

Vera-Estrada, F.; Sánchez-Rivas, E. y Sánchez-Rodríguez, J. (2018) Promoción de la actividad física saludable en el recreo escolar / Promotion of Healthy Physical Activity in School Recreation. Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte vol. 18 (72) pp. 655-668 [Http://cdeporte.rediris.es/revista/revista72/artpromocion980.htm](http://cdeporte.rediris.es/revista/revista72/artpromocion980.htm)
DOI: <http://doi.org/10.15366/rimcafd2018.72.004>

ORIGINAL

PROMOTION OF HEALTHY PHYSICAL ACTIVITY IN SCHOOL BREAKS

PROMOCIÓN DE LA ACTIVIDAD FÍSICA SALUDABLE EN EL RECREO ESCOLAR

Vera-Estrada, F.¹; Sánchez-Rivas, E.²; Sánchez-Rodríguez, J.³

¹ Primary school teacher in the CEIP José María Hinojosa de Málaga (Spain) fveraestrada@gmail.com

² Training adviser. Malaga Teachers Centre (Spain) enriquesr@cepmalaga.com

³ Full professor in the University of Malaga. Faculty of Education, Malaga Teachers Centre (Spain) josesanchez@uma.es

Spanish-English translator: Casimiro, A. anacasimiro.trad@gmail.com

Acknowledgements: The authors wish to show their appreciation to the Physical Education teachers of the participating centers for their collaboration, the management teams of these centers for their support and the families of the students for authorizing carrying out the research.

Código UNESCO / UNESCO Code: 5599 - Otras especialidades pedagógicas (Educación Física y Deportes) / Other historical specialties (Physical Education and Sports)

Clasificación del Consejo de Europa / Council of Europe Classification: 4 - Educación Física y Deporte comparado/Comparative Physical Education and Sport.

Recibido 8 de febrero de 2017 **Received** February 8, 2017

Aceptado 17 de mayo de 2017 **Accepted** May 17, 2017

ABSTRACT

The objective of this work was to investigate what measures could be taken to increase the general levels of physical activity of students in sixth grade of Primary Education during the school breaks. A specific program was implemented from the curriculum of the subject of Physical Education and, after completing its application, physical activity levels were analyzed. In addition, an observation was conducted thirty days after its completion, in order to verify to what extent the habits of physical activity are modified. The instrument of data collection was the pedometer, which the participants used during the periods of

school break. The analysis of the results allows affirming that the application of the specific program object of study affects positively on the increase of the volume of physical activity that the students do in their free time and that, after thirty days from its application, the students keep part of this increase acquired, which means a change in their activity habit during school breaks.

KEY WORDS: public health, physical activity, children, schools, school break.

RESUMEN

El objetivo de este trabajo fue investigar qué medidas se podrían tomar para aumentar los niveles generales de actividad física del alumnado de sexto de Educación Primaria durante los periodos de recreo escolar. Se implementó un programa específico desde el currículum de la asignatura de Educación Física y, después de haber finalizado la aplicación del citado programa, se comprobó los niveles de actividad física. También se realizó una observación pasados treinta días de su finalización, con el fin de comprobar en qué medida se modifican los hábitos de actividad física. El instrumento de recogida de datos fue el podómetro, que los participantes utilizaron durante los periodos de recreo escolar. El análisis de los resultados permite afirmar que la aplicación del programa específico objeto de estudio incide positivamente sobre el incremento del volumen de actividad física que realiza el alumnado en su tiempo libre y que, pasados treinta días desde su aplicación, el alumnado mantiene parte de incremento adquirido, modificando su hábito de actividad durante el recreo escolar.

PALABRAS CLAVES: salud pública; actividad física; niños; escuelas; recreo.

INTRODUCTION

Education for health and physical activity has been gaining prominence in educational policies, which promote the development of healthy habits and lifestyles in students through the school curriculum. The aim is to reduce the growing rates of childhood sedentariness and overweight (WHO, 2010).

