

Cross-cultural adaptation of a questionnaire that evaluates physical activity among children aged 10 and 11

Pedro Luis Rodríguez García, M.D.^a, Juan José Pérez Soto, B.S.^a,
Eliseo García Cantó, M.D.^a and Andrés Rosa Guillamón, B.S.^a

ABSTRACT

Objective. To adapt to certain cultural patterns and to localize into Spanish the Previous Day Physical Activity Recall questionnaire and to evaluate its content, acceptability and reliability.

Method. The Previous Day Physical Activity Recall questionnaire was subjected to a process of direct translation, back translation and final pretesting. Judges assessed their semantic, idiomatic and conceptual equivalences. A preliminary version was pretested. Afterwards, a reliability analysis was made through a test-retesting. According to the committee of judges the rate of agreement was determined using the content validity index and the mean of the judges' scores. Acceptability, through the number of questionnaires with mismatching answers. Reliability was assessed by the stability criterion.

Results. The translated version of the questionnaire reached appropriate semantic, idiomatic and conceptual equivalences with a high content validity index in all the evaluated documents. The 32 schoolchildren that did the pretest employed a mean time of 18 minutes to complete it; 6 subjects replied, at least, 1 mismatched answer; only one questionnaire was discarded (more than 4 mismatch answers). The test-retesting analysis, conducted with 73 school children, showed an intra class correlation coefficient of 0.99 regarding the total metabolic equivalents and of 0.98 and 0.97 for the moderate and vigorous physical activity blocks, respectively.

Conclusions. The adaptation to certain cultural patterns and the localization into the Spanish language of the Previous Day Physical Activity Recall questionnaire showed successful results in each of the studied settings.

Key words: questionnaires, physical activity, youth, adaptation.

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a. Universidad de Murcia, Spain.

E-mail Address:
Dr. Eliseo García Cantó,
M.D.: eliseo.garcia@um.es

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INTRODUCTION

The World Health Organization (WHO) recommends that moderate to vigorous intensity physical activity for at least 60 minutes per day would help children and youth maintain an optimal health status.¹

Taking into consideration the above mentioned recommendations, leisure time physical activity is a

determining factor to get to know physical activity habits adopted by the subject and, thereby have an overall perception of the physical activity performed on a daily basis.^{2,3}

To measure physical activity levels, objective measurement instruments such as accelerometers, pedometers or calorimetry are used. These are usually expensive and difficult to apply in the school setting thus self report methods are easier to administer.⁴

The Previous Day Physical Activity Recall (PDPAR) questionnaire assesses physical activity in the leisure and free time and has some metabolic equivalents set for each activity performed. The physical activity performed, and its intensity, is assessed in blocks of 30 minutes. This instrument has been validated among young teenagers⁵ and among schoolchildren aged 10 and 11.⁶

The instrument is completed individually and the subject should perform a recall of the activities performed the previous day after school (3:00-11:30 p.m.), as well as their relative intensity. In an attached sheet, a series of common activities grouped in different categories is provided. Once subjects select the timeframe and activity, they are asked to indicate the type of relative intensity to which they performed such activity. For each level of intensity students are assisted with drawings reflecting typical activities.

In the validation study of the questionnaire,⁵ a table with metabolic equivalents for each activity and their respective level of intensity is shown. This table was designed under the compendium of physical activities⁷

and based in references from other authors well-known in the physical activity setting.⁸⁻¹¹

One of the characteristics of the instrument is that it not only provides a measure of the summary of the total physical activity in energy expenditure, but it also detects the participation in specific encounters of moderate-to-vigorous-intensity activity.

Due to the lack of questionnaires that measure schoolchildren's physical activity in a reliable and accurate fashion,¹² and more precisely in Spanish language, the localization of this questionnaire into Spanish was planned. The objective of this study is to develop the adaptation of the PDPAR to the Spanish culture and language, analyzing its content, acceptability and reliability.

POPULATION AND METHODS

Cultural adaptation

For the cross-cultural adaptation of the PDPAR, a translation of all the elements that form part of it was made (list of activities, instruction script, activity scale and registration table)¹³ following the steps for the cultural adaptation of the questionnaire that are shown in *Table 1*.

