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Full Length Research Paper

Reliability and content validity of the organized physical activity questionnaire for adolescents

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Abstract

Objective: The purpose of this study was to develop and to determine reproducibility and content validity of the Organized Physical Activity Questionnaire for adolescents (OPAQA). Methods: Initially literature was reviewed and OPAQA was developed; after that the initial version of the OPAQA was reviewed by the co-authors and by 5 experts in the Exercise Science filed with emphases on conceptual framework and methodological knowledge about construction of questionnaires. Subsequently, the 5 experts and 77 participants (aged 11–18 years; boys=33) were used to evaluate content validity and reproducibility of the OPAQA respectively. Participants were asked to complete the OPAQA twice with an in-between period of approximately 2 weeks. Content Validity Coefficient (CVC), Kappa index and Spearman correlations were used for the analyses. Results: CVC were 0.83 (for current practice) and 0.82 (for previous practice); Kappa analyses ranged 0.37-0.95 (p=0.002) for current practice and 0.82 for previous practice; Spearman correlations for overall reproducibility of OPAQA were 0.68 (p<0.001) for current practice, and 0.75 (p<0.001) for previous practice. In conclusion the OPAQA is a fairly reliable and reasonably valid questionnaire and may be used in researches that aim to investigate organized of physical activities in adolescents.

Keywords: Validation Study; Motor activity, Teenagers.

INTRODUCTION

Organized physical activity (OPA) can be considered one of the most important environment for children and adolescents achieve the recommendation for 60 minutes of moderate to vigorous physical activity (Alves et al., 2005; Malina et al., 2009; Malina, 2009). These activities can be defined as those that involve regular classes, training, or competition, are formally structured, and are led by a coach, instructor, or teacher (Okely et al., 2001). Some examples include playing soccer or basketball, swimming or athletics clubs or any other team or individual and attending dance or martial arts in general.

Tracking OPA in adolescents can be considered an important approach for improving youth health. The National Survey of Children's Health (Walsh et al., 2011) reported that 60% of youth were engaged in at least one OPA. Over those, 70% dropped out organized activity's programs prior high school. The reasons for drop out vary depending on gender, age, and intensity of participation, but the common reasons include, OPA conflicts with other activities, too much of a time commitment, excessive pressure and specially socioeconomic status and lack of fun (Burden and Dixon, 2013; Butcher et al., 2002; Russell, 2014; White and McTeer, 2012). The high rates of OPA dropout are troubling, because it represents a lack of opportunity to enhance youth health, such as increasing levels of moderate to vigorous physical activity (MVPA)(Machado-Rodrigues et al., 2012) and increasing bone mineral composition (Tenforde and Fredericson, 2011), through OPA.

Thus, understanding the mechanisms that facilitate regular participation and decrease in OPA, such as tracking of activities through lifespan (current and previous OPA), should be considered an important approach to improving youth health, since OPA have been considered one of the most important environments for youth to accumulate health enhancing levels of MVPA (Alves et al., 2005; Malina et al., 2009; Malina, 2009).

A self-report measurement is often the most feasible

methodology to collect information on OPA. Because it is cost-effective, very efficient and easy to administer on a large-scale many studies investigating OPA have been used questionnaires (Buckworth and Nigg, 2004; Côté et al., 2007; Fransen et al., 2012; Leite et al., 2009; Pate et al., 2000; Telama and Yang, 2006; Vilhjalmsson and Kristjansdottir, 2003; Young et al., 2008). Fransen et al., (2012) investigating 735 boys (aged 6-12years) used the Flemish Physical Activity Computerized Questionnaire (Philippaerts et al., 2006). This questionnaire allowed the participant to report their participation in only one sport during the year how many hour per practice. Further, Balaguer et al. (2012) used the adaptation of the Health Behavior of School Children to assess OPA in adolescents. Participants responded what activities outside of school they were engaged (i.e. soccer, basketball, volleyball, tennis, handball, athletics, martial arts, aerobics, swimming, ballet, etc.), their frequency (never practice sport, practice less than once a week, practice once a week, practice between 2-3 times a week, practice between 4-5 times a week, and practice between 6-7 times a week) and the duration (ranging from less than 5 minutes, between 5-10 minutes, between 15-20 minutes, between 25-30 minutes, between 35 and 45 minutes and more than 45 minutes). However, to our knowledge literature does not provide valid instruments that also report adolescent's previous (more than one year of practice) OPA participation.

A systematic review (Helmerhorst et al., 2012) aimed to provide an updated review of the existing and more recently developed physical activity questionnaires (including OPA) review that only 4 questionnaires addressed to youth provide some kind of OPA measures (Martinez-Gomez et al., 2010; Ridley et al., 2006; Treuth et al., 2005; Welk et al., 2007). However, over those, none report adolescents' prior activities (prior a year) and specifically the Organized Physical Activity Questionnaire for adolescents (OPAQA) was designed to address this limitation. Thus, the objective of this study was to design an instrument that could be used to track OPA in adolescents and determine its reproducibility and content validity.