These new educational demands recommend a better knowledge of the incidence of physical activity on the school-age population. In this line Tudor-Locke et al. (2011) show that a healthy volume for subjects aged between eight and ten years old is between 12,000 and 16,000 steps a day. Regarding school time, there is a progressive decline from the healthy interval, which is reached in childhood, to average values between 8,000 and 9,000 steps a day within adolescents (Tudor-Locke, Johnson & Katzmarzyk, 2010).

Table 1: Quantification of daily steps necessary for the improvement of health in children between six and twelve years old.

Values for boys (steps/day):	Values for girls (steps/day):
<10,000; "sedentary"	<7,000; " sedentary "
10,000-12,499; "very little active"	7,000-9,499; "very little active "
12,500-14,999; "little active"	9,500-11,999; " little active "
15.000 - 17.499, "active"	12.000 - 14.499; " active "
≥ 17.500 pasos / día; "very active"	≥ 14.500 pasos / día; " very active "

Source: Tudor-Locke, Hatano, Pangrazi & Kang (2008)

Several studies have demonstrated the importance of periods of school breaks to achieve a volume of healthy physical activity. Guinhouya et al. (2006) established that the break contributes up to 26% of daily, moderate and vigorous physical activity of school-age youth. Ridgers, Stratton and Fairclough (2006) claimed that school breaks can contribute between 5% and 40% of the daily recommended physical activity; and that the break contributes between 6% and 13% of the moderate-intense physical activity that should be practiced daily by children aged eight to eleven (Ridgers, Tóth & Uvacsek, 2009). School break, along with physical education sessions, is the key to promote physical activity to healthy levels (Fairclough, Beighle, Erwin, & Ridgers, 2012; Martínez Martínez, Contreras Jordán, Lera Navarro & Aznar Laín, 2012; Ridgers, Stratton & Fairclough, 2005; Ridgers et al., 2006; Stratton, 1999; World Health Organization, 2010).

Taking as reference the specific literature on the development of physical activity in school breaks, most studies are limited to the personal variable of gender. Ridgers, Saint-Maurice, Welk, Siahpush and Huberty (2011); Beighle, Morgan, Le Masurier and Pangrazi (2006) and Ridgers et al. (2011, 2009) found that, with a freely chosen activity, boys do more physical activity than girls during the school break. In this line, different studies are also included (Aznar et al., 2011; Haug, Torsheim, & Samdal, 2010; Martínez, Aznar, & Contreras, 2015; Sarkin, McKenzie, & Sallis, 1997; Tudor-Locke et al. 2011).

Other research lines have explored the relationship between physical activity in school breaks and the level of education (Faison-Hodge and Porretta, 2004; Haug et al., 2010), age (Ridgers et al., 2005; Ridgers, Stratton and McKenzie, 2010) or body mass index (McKenzie et al., 2010; Gareth et al., 2007). However, no studies have been found to analyze whether the volume of physical activity of the pupils in the break increases after the application of specific programs linked to the subject of physical education (P.E.). The most similar studies compare the volume of activity between the P.E. class and the school break (Escalante, Backx, Saavedra, García-Hermoso, & Domínguez, 2011; Jennings-Aburto et al., 2009; Sarkin et al., 1997).

This recommendation should guide the work towards determining the impact of a specific program designed within the framework of the present study

(Sánchez-Rivas and Vera-Estrada, 2013) on the activity that students freely perform during a leisure period, such as the school break. The aim of this study is to determine whether, following the implementation of a specific program for the promotion of recreational physical activity through P.E. classes, the physical activity of the participants increases during school breaks

In the event that there is an increase in the volume of activity after following the program, the knowledge about the level of consolidation of the activity increase will be deepened. In order to do so, it is essential to know the extent to which the increases obtained after thirty days from the end of the implementation of a specific program in order to promote recreational physical activity are maintained.

MATERIAL AND METHODS

Population and sample

The population is formed by students from state and semi-private schools of Primary Education within the territorial area of a district in Malaga city. Therefore, a non-probabilistic (accidental) sampling is performed, determined by the ease of access to the contact data, through the lists that the Malaga City Council publishes in its institutional portal. With this, the filtering of the participating educational centers is articulated according to an accessibility criterion according to their proximity. Thus, a sample of 10 centers (with 492 subjects) was obtained.

