation accomplishment and, secondly, the MVPA achieved during the whole day and during the school recess time.

### 3.1. PA recommendation accomplishment

The number of days children achieved a minimum of 60 minutes of MVPA per day is presented in table 1. Boys accomplished the PA recommendations on more days than girls did ( $t = 2,730, p < ,05$ ).

**Table 1.** Number of days achieving the PA Recommendation ( $\geq 60'$  MVPA/ day).

	N	Number of days/week		
		M (SD)	T	Sig. (bilateral)
Total	36	2,83 (2,10)		
Boys	20	3,60 (2,16)	2,73	,010*
Girls	16	1,87 ( 1,62)		

Note. N= total number of cases; M= Mean; SD= Standard Deviation; t= Distribution of Student t, Sig= Signification.

\* $p < 0,05$

Table 2 presents the number of children who achieved the PA recommendation (7 days accumulating  $\geq 60'$  MVPA/ day). Only 7 boys and 1 girl accomplished them.

**Table 2.** Percentage and number of children accomplishing PA recommendations ( $\geq 60'$  MVPA/ day).

	N	Number of children that accomplished the PA recommendation	Percentage
Total	36	8	22,20%
Boys	20	7	35,00%
Girls	16	1	6,30%

Note: N= Total number of individuals

In Figure 1, presents total PA time and MVPA time during week day. Gender differences are also presented. The results show us that there are meaningful differences between the total PA and the MVPA, ( $t= 2,278$ ,  $p< 0,05$ ;  $t= 3,153$ ,  $p< 0,05$ ) respectively.

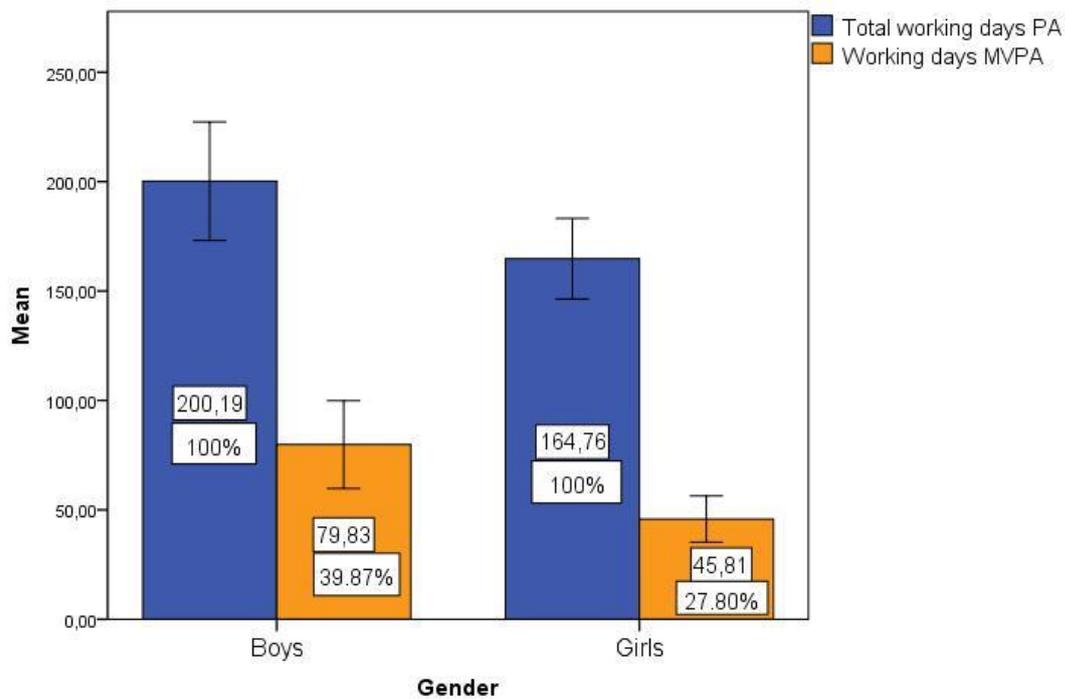


Figure 1. Gender differences and percentage or total working days PA and MVPA.