METHODS

Study design and sample

The instrument development included a literature review, input from 5 committee members, experts on the Exercise Science and Physical Education field, with emphases on conceptual framework and methodological knowledge about construction of questionnaires (Alexandre and Colluci, 2011), and test-retest from adolescents (aged 11–18 years) as suggested by the literature (Cassepp-Borges et al., 2010). All adolescents were Brazilians, recruited from an urban school district in northwest of Recife, Brazil, and had similar social status characteristics.

Description of the OPAQA

The OPAQA is a self-administered questionnaire and was developed to identify and prove sufficient detail on OPA participation (excluding physical education) in adolescents (current and previous activities). In the first section of the OPAQA students are asked to report the all types of the organized activity (e.g. swimming, soccer, ballet) that they were currently engaged. For each activity mentioned, the adolescents were asked the number of days (i.e., times attended per week) they usually practice. Next, students were then asked to report how long (duration in hours or minutes) they had spent doing each activity and the total time (months) spent in each activity (maximum six months). Second section of the questionnaire correspond to the OPA that adolescents were engaged prior the last six months. Same questions about type of activity, frequency, and duration were asked. In addition adolescents were also asked to report in what age they started to do the practice (i.e. since I was 5 years old) (Appendices).

Procedures

Prior to data collection, study procedures were approved by the local Ethics Committee and written informed consent was collected from all participants. Initially, an extensive review of the literature was carried out, in order to find previous questionnaires involving OPA. After that the OPAQA was develop by the authors.

Content validity

The initial version of the OPAQA was reviewed by the co-authors and by the 5 experts committee for further suggestions. Once the instrument was considered finalized, the experts were invited to examine the content validity. This committee evaluated the content validity of OPAQA, using a Likert scale developed by the investigation team. Experts expressed their degree of agreement according to the 1) clarity of the language, 2) practical relevance and 3) theoretical relevance of instrument, on a scale of 1 to 5, justifying their score (1: nothing relevant or unclear; 5: very relevant or very clear) (Cassepp-Borges et al., 2010). Acceptable level of content validity was set as 0.70 or higher (Cassepp-Borges et al., 2010).

Reliability

After modifying instruments to improve clarity and

Table 1. Content validity coefficient (CVC) of the Organized Physical Activity Questionnaire for adolescents

Organized Physical Activity (OPA)			
Current OPA	**Clarity**	**Theoretical relevance**	**Practical relevance**
	CVC Mean	**CVC Mean**	**CVC Mean**
Item 1 (current engagement in OPA)	0.80	0.85	0.76
Item 2 (type of OPA practiced)	0.95	0.95	0.90
Item 3 (frequency)	1.00	1.00	0.96
Item 4 (duration)	0.85	0.90	0.83
Item 5 (total time spent currently)	0.75	0.85	0.70
Item 6 (practice on vacations breaks)	0.85	0.90	0.83
TOTAL	**0.86**	**0.90**	**0.83**
Previous OPA	**Clarity**	**Theoretical relevance**	**Practical relevance**
	CVC Mean	**CVC Mean**	**CVC Mean**
Item 1 (previous engagement in OPA)	0.75	0.85	0.90
Item 2 (previous engagement in OPA 2)	0.75	0.75	0.70
Item 3 (type of OPA practiced)	1.00	1.00	0.96
Item 4 (frequency)	1.00	1.00	0.90
Item 5 (duration)	0.90	0.95	0.83
Item 6 (total time spent currently)	0.85	0.95	0.76
Item 7 (practice on vacations breaks)	0.90	0.80	0.70
TOTAL	**0.87**	**0.90**	**0.82**

Note: CVC = Content validity coefficient

minimize response error, the OPAQA was applied, by trained researches, to the target population to determine its reliability. The reliability study was conducted at the facilities of the school in a regular Physical Education class time. Adolescents were asked to complete the OPAQA twice (Test-retest validity) with an in-between period of approximately 2 weeks. This period was determined based on the existing literature and on protocols used in similar studies in order minimize possible memory bias of the participants.

Statistical analysis

Initially, descriptive (median and Interquartile range) and normality (Kolmogorov-Smirnov) analysis were completed. Content Validity Coefficient (CVC) (Hernandez-Nieto, 2001) was used to assess the content validity. Kappa coefficient and Spearman correlations were used to examine reproducibility. Analyses were assessed by gender. The strength of correlations was defined as: low=0.20 –0.39; moderate= 0.40–0.59; moderately high= 0.60–0.79 and high ≥ .80 (Zhu, 2012). Data was analyzed with the SPSS (v. 20.0).

RESULTS

Content validity

Table 1 shows CVC results. Analyses reported that means for both, current and previous practice, CVC were higher than the acceptable level set (≥0.70) for all items assessed (clarity of the language; practical and theoretical relevance).