Since the program designed is aimed at students in the sixth grade of Primary Education, for the purposes of population and sample students are considered to attend this level during the period of investigation (Table 2).

Table 2: participants

	Population (district of Malaga)	Connected schools	Sample	Experimental Group (6° A)	Control Group (6° B)
Schools	18	18	10	10	10
Students	863	-	492	243	249

Source: own elaboration

The sample was structured into two groups. The first one, which we will call "experimental" is composed of all the subjects enrolled in the letter A, that is to say the students of 6th A of the ten centers conform the group to which the program is applied. The second group is composed of those inscribed in letter B, and will not receive the action of the measure, acting as the "control group". None of the sample centers have more than two lines in sixth grade. In this sense, it should be noted that the ten centers that accepted to be part of the study had a two-line organization, as is usually the case in the school area of the selected district of Malaga.

Ethical principles and data collection

With reference to the Declaration of Helsinki promulgated by the World Medical Association (WMA), a series of guidelines were designed to guide the collection of data.

Before starting the fieldwork, the families and the students involved were informed, and a consent authorization was given to participate in the investigation, which had to be returned and signed by the parents or legal guardians. With the authorization of consent, a fact sheet was included for parents or legal guardians, which indicated the objectives of the investigation and the procedures to be followed in the study. In it, they were also reminded that participation is voluntary and anonymous. In order to clarify any doubts that might arise and encourage participation, the parents and guardians of the students from sixth grade were summoned to an informative meeting.

Once the signed consent was obtained, the teachers participating in the study met to unify criteria and reduce the presence of significant variables in the development of the fieldwork (initial information, program tasks, guidelines for school breaks, etc.) and in the collection of information. Already in the Physical Education class, each of the teachers explained to their students the protocol for taking data on the daily step record sheet.

In order to improve expository clarity, three phases have been established in the development of the data collection sequence:

(1) Phase of application of the pre-test. In order to obtain a familiarity with the data collection tool, before the application of the pre-test, the subjects of the sample used a pedometer during a week (Monday to Friday) to avoid the novelty effect (reactivity). After the familiarization period, data were collected (pre-test) for thirty school days, during periods of school break.

Meanwhile, a protocol was established for the use of the pedometer, which indicated how to wear and take off the pedometer, and how and when the data obtained were recorded.

Table 3: Protocol for Pedometer Use

- | |
|---|
| <ol style="list-style-type: none">1. Students will place the pedometers at the waist during the school break, which lasts 30 minutes. This process will be repeated from Monday to Friday.2. Approximately 5 minutes before the break, the researchers will enter the classes (this intervention is agreed with the center's management team and teachers from the sixth grade in the time before the start of the break) and distribute the pedometers to each participant.3. At the sound of the buzzer both classes will be placed in the indicated place and will go down to the playground, starting at that moment the digitized record of the number of steps accumulated during this period.4. When the buzzer signals the end of break time the students will be placed in their respective rows where the researchers will record the pertinent data.5. Once data collection is complete, the pedometers will be collected and reset for the next record. |
|---|

Source: own elaboration

Once participants were used to using the pedometer and once established the protocol for pedometer use, the data (steps taken) started to be recorded during a month in the school break period. The normal course of the break was not altered; it was simply limited to the data collection both to the control group and to the experimental group.

2) Phase of application of the program and the test. The intervention program designed (Sánchez-Rivas and Vera-Estrada, 2013) was integrated into the curriculum of the subject of Physical Education. Its development took place between the first and second term of the school calendar. From the sessions of Physical Education, they were applied to the subjects assigned to the experimental group during a period of thirty school days, distributed in three Didactic Units (table 4).

Table 4: Contents of the program

Didactic Unit	Sessions	Basic contents
Hanae builds its materials	10	Alternative games with self-built material
Ni Ye, the Lord of the Games	10	Popular and traditional games
Paula is an athlete	10	Pre-sports games

Source: own elaboration

3) Phase of application of the post-test. This phase involved a new data collection, which took place during thirty school days, and which took place one month after the end of the intervention program, throughout the third term of the school calendar.