Table 3 presents the gender differences in the amount of daily PA and the amount of PA during school recess time. Significant differences between boys and girls were found in daily MVPA ( $t=3,153$ ,  $p< 0,05$ ), daily number of steps ( $t=2,382$ ,  $p< 0,05$ ), sedentary time during the school recess ( $t=3,379$ ,  $p< 0,05$ ), the recess MVPA ( $t=2,297$ ,  $p< 0,05$ ), and the number of steps during school recess ( $t=3,320$ ,  $p< 0,05$ ).

**Table 3.** Mean, Standard deviation and significance degree of time dedicated to practice Physical Activity during the working days and the recess according to the gender.

		N	M (SD)	T	Sig (bilateral)
SED Working days	♂	20	1128,96(79,81)	-,135	,893
	♀	16	1131,98(53,22)		
LIGPA Working days	♂	20	134,57(30,05)	,776	,443
	♀	16	127,23(25,64)		
MVPA Working days	♂	20	79,83(42,86)	3,153	,004*
	♀	16	45,80(19,82)		
STEP Working days	♂	20	11824,31(4285,62)	2,382	,024*
	♀	16	9189,62(2208,06)		
SED Recess	♂	20	36,39(7,01)	-3,379	,002*
	♀	16	43,46(5,10)		
LIGPA Recess	♂	20	12,73(3,79)	1,784	,083
	♀	16	10,68(2,88)		
MVPA Recess	♂	20	9,07(4,76)	2,297	,028*
	♀	16	5,85(3,32)		
STEP Recess	♂	20	1406,06(350,42)	3,320	,002*
	♀	16	1045,23(287,20)		

Note. SED: Sedentary; LIGPA: Physical Activity Light; MVPA: Moderate to Vigorous physical activity; N= Number of individuals; M= Mean; SD= Standard Deviation; t= Distribution t of Student;

Sig= Significance; ♂= boys; ♀=girls.

\*  $p < 0,05$

Our sample presented a positive but moderate correlation ( $r = ,410$ ,  $p < ,05$ ) between the amount of MVPA during the working days and the MVPA done during the school recess time ( $r = ,356$ ,  $p < ,05$ ).

In figure 2, we could see the mean of MVPA in minutes during the working days and during the school recess time. School recess time represented a 11.80% of total daily MVPA.

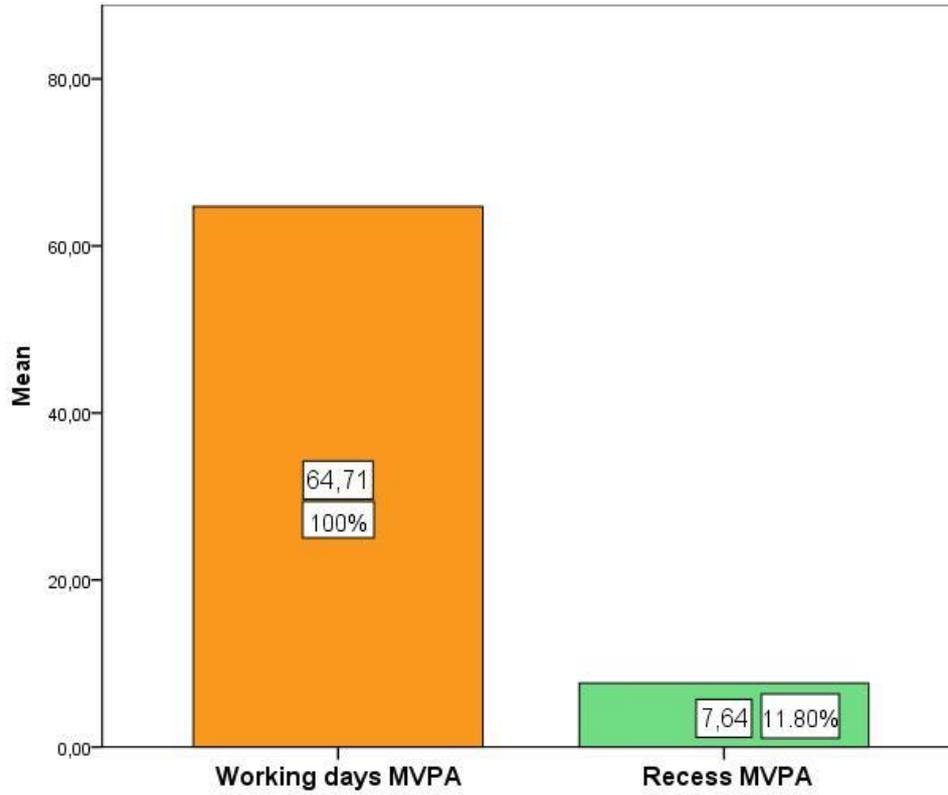


Figure 2. Minute mean of working days MVPA and the recess MVPA.