Firstly, a translation was done by two bilingual Spanish into English translators. One of the translators received information about the objectives of the translation of the scale, and the other one was blind to the objective. Both translations were compared and analyzed by a

professional translator until an agreement was reached and a unique version was done. That version was back translated into English by two bilingual translators who, in turn, were natives of English speaking countries and who had not participated in the translations before. Two translations into English were obtained.

A group of 7 bilingual experts in the field participated in the committee that evaluated the translations. The translation of the PDPAR was appraised in two areas: firstly, the semantic and idiomatic equivalence to determine whether items translated into Spanish kept the meaning of the source version; and, secondly, the cultural equivalence to verify if the description of activities corresponded with those experienced by Spanish children and youth.

In turn, activities described and time frames proposed were reviewed, since, being an American instrument, some of the activities that American children and youth perform cannot be literally translated to the Spanish context. Likewise, the time school finishes in Spain is different. Some activities were modified, such as "housework/paperwork", that was replaced by "duties/study"; despite not being the most appropriate translation, it was interpreted that it was easier to be understood by schoolchildren. Likewise, the activity "navegar en internet" (navigate internet) was added to "jugar a videojuegos" (play videogames) since it was a common

TABLE 1. Graphic representation of the steps followed for the cultural adaptation of the PDPAR Spanish version (adapted from Beaton et al., 2000)¹³

Step 1: Translation	- Two translations: T1 and T2. - In the language object of study. - Non blinded + blinded translator.	Written report for each version (T1 and T2)
Step 2: Synthesis	- Synthesize T1 and T2 into T12. - Solve any discrepancies with the translators' reports.	Written report
Step 3: Back translation	- Two English first-language. - They are unaware of the translation result. - They work with the T12 version. - They create 2 translations in English: T11 and T12.	Report written for each version (T11 and T12)
Step 4: Expert committee review	- Review all reports. - Methodologist, developer, language professional and translators. - Reach consensus on discrepancies. - Produce prefinal version.	Written report
Step 5: Pretesting	- n= 30-40. - Complete questionnaire. - Probe to get at understanding of items.	Questionnaire elaboration

PDPAR: Previous Day Physical Activity Recall.

activity among Spanish children and youth. In addition, it was considered that the original instrument evaluated physical activity in the leisure and free time from 03:00 p.m. to 11:00 p.m., while the time school finishes for Spanish children and youth who attend public schools is at 02:00 p.m. Therefore, it was decided that two additional blocks would be added to the grid, so that the starting point would be by the time school finished (02:00 p.m.). Once the provisional questionnaire was defined, the content validity was finalized with the pretest.

Pretesting

With the PDPAR version adapted to the Spanish context, schoolchildren aged between 10 and 11 were chosen by means of a simple randomized sampling. The number of discrepancies was assessed, as well as the questionnaires discarded for doing 4 or more. The incompatible response was that in which there was discrepancy between the mode of physical activity chosen and the intensity assigned⁵ (*Annex 1*).

In addition, after filling in the questionnaire, in the last page, schoolchildren were asked if they had had any difficulty or if there was any activity or part of the questionnaire they had not understood.

Testing-retesting

For this assessment, a sample of schoolchildren aged 10 and 11 attending public centers of primary education of the southwest of Spain was chosen by simple randomized sampling. These subjects were different from the ones chosen in the pretesting stage.

Subjects completed a measurement very early in the morning (09:00 a.m.), related to the physical activity they had performed on Monday in their leisure and free time; and, 4 hours later, in the last hour of the school day (13:00 a.m.), they filled in the questionnaire again, reproducing the same conditions as in the first measurement. Therefore, a 4 hour period was established between measurements. The data of each subject chosen for the analysis was the amount of times they had completed a chart with the activity number and its corresponding intensity that, according to the metabolic equivalence (*Annex 2*) and the international recommendations, was equal to moderate activity (3-6 metabolic equivalents) or to vigorous activity (> 6 metabolic equivalents).¹⁴

Data analysis

For the assessment of the semantic, idiomatic and cultural equivalence, the content validity index (CVI), which measures the rate of agreement among judges on the assessed items was used. A scale that provided options of the degree of agreement, with a score that varied from 1 (representative) to 4 (non-representative) based on the values recorded by the 7 judges was employed. The CVI was calculated in each item by means of the sum of the assessments received with a score of 3 or 4, divided by the total number of assessments received, that, in this study, were as many as the number of judges who participated.¹⁵ The items that received any score below 3 were reviewed. The mean of the answers that each judge assigned to the item, which ranged from 1 to 4, was also calculated.