Tool

The instrument for data collection was the Dista Newfeel 100 pedometer (Oxylane, Villeneuve d'Ascq cedex, France). López Fernández, Pascual-Martos and Álvarez Carnero (2013) consider it an objective and reliable tool to measure the amount of physical activity performed in everyday activities and conclude that it is a valid instrument considered by the international scientific community as the reference instrument for step counting. Other works (Schneider, Crouter, and Bassett, 2004; Tudor-Locke et al., 2009) are along this line.

Statistical analysis

After completing the field work, the statistical treatment of the data was performed with the SPSS program (registered program, Version 20). Considering that our research is based on the analysis of the relationships between variables (Table 5), we will apply the Student's t-test for independent samples. This test will be complemented by the analysis of the basic descriptive statistics.

Table 5: Main variables involved in the study

Independent variable	Specific program for the promotion of recreational physical activity (Sánchez-Rivas and Vera-Estrada, 2013)
First dependent variable (1DV)	Parameters of immediate accumulated physical activity (steps taken) of the participants
Second dependent variable (2DV)	Parameters of accumulated physical activity maintained (steps taken) of participants

Source: own elaboration

Previously, and provided that this is a parametric test, the compliance of the requirements of Normality and Homoscedasticity was respectively verified by the contrasts of Shapiro-Wilk and Levene.

RESULTS

To determine the value acquired by the dependent variables, the mean number of steps was found for both the experimental group and the control group in the various data collections (Table 6).

Table 6: Value of dependent variables (DV)

	Pre-test	Test (DV 1)	Post-test (DV 2)
Experimental group (average of steps)	2,057.44	2,846.56	2,357.88
Control group (average of steps)	1,701.19	1,995.87	1,818.52

Source: own elaboration

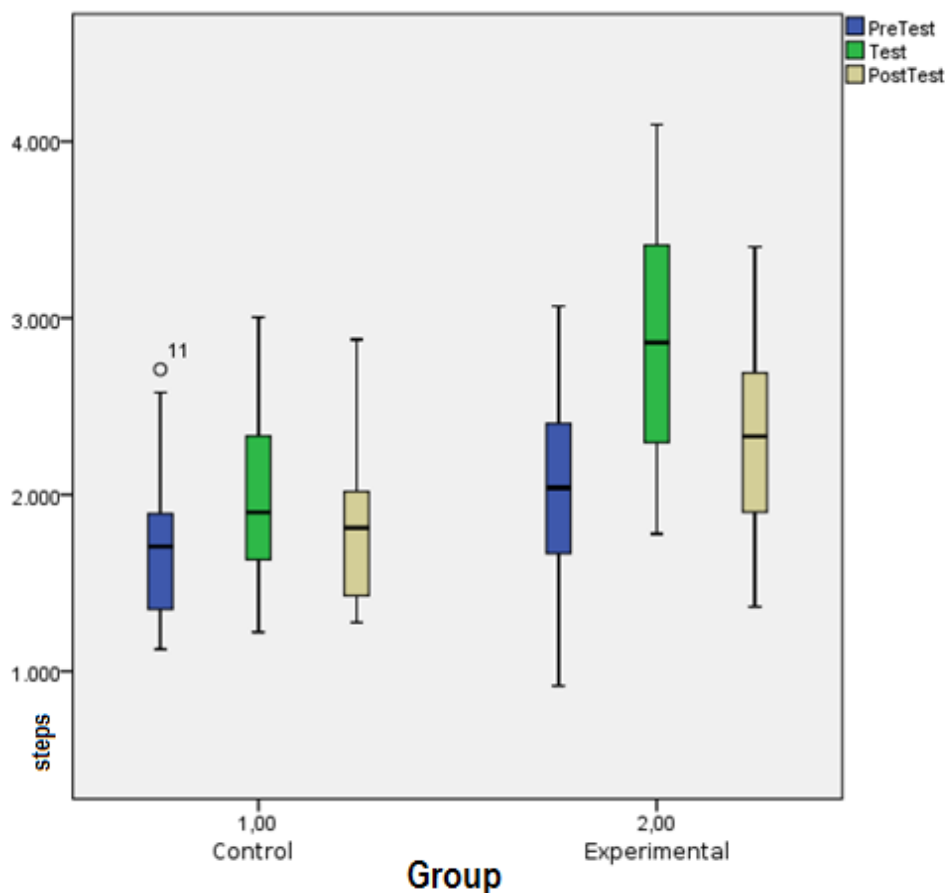
As the data in table 6 show, the increase in general levels of physical activity in the school break obtained by the experimental group has increased from 2,057.44 average steps to 2,846.56 average steps during the performance of the established program, so the difference between the pre-test and the test is 789.12 steps on average per day, which means an average increase of 38.35%. This high percentage points to the existence of significant differences associated with the program.