In the figure 3, the mean of MVPA in minutes during the working days and during the school recess time by gender are presented. Recess time represented the 11,37% of total daily MVPA for boys and 12,77% for girls.

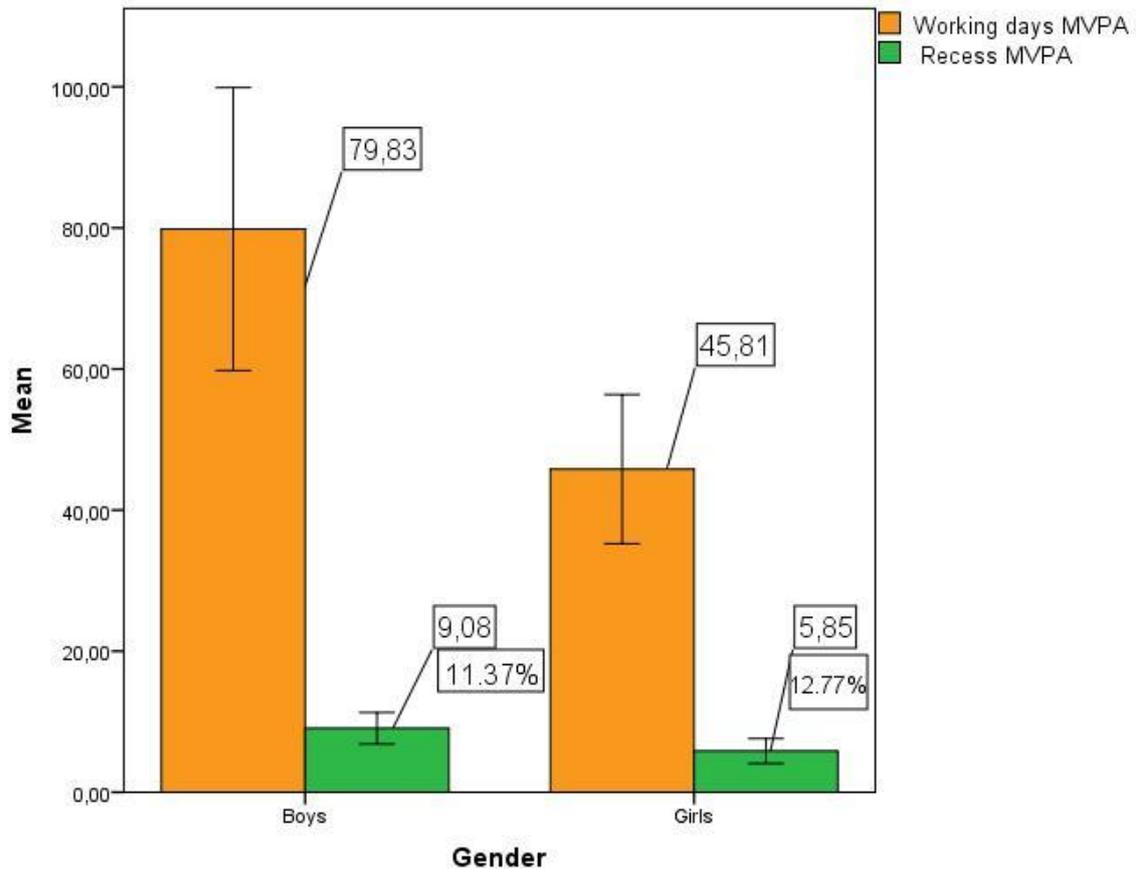


Figure 3. Minutes and Percentage of Working days MVPA and Recess per gender.