In the pretesting stage, its estimated acceptability was measured through a percentage of charts incompatibly completed and those who had completed the whole questionnaire in a correct fashion. Likewise, its usefulness was assessed by means of the time used to fill in the questionnaire.

Reliability was estimated through stability of the measurement; the concordance among repeated measurements (testing-retesting) was verified using the intra class correlation coefficient (ICC). The statistic package SPSS (v. 19.0 of SPSS Inc., Chicago, IL, EE.UU.) was used to conduct the study.

Additionally, the informed consent of all those who participated in the study as well as of headmasters and parents' associations of participating primary school centers was obtained. This work has obtained a positive feedback by the Bioethics Committee of the University of Murcia and was approved without any ethical objections.

RESULTS

The rate of agreement among experts in the analysis of semantic, idiomatic and conceptual equivalences of the different items, which includes the instruction script to be followed, the activity scale, the list of activities and the chart to complete is shown in *Table 2*.

Results showed a CVI of 0.8-1 in all the assessed items of semantic and idiomatic equivalence, as well as in 35 of the 36 items of cultural equivalence. Only one item (*28. Lift weights*) was below 0.8 and was reviewed and analyzed by judges. The means of the judges'

scores ranged from 4 (totally representative) to 3.43 in its semantic equivalence; while it ranged from 4 to 3.14 in its cultural equivalence.

Pretesting

Out of the total number of subjects (n= 32; 15 males) that did the pretesting, 6 had one or more incompatible responses and a questionnaire was discarded, as observed in *Table 3*.

Of all the schoolchildren studied in the pretesting, 3 (9.3%) pointed out having difficulties in the understanding of intensities and 1 (3.12%), in the process of filling in the charts. No doubts

were recorded regarding the type of activities. The average time used for completing the questionnaire was 18 minutes.

Testing-retesting

With a sample of 73 schoolchildren (33 males), the ICC was calculated in two ways: firstly, the reliability among repeated measures through the total caloric expenditure measured in metabolic equivalents was set (*Table 4*); and, secondly, through the indicated number of blocks of moderate and of vigorous physical activity (*Table 5*).

TABLE 2. Translation of activities and agreement among judges

N°	OVA	SVA	JAM		CV	
			SD	CE	SD	CE
List of Activities						
1	Meal	Comida del medio día. merienda o cena	3.57	4	1.0	1.0
2	Snack	<i>Snack</i>	4	4	1.0	1.0
3	Cooking	Cocinar	4	3.86	1.0	1.0
4	Sleeping	Dormir	4	4	1.0	1.0
5	Resting	Descansar	4	4	1.0	1.0
6	Shower/Bath	Ducharse/bañarse	4	4	1.0	1.0
7	Ride in car. Bus	Ir en coche/autobus	4	4	1.0	1.0
8	Travel by walking	Andando	4	4	1.0	1.0
9	Travel by bike	En bicicleta	4	4	1.0	1.0
10	Job (list)	Trabajo (poner cuál)	4	4	1.0	1.0
11	Housework/paperwork	Deberes/estudiar	3.57	4	0.8	1.0
12	Housechores (list)	Tareas de casa	4	4	1.0	1.0
13	Watch TV	Ver la televisión	4	4	1.0	1.0
14	Go to movies/ concert	Ir al cine/conciertos	4	4	1.0	1.0
15	Listen to music	Escuchar música	4	4	1.0	1.0
16	Talk on the phone	Hablar por teléfono	4	4	1.0	1.0
17	Hang around	Dar una vuelta	3.86	4	1.0	1.0
18	Shopping	Comprar	4	4	1.0	1.0
19	Play video games	Jugar a videojuegos/internet	3.71	4	1.0	1.0
20	Other (list)	Otros (lista)	4	4	1.0	1.0
21	Walk	Andar	4	4	1.0	1.0
22	Jog/run	Correr	4	4	1.0	1.0
23	Dance (for fun)	Bailar	3.57	4	1.0	1.0
24	Aerobic dance	Bailar <i>aerobic</i>	4	3.43	1.0	0.8
25	Swim (for fun)	Nadar (por diversión)	4	4	1.0	1.0
26	Swim laps	Nadar (entrenamiento)	4	3.43	1.0	0.8
27	Ride bicycle	Montar en bicicleta	4	4	1.0	1.0
28	Lift weights	Hacer ejercicios de pesas	4	3.14	1.0	0.7
29	Use skateboard	Usar el <i>skateboard</i>	4	4	1.0	1.0
30	Play organized sport	Jugar a un deporte organizado	4	4	1.0	1.0
31	Did individual exercise	Hacer ejercicio de forma individual	4	3.71	1.0	1.0
32	Did active game outside	Hacer ejercicios fuera de la casa	4	4	1.0	1.0
33	Other (list)	Otros (lista)	4	4	1.0	1.0
Instructions guide		Guión de instrucciones	3.57	4	1.0	1.0
Activity scale		Escala de actividades	3.57	4	0.8	1.0
Registry table		Tabla de registro	4	4	1.0	1.0