Continuing on a purely descriptive level, it is worth noting the existence of very important differences between the two groups. While in the pre-test the difference of steps between control group and experimental group of is 356.25 steps/day, in the test, that difference increases to 850.69 steps/day, which represents an increase of 138% with respect to the initial value.

Regarding the habit of consolidated physical activity (in number of steps) of the students, after thirty days from the end of the intervention program, obtained values imply an increase of 300.44 steps/day, which means an increase of the volume of physical activity from 2,057.44 steps/day to 2,357.88 steps/day. As a percentage, the increases obtained imply a level of consolidation of the physical activity habit of 38.07%, which is significant. If we analyze it in reverse, there is a decrease of 488.56 steps/day (from 2,846.44 to 2,357.88), which means a percentage reduction of 61.93% at the end of the program.

Differences are evident when the data are reviewed in a box diagram (Graph 1). When comparing the post-tests of both groups, the central tendency indices of the experimental group (2) were higher than those of the control group (1). Secondly, when comparing the test and the post-test in each group, we can contrast that the boxes of the post-test are below those of the test. Thirdly, if we compare the boxes of the post-tests with those of the pre-tests, in the case of the control group it is practically the same, whereas in the experimental group there is some retention, that is to say that the central tendency index is clearly above the pre-test. Finally, if we compare the positions of the boxes in each group, they indicate that in the control group they are similar in pre-test, test and post-test, whereas in the experimental group, greater differences are observed, being greater between the pre-test and the test than between the test and the post-test.

Graph 1: Box diagram for each of the data collections



Source: own elaboration

The differences observed in the descriptive analysis recommend a deeper analysis of inferential statistics. Before applying the parametric student's t-test for independent samples, it is pertinent to perform Normality contrasts. Given the size of the sample, the Shapiro-Wilk test is applied. The result obtained in the Shapiro-Wilk test is higher than 0.05 (Table 7), which recommends the application of parametric tests.

Table 7: Results of the Shapiro-Wilk test

Group	Shapiro-Wilk		
	Statistical	gl	Sig.
Test 1,00	,949	22	,300
2,00	,964	23	,543

Source: own elaboration

The Levene test for the equality of variances (see Table 8) acquires a value of 0.103 so that the equality of variance is assumed to be greater than 0.05. This makes relevant the application of the Student's t-test to determine the degree of statistical significance of the variance.

Once the parametric assumptions have been verified, the results of the tests applied point to statistically significant differences of the group submitted to the intervention program with respect to the control group in the post-test (Table 8).

Table 8: Test of independent samples. Pre-test, test and post-test

		Levene test for the equality of variances		Student's t-test for the equality of averages						
		F	Sig.	t	gl	Sig. (bilateral)	Difference of averages	Difference of Standard Error	95% confidence interval of the difference	
									Lower	Upper
Pre Test	Equal variances are assumed	3.182	.081	-2.307	43	.026	-356.24802	154.43502	-667.69591	-44.80013
	Equal variances are not assumed			-2.324	39.662	.025	-356.24802	153.26961	-666.09965	-46.39640
Test	Equal variances are assumed	2.781	.103	-4.673	43	.000	-850.68379	182.05393	-1217.83053	-483.53706
	Equal variances are not assumed			-4.703	40.576	.000	-850.68379	180.86520	-1216.06451	-485.30308
Post Test	Equal variances are assumed	2.921	.095	-3.427	43	.001	-539.35771	157.38286	-856.75049	-221.96493
	Equal variances are not assumed			-3.451	40.243	.001	-539.35771	156.29451	-855.18129	-223.53413