#### 4. DISCUSSION AND CONCLUSIONS

The main result of this study was to demonstrate the situation of the state of the healthy PA levels and the existent gender differences. For its part, it is highlighted the analysis of these day moments which you could be active, our attention have been focused on it the same as our analysis of the PA lesson and its repercussion in the global PA calculation (Martínez et al., 2012). So, the specific area that gives chance of acting with other school moments, like the rest of teaching activity, group that have been studied by (Cavill, et al., 2001; Corbin, 2002; Stratton & Mulan, 2005; Mota et al., 2005; Ridgers et al., 2005; Verstraete et al., 2006; Beighle, Morgan, Le Masurier & Pancrazi, 2006; Ridgers et al., 2006; Ridgers et al., 2007; Ridgers, Tóth & Uvacsek, 2009; Ridgers, Fairclough & Stratton, 2010; Ridgers, Saint-Maurice, Welk, Siahpush & Huberty, 2011; Luengo, 2007; Hardman, 2008; Escalante, Backx, Saavedra, Garcia-Hermoso & Dominguez, 2011; and Martínez et al. 2012) is now our business. Nowadays, the recess lasts 30 min daily in the Spanish educational system, which equates two and a half hours throughout the week, providing an excellent opportunity to provide a healthy time and space.

Mota et al. (2005) tried to examine the boys and the girls differences related to the PA quantity in his study about the PA and recess (60 min divided in two parts: morning (10:30-11:00 h); and afternoon (15:30-16:00 h). His data showed that, even though the boys have been considered active than the girls, recess could be very relevant for girls to have a motor action space. For this reason, the time that girls dedicate to the healthy MVPA during the recess was the 38% whereas the time that the boys dedicate to healthy MVPA during the recess was the 31%. This practice is more meaningful in girls than in boys concerning with the total recommended PA and it supposes a percentage of 6 % in boys and the 8 % in girls in relation to the daily activity. For its part, the activity participation within recess represents the 19% and the 15% of the healthy recommendations, gathering the Public healthy aims related to PA. Aznar et al. (2011) noticed that the girls with 9 years old did much MVPA in morning time (11:00 - 11:30 h) than in the evening time (18:00 - 20:00 h) while the boys happened in the reverse order; that is, the boys were active in the evening time. So, it seems that the school day is a very important period for girls to do a lot of MVPA. Our results show that the recess is supposed to be a high percentage in relation to the weekly calculation for the boys and the girls (11,80%), knowing that recess takes 2 hours and a half per week. We could compare them with the late-night 15 hours for the boy and the girl each day in which the boy/girl could be active. We noted that there were meaningful differences between the boys and the girls; the boys were active than the girls but it is a curious result when we saw the percentage related to MVPA during the recess in relation to the MVPA daily. The girls MVPA is higher than the boys MVPA (12,77% y 11,37%). If we compare the MVPA during the recess with the total MVPA, we do not get the similar results as it is reflected in figure 1.

Stratton & Mullan (2000) detailed that the boys were more meaningfully active than the girls in any proposed activity level, but focusing on the MVPA, the values were located between the 24,9 % and the 17,5% respectively in contrast with Mota et al (2005) studies. The MVPA done during the recess in this study meant between the 13,1 % and the 10,8% of the total daily healthy PA. Recently, Ridgers et al. (2011) showed that the recess contributed to the 16% of the total healthy PA per day. These data were different for the boys with a 17,9 % than for the girl witch a 15,6%. Concluding than the recess, within a non-curricular context, acquires an important role, idea which we are agrees with our data. At this point, we are in the starting point for future interventions. Escalante et al. (2011) set out that the practice during the recess was higher in boys than in girls, but there were differences concerning with the options and the opportunities that the recess areas offer. Besides, they watched that the boys participated frequently in team sport activities such as football, handball or basketball from moderate to vigorous strength. For their part, the girls participated in activities with less strength. Generally speaking, the boys are used to participate in competitive activities and the girls prefer the cooperative ones and consider the recess as a socialising opportunity.

According to Sallis, Mckneize, Elder, Hoy, Galati, Barry et al. (1998) works, all these aspects could be affected by cultural and environmental factors. In this

sense, it will be a motif for studying, the data set out that also the girls could participate in activities with diverse strengths through determined games which imply continuous displacement with certain strength or the practice during the recess could be more attractive than the rest of the days.

In conclusion, we are conscious of this work deriving from a transversal investigation based on a pilot study with a reduced number of samples and considering other variables that could affect the recess time, for example, the climate or the time of the year. In spite of this limit, we consider that this study presents results that will help to understand the PA reality and set out new aims for studying, as new approaches in the educative interventions within the school time, such as, creating recess areas implying the pupils mobility and mixed sport programmes generating a motivation level and a motor practice of high strength.

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