OVA: original version activity; SVA: Spanish version activity; JAM: judge acceptance mean.

The JAM was rated from 1 (non-representative) to 4 (representative). SE: semantic-idiomatic equivalence;

CE: cultural equivalence. CVI: content validity index.

DISCUSSION

In this study, an adaptation of the PDPAR to certain culture patterns and to the Spanish language has been carried out by means of the analysis of its content validity and the assessment of its acceptability and reliability.

The content analysis has reflected acceptable levels of agreement among judges. Most items were rated as representative in their semantic, idiomatic and conceptual equivalence. This translation method has already been used in other cross-cultural translations of questionnaires related to health and successful results have been obtained.¹⁶

In a study in which a similar translation system was used, the authors performed the cultural adaptation into Portuguese of a questionnaire for the measurement of physical activity. The CVI levels described by the judges ranged from 0.8 to 1, and the semantic, idiomatic and conceptual levels were deemed satisfactory and valid for the questionnaire to be used.¹⁷

In our study, all the items are situated within this range, which suggests that there has been a high level of agreement among judges. Two items had to be modified after the review stage for showing an answer that was not representative enough by one of the judges. In this way, item 26, "swim laps", that had been translated as "nadar (largos)", was replaced according to the review regarding cultural equivalence by "nadar (entrenamiento)" swim (training). Also, item 28, "lift weights", that was translated as "levantamiento de pesas", was replaced, in its cultural review, by "hacer ejercicios de pesas" (exercise with weights).

PDPAR Spanish version has proved to be a useful instrument in the school setting for being flexible and apparently well understood by schoolchildren, since only 6 subjects had incompatible answers when filling in the questionnaire. The time to do the questionnaire was appropriate so that the daily class routine was not excessively interrupted.

In another study with Colombian youth that evaluated 3-Day Physical Activity Recall (3DPAR) reproducibility, which is an instrument similar to the PDPAR but mandatorily measured in 3 days, with more activity blocks and thought, at first, for adolescents,¹⁸ the mean time used was 29 minutes. The difference with the 18 minutes used in our study can be accounted for because authors rated physical activity from 05:00 p.m. to 11:00 p.m., and therefore there was a remarkable higher number of blocks to be filled.¹⁹ It should be taken into account that, in our adaptation, the leisure period out of school (02:00 p.m.-11:00 p.m.) is being assessed.

TABLE 3. Number of incompatible answers in the PDPAR questionnaire

Incompatible answer	Male	Female	Total
1	1	2	3/32
2	0	1	1/32
3	1	0	1/32
4*	0	1	1/32
			6/32

* In the subjects that answered 4 or more incompatible answers the questionnaire was discarded.

TABLE 4. Testing-retesting correlation of daily metabolic equivalents

Testing	Mean	N	SD	E	Correlation	p value
Metabolic equivalents test/day	41.8593	77	9.41937	1.07344	0.999	0.000
Metabolic equivalents retesting/day	41.8806	77	9.41802	1.07328		

N: number of subjects; SD: standard deviation; E: mean typical error.