Source: own elaboration

DISCUSION

Once the analysis of the data is completed, we can assume an increased physical activity within healthy parameters in the reference population. Considering previous studies (Tudor-Locke et al., 2011), where the number of

necessary steps are established (Table 1) for the subjects of the studied age group to be considered "active", there has been an increase in the volume of activity during breaks between 5% and 6% during the 30 sessions covered by the program implementation period.

Prior to the program, the school break represented between 12.85% and 17.14% of the total of physical activity considered to be healthy for the students of this age (Table 1). The application of the program has allowed the subjects to perform during the school break a physical activity equivalent to between 17.79% and 23.72% of the necessary steps in order to achieve an improvement in health.

These results agree with those reported by other studies (Ridgers et al., 2012; Sarkin et al., 1997) that have analyzed the physical activity performed by primary school students in school breaks from activities proposed by researchers. However, it should be noted that most of the reviewed studies focus on the variables of gender, course, weight or intensity levels of practice through accelerometry. Although, in their recommendations, they propose the convenience of organizing activities to promote the increase of physical activity during school breaks (Muñoz Caro, 2016).

Our experience has shown that the subject of Physical Education can be the backbone of healthy leisure alternatives which increases the physical activity of students during school breaks. This is something that already pointed the study of Faison-Hodge and Porretta (2004) in relation to the students with special educational needs.

We believe that the increase of physical activity in moments of leisure will have more value the more the improvement is consolidated in time. In this sense, one month after the application of the program we have detected that the subjects have consolidated very acceptable levels of consolidation of the physical activity habit, which have been materialized in an average increase of 300.44 steps/day with respect to the initial values (2,057.44 steps/day). The average of physical activity after 30 days was 2,357.88 steps. This is equivalent to a 38.07% maintained increase of physical activity during school breaks.

When comparing these results with those obtained by Guinhouya et al. (2006) and Ridgers et al. (2009) about healthy habits and levels of healthy activity during school breaks, we find that we could affirm that the students of the program have developed the habit of performing physical rather than sedentary activities in these breaks.

CONCLUSIONS

Our research allows us to affirm that the application of the specific program under study has effects on the level of physical activity observed during school breaks, positively affecting on the volume of activity that students perform in their free time. We have detected a significant increase in the physical activity that students perform during school breaks (in the context of reference) after

having experienced the designed program. We have also observed that, after thirty days of the program implementation, the students maintain part of the increase in physical activity that they experienced with the application of the program, as it was evidenced by the results of the comparison of the average of steps between the control and the experimental group (table 8).

Linking the program to the subject of Physical Education has been decisive for the achievement of such favorable results. Therefore, we consider it advisable to recommend to the scientific community to deepen on this line of research. Especially when the study is oriented to the search of proposals aimed at the promotion of physical activity in leisure times of children and young people.

It should be noted that there is a scarce scientific production aimed at studying the effectiveness of strategies that seek the increase of physical activity in school breaks by implementing an intervention program linked to the subject of Physical Education. This lack of specific studies is motivated, to a great extent, by the lack of programs that relate the leisure in the infantile age with the curricular contents. Our research also aims to provide a program that has been proved to be effective for the population participating in the study (Sánchez-Rivas and Vera-Estrada, 2013).

REFERENCES

- Aznar, S., Naylor, P. J., Silva, P., Pérez, M., Angulo, T., Laguna, M., ... López-Chicharro, J. (2011). Patterns of physical activity in Spanish children: a descriptive pilot study. *Child: Care, Health and Development*, 37(3), 322-328. <https://doi.org/10.1111/j.1365-2214.2010.01175.x>
- Beighle, A., Morgan, C. F., Le Masurier, G., & Pangrazi, R. P. (2006). Children's physical activity during recess and outside of school. *Journal of School Health*, 76(10), 516-520. <https://doi.org/10.1111/j.1746-1561.2006.00151.x>
- Escalante, Y., Backx, K., Saavedra, J. M., García-Hermoso, A., & Domínguez, A. M. (2011). Relationship between daily physical activity, recess physical activity, age and sex in scholar of primary school, Spain. *Revista española de salud pública*, 85(5), 481-489. <https://doi.org/10.1590/S1135-57272011000500007>
- Fairclough, S. J., Beighle, A., Erwin, H., & Ridgers, N. D. (2012). School day segmented physical activity patterns of high and low active children. *BMC Public Health*, 12(1), 1-12. <https://doi.org/10.1186/1471-2458-12-406>
- Faison-Hodge, J., & Porretta, D. L. (2004). Physical activity levels of students with mental retardation and students without disabilities. *Adapted Physical Activity Quarterly*, 21(2), 139-152. <https://doi.org/10.1123/apaq.21.2.139>
- Guinhouya, C. B., Hubert, H., Soubrier, S., Vilhelm, C., Lemdani, M., & Durocher, A. (2006). Moderate-to-vigorous physical activity among children: discrepancies in accelerometry-based cut-off points. *Obesity (Silver Spring, Md.)*, 14(5), 774-777. <https://doi.org/10.1038/oby.2006.89>
- Haug, E., Torsheim, T., & Samdal, O. (2010). Local school policies increase physical activity in Norwegian secondary schools. *Health promotion international*, 25(1), 63-72. <https://doi.org/10.1093/heapro/dap040>
- Jennings-Aburto, N., Nava, F., Bonvecchio, A., Safdie, M., González-Casanova, I., Gust, T., & Rivera, J. (2009). Physical activity during the school day in public primary schools in Mexico City. *Salud pública de México*, 51(2), 141-147.
- López Fernández, I., Pascual-Martos, C. A., & Álvarez Carnero, E. (2013). Validation of a pedometer to Measure Physical Activity during school recess. *Journal of sport and health research*, 5(2), 167-178.
- Martínez, J., Aznar, S., & Contreras, O. (2015). El recreo escolar como oportunidad de espacio y tiempo saludable. *Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte*, 15(59), 419-432. <https://doi.org/10.15366/rimcafd2015.59.002>
- Martínez Martínez, J., Contreras Jordán, O. R., Lera Navarro, Á., & Aznar Laín, S. (2012). Niveles de actividad física medido con acelerómetro en alumnos de 3º ciclo de educación primaria: actividad física diaria y sesiones de educación física. *Revista de Psicología del Deporte*, 21(1), 117-123.
- McKenzie, T. L., Crespo, N. C., Baquero, B., & Elder, J. P. (2010). Leisure-time physical activity in elementary schools: Analysis of contextual conditions. *Journal of School Health*, 80(10), 470-477. <https://doi.org/10.1111/j.1746-1561.2010.00530.x>