TABLE 5. Testing-retesting correlation of blocks of moderate and vigorous physical activity

		M	N	SD	E	Correlation	p value
VPA	Testing	1.3766	77	1.73235	0.19742	0.976	0.000
	Re-testing	1.3117		1.67222	0.19057		
MPA	Testing	0.7792	77	1.35359	0.15426	0.986	0.000
	Re-testing	0.8052		1.30826	0.14909		

VPA: Vigorous physical activity; MPA: Moderate physical activity; M: mean; N: number; SD: standard deviation; E: mean typical error.

The instrument reliability assessed via the testing-retesting calculation of the number of metabolic equivalents used per day showed very high consistency levels (ICC= 0.99). When the testing-retesting reliability was checked via the indicated number of blocks of moderate (ICC= 0.98) and vigorous physical activity (ICC= 0.97), equally consistent stability levels were observed. In the study that established PDPAR reliability and validity,⁵ an ICC= 0.98 was obtained, which indicated that subjects' recalls of their physical activity pattern performed the day before were stable when they were informed twice within an hour. In our study, they were informed with a 4 hour interval between measurements, since it was considered that a longer period between measurements would render more consistency to the resulting measure.

In the study with Colombian youth on the reliability of 3DPAR,¹⁹ the ICC was analyzed per blocks of strong and very strong physical activity and ICCs of 0.55 and 0.63, respectively, were obtained. The difference with our results might relate to the time interval between measurements authors set up, which ranged from 21 to 63 days, and reproducibility tended to diminish with such a long time between measurements.

In another study that validated the 3DPAR version in Singapore, a sample of adolescents was evaluated; interval between measurements, which resulted in an ICC= 0.88 for the total mean of metabolic equivalents. With that same instrument, a testing-retesting was also carried out among Greek youth and an ICC= 0.97 was shown between total metabolic equivalents of the two measurements performed within an interval of two weeks.²⁰

This study has some limitations. First, the typical ones of internal validity which the self-report measurements have, where it should be taken into account that there is a trend among youth to overestimate the intensity of the physical activity carried out.²¹ And, secondly, the cross-sectional nature of the study, since the testing-retesting was carried out in one day and does not allow to know whether subjects would have continued reporting measurements in an appropriate way during the following days. Nevertheless, high degrees of testing-retesting reliability should be considered as well as the degree of agreement shown among judges in cultural adaptation. Likewise, as it is a questionnaire about activities performed on the day before, it is not a measurement of

an individual but population physical activity pattern, given the intra subject variability that might be present throughout the days.

CONCLUSIONS

PDPAR adaptation was successful as far as content validity, acceptability and reliability. Thus, this instrument turns into a practical tool to assess, in a subjective fashion, the physical activity performed by Spanish schoolchildren aged 10 and 11 out of school. Further studies should be conducted to assess its extrapolation to other populations. ■

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Annex 1. Scales of Activity

In the following page there is a scale showing the main activities you carried out yesterday. Please, pay attention to write on the scale about yesterday activities.

1. For each time period write the number of the main activity you did in the box corresponding to the time scale.
2. Then assess how physically intense those activities were. Place an "X" on the assessment scale to indicate if the activities performed in each time period were:

- **Very light:** where the breathing rate is relaxed or there is almost no movement.



- **Light:** normal breathing rate and regular or normal movement.



- **Medium:** where breathing rate increases. Fast movements during short periods of time.
- **Hard:** where the breathing rate is very fast, a very fast movement during 20 minutes or more.



PLEASE BE AS ACCURATE AS POSSIBLE WITHOUT TAKING MUCH TIME IN FILLING IN THE QUESTIONNAIRE.

NUMBER OF ACTIVITIES

Eating:

1. Lunch, tea or supper.
2. Snack, candies, etc.
3. Cooking.

Sleeping/Taking a bath/Taking a shower:

4. Sleeping.
5. Resting.
6. Taking a shower/taking a bath.

Means of transport:

7. Ride a car/bus.
8. Walking.
9. By bicycle.

Work/School:

10. Job (list): _____
11. Homework/Study.
12. Housechores (list): _____

Leisure time:

13. Watch TV.
14. Go to the movies/concerts.
15. Listen to music.
16. Talk on the phone.
17. Hang around.
18. Shopping.
19. Play videogames/internet.
20. Others (list): _____

Physical activities:

21. Walk.
22. Jog.
23. Dance (for fun)
24. Aerobic dance.
25. Swim (for fun)
26. Swim (training)
27. Ride a bicycle.
28. Exercise with weights.
29. Use the skateboard.
30. Play an organized sport
31. Exercise individually.
32. Exercise out of the house.
33. Others (list): _____

Circle the week day in which you performed the activities: M T W T F S S	1. Write the activity number in this column Activity number	2. Write an X to determine how hard the activities were			
		 Very light	 Light	 Medium	 Hard
Noon	14:00				
	14:30				
	15:00				
	15:30				
	16:00				
	16:30				
Afternoon	17:00				
	17:30				
	18:00				
	18:30				
Afternoon - Evening	19:00				
	19:30				
	20:00				
	20:30				
	21:00				
Evening	21:30				
	22:00				
	22:30				
	23:00				

Annex 2. Equivalence of PDPAR intensities and metabolic equivalents (Weston, Petosa y Pate, 1997)⁷

Assignment of levels of metabolic equivalents to each 30 min. block of the PDPAR

Mode of physical activity	N°	Very light	Light	Medium	Hard	References
Meals	1	1.5	1.5	1.5*	1.5*	8, 9
Bag of potato chips (snack)	2	1.5	1.5	1.5*	1.5*	8, 9
Cooking	3	2.0	2.0	2.0*	2.0*	8, 9
Sleeping	4	1.0	1.0	1.0*	1.0*	8, 9, 10
Resting	5	1.0	1.0	1.0*	1.0*	8, 9, 10
Taking a shower /a bath	6	2.0	2.0	2.0*	2.0*	9
Ride a car /bus	7	1.5	1.5	1.5*	1.5*	8, 9
Walking	8	3.0	3.0	4.5	4.5	8, 9, 10
Cycling	9	3.0	3.0	4.5	4.5	8, 9, 10
Job (list)	10	Taken directly from the compendium				8
Homework /study	11	1.5	1.5	1.5*	1.5*	8, 9
Housechores	12	Taken directly from the compendium				8, 9
Watch TV	13	1.5	1.5	1.5*	1.5*	8, 9
Go to the movies /concerts	14	1.5	1.5	1.5*	1.5*	8, 9
Listen to music	15	1.5	1.5	1.5*	1.5*	8, 9
Talk on the phone	16	1.5	1.5	1.5*	1.5*	8, 9
Hang around	17	1.5	1.5	1.5*	1.5*	8, 9
Shopping	18	2.0	3.0	3.0	3.0*	8, 9
Hobby. Play videogames	19	Taken directly from the compendium				7
Others	20	Taken directly from the compendium				7
Walking (slowly)	21	3.0*	3.0	4.5	4.5*	8, 9, 10, 11
Running / footing	22	6.0*	6.0	9.0	12.0	8, 9, 11
Dancing	23	3.0*	3.0	4.5	4.5*	8, 9, 10, 11
Aerobic dance	24	5.0*	5.0	8.0	11.0	9, 11
Swimming (for fun)	25	3.0*	3.0	4.5	4.5*	8, 9, 10, 11
Swimming (training)	26	5.0*	5.0	8.0	11.0	8, 9, 11
Riding a bicycle (fast)	27	5.0*	5.0	8.0	11.0	8, 9, 10, 11
Exercising with weights	28	4.0*	4.0	6.0	6.0	8, 9, 10
Using the skateboard	29	3.0*	3.0	4.5	4.5*	9
Playing an organized sport	30	5.0*	5.0	8.0	11.0	8, 9, 10, 11
Exercising individually	31	5.0*	5.0	8.0	11.0	8, 9, 10, 11
Exercising out of the house	32	Taken directly from the compendium				7
Others	33	Taken directly from the compendium				7

**Indicators of inappropriate combinations of activity mode and intensity.*

PDPAR: Previous Day Physical Activity Recall.