- Muñoz Caro, G. (2016). *Promoción de actividad física durante los recreos escolares: trabajando con podómetros*. Universidad Miguel Hernández, Elche. Recuperado a partir de <http://dspace.umh.es//handle/11000/2786>
- OMS. (2017). Datos y cifras sobre obesidad infantil. Recuperado 3 de febrero de 2017, a partir de <http://www.who.int/end-childhood-obesity/facts/es/>
- Pérez López, I. J., & Delgado Fernández, M. (2013). Mejora de hábitos saludables en adolescentes desde la Educación Física escolar. *Revista de educación*, 360, 314-337. <https://doi.org/10.4438/1988-592X-RE-2011-360-113>
- Ridgers, N. D., Saint-Maurice, P. F., Welk, G. J., Siahpush, M., & Huberty, J. (2011). Differences in physical activity during school recess. *Journal of School Health*, 81(9), 545-551. <https://doi.org/10.1111/j.1746-1561.2011.00625.x>
- Ridgers, N. D., Salmon, J., Parrish, A.-M., Stanley, R. M., & Okely, A. D. (2012). Physical activity during school recess: a systematic review. *American journal of preventive medicine*, 43(3), 320-328. <https://doi.org/10.1016/j.amepre.2012.05.019>
- Ridgers, N. D., Stratton, G., & Fairclough, S. J. (2005). Assessing physical activity during recess using accelerometry. *Preventive medicine*, 41(1), 102-107. <https://doi.org/10.1016/j.yjmed.2004.10.023>
- Ridgers, N. D., Stratton, G., & Fairclough, S. J. (2006). Physical activity levels of children during school playtime. *Sports Medicine (Auckland, N.Z.)*, 36(4), 359-371. <https://doi.org/10.2165/00007256-200636040-00005>
- Ridgers, N. D., Stratton, G., & McKenzie, T. L. (2010). Reliability and validity of the System for Observing Children's Activity and Relationships during Play (SOCARP). *Journal of Physical Activity and Health*, 7(1), 17-25. <https://doi.org/10.1123/jpah.7.1.17>
- Ridgers, N. D., Tóth, M., & Uvacsek, M. (2009). Physical activity levels of Hungarian children during school recess. *Preventive Medicine*, 49(5), 410-412. <https://doi.org/10.1016/j.yjmed.2009.08.008>
- Sánchez Rivas, E., & Vera Estrada, F. (2013). *El club de la W: ¡Hoy jugamos en clase!: Educación física, 6º Educación Primaria*. Sevilla: Wanceulen.
- Sarkin, J. A., McKenzie, T. L., & Sallis, J. F. (1997). Gender differences in physical activity during fifth-grade physical education and recess periods. *Journal of Teaching in Physical Education*, 17(1), 99-106. <https://doi.org/10.1123/jtpe.17.1.99>
- Schneider, P. L., Crouter, S. E., & Bassett, D. R. (2004). Pedometer measures of free-living physical activity: comparison of 13 models. *Medicine and science in sports and exercise*, 36(2), 331-335. <https://doi.org/10.1249/01.MSS.0000113486.60548.E9>
- Stratton, G. (1999). Limits of agreement between 5 and 60 second heart rate recording intervals during school recess. *Pediatric Exercise Science*, 11, 253-254.
- Stratton, Gareth, Ridgers, N. D., Fairclough, S. J., & Richardson, D. J. (2007). Physical Activity Levels of Normal-weight and Overweight Girls and Boys During Primary School Recess. *Obesity*, 15(6), 1513-1519. <https://doi.org/10.1038/oby.2007.179>
- Tudor-Locke, C., Craig, C. L., Beets, M. W., Belton, S., Cardon, G. M., Duncan, S., ... Blair, S. N. (2011). How many steps/day are enough? for children

- and adolescents. *The International Journal of Behavioral Nutrition and Physical Activity*, 8, 78. <https://doi.org/10.1186/1479-5868-8-78>
- Tudor-Locke, C., Hatano, Y., Pangrazi, R. P., & Kang, M. (2008). Revisiting "how many steps are enough?". *Medicine and science in sports and exercise*, 40(7S), S537-S543. <https://doi.org/10.1249/MSS.0b013e31817c7133>
- Tudor-Locke, C., Johnson, W. D., & Katzmarzyk, P. T. (2010). Accelerometer-Determined Steps per Day in US Children and Youth. *Medicine & Science in Sports & Exercise: Official Journal of the American College of Sports Medicine*, 42(12), 2244-2250. <https://doi.org/10.1249/MSS.0b013e3181e32d7f>
- Tudor-Locke, C., McClain, J. J., Hart, T. L., Sisson, S. B., & Washington, T. L. (2009). Pedometer methods for assessing free-living youth. *Research quarterly for exercise and sport*, 80(2), 175-184. <https://doi.org/10.1080/02701367.2009.10599551>
- World Health Organization. (2010). *Global recommendations on physical activity for health*. Recuperado a partir de <http://www.ncbi.nlm.nih.gov/books/NBK305057/>

Número de citas totales/Total references: 31 (100%)

Número de citas propias de la revista/Journal's own references: 1 (3.2%)