Reproducibility

The Questionnaire was applied in 77 adolescents (girls

Table 2: Spearman correlations of the Organized Physical Activity Questionnaire for adolescents by gender

Organized Physical Activity (OPA)						
Current OPA	**Boys (n=33)**		**Girls (n=44)**		**All (n=77)**	
	rho	***p***	**rho**	***p***	**rho**	***p***
Frequency	0.951	0.000	0.603	0.006	0.840	0.000
Duration	0.690	0.001	0.873	0.000	0.895	0.000
Total time Spent	0.810	0.000	0.481	0.027	0.684	0.000
Previous OPA	**rho**	***p***	**rho**	***p***	**rho**	***p***
Frequency	0.838	0.000	0.499	0.001	0.826	0.000
Duration	0.735	0.000	0.461	0.002	0.772	0.000
Starting age of OPA	0.509	0.018	0.532	0.006	0.656	0.000
Total time spent	0.710	0.000	0.456	0.002	0.752	0.000

Note: OPA = Organized Physical Activity

Table 3. Kappa coefficients of the Organized Physical Activity Questionnaire for adolescents

Organized Physical Activity (OPA)						
Current OPA	**Boys (n=33)**		**Girls (n=44)**		**All (n=77)**	
	Kappa	***p***	**Kappa**	***p***	**Kappa**	***p***
Current engagement in OPA	0.651	0.000	0.953	0.000	0.764	0.000
Engagement during schools breaks	0.719	0.000	0.919	0.000	0.772	0.000
Previous OPA	**Kappa**	***p***	**Kappa**	***p***	**Kappa**	***p***
Previous engagement in OPA	0.370	0.020	0.754	0.000	0.644	0.000
Engagement during schools breaks	0.750	0.000	0.713	0.001	0.742	0.000

Note: OPA = Organized Physical Activity

=44; mean age= 14.0±2.6 years; boys = 33, mean age 14.1± 2.4years). There were no differences between male and female participants' age. Overall, Spearman analyses reported moderate to high correlations for both current (rho= 0.68 – 0.89) and previous practice (rho=0.65 – 0.82). Analyses by gender identified moderate to high correlations for boys (*rho* = 0.69 – 0.95) and moderate correlations for girls de (*rho* = 0.48 –0.60) in current OPA and moderate to high correlations for boys (*rho* = 0.50 – 0.83) and moderate correlations for girls de (*rho* = 0.45 –0.53) for engagement in previous OPA (Table 2).

Kappa coefficients are reported in table 3. Results were considered moderate for current OPA (*k* = 0.76 – 0.77) and moderate to high (*k* = 0.64 – 0.74) for previous OPA. Analyses by gender reported moderate coefficients for boys (*k* = 0.65–0.71) and high coefficients for girls (*k* = 0.91–0.95) for current OPA and low to moderate coefficients for boys (*k* = 0.37–0.75) and moderate coefficients for girls (*k* = 0.64–0.74).

DISCUSSION

The purpose of this study was to develop and to determine reproducibility and content validity of the OPAQA and the results of this study demonstrate that estimates of OPA from the OPAQA in adolescents are reliable and valid. Mean of content validity coefficients from the 5 experts committee were considered high (CVC >0.80) for all items in both current and previous OPA and this results is consistent with the literature that reported high levels of clarity and pertinence of its instrument (Martinez-Gomez et al., 2010; Booth et al., 2002).

Regarding the reproducibility of the OPAQA, results also reported moderate to high Spearman's and Kappa's

correlations assessing current (k = 0.76 –0.77/ *rho*= 0.68 – 0.89) and previous (k = 0.64 – 0.74 / *rho*=0.65 – 0.82) OPS in adolescents. The higher reliability for estimates OPA is consistent with findings in previous studies in youth aimed to determine reproducibility using test-retest protocols (Martínez-Gómez et al., 2010). Typically, values of ≥0.70 for Spearman's and Kappa's correlations are considered to be the criterion for acceptable test–retest reliability; however, the present study reported higher values when compared with previous studies (Helmerhorst et al., 2012; Militão et al., 2013; Janz et al., 2005; Wong et al., 2006). Taken together these results provide support for the reliability and validity of the OPAQA used as OPA assessment.

When stratified by gender, reproducibility of the OPAQA reported gender differences of the coefficients' magnitudes, with boys being, in general, more consistent with their answered when compared with girls for current (boys k = 0.65–0.71 / *rho* = 0.69 – 0.95; girls k = 0.91–0.95 / *rho* = 0.48 –0.60) and previous (boys = (k = 0.37–0.75 / *rho* = 0.50 – 0.83; girls k = 0.64–0.74 / *rho* = 0.45 – 0.53). These results are consistent with the literature that has reported that boys and girls answer questionnaires related with physical activity differently (Nahas et al., 2007; Martínez-Gómez et al., 2010). Literature has suggested that differences of answers consistency might be related with the level of physical activity of the participants (Farias Júnior et al., 2012). According with Kamtsios et al., (2010), boys in general are more involved in OPA when compared with girls and this can contribute for the higher retention of information about the details of the practice, when compared with girls (Farias Júnior et al., 2012). Thus, is not surprising that in this study, reproducibility of the OPAQA among boys were higher.

Perspectives

Organized Physical Activity has the potential to achieve fundamental goal in youth development, such as improving physical health and learning motor skills. Although important, analysis of short periods of OPA can include the effects of seasonal variations and random life events that may not reflect the participation in OPA during longer periods of time. Thus, tracking adolescent's OPA can represent potentially strong information about a habit that is related to positive building experiences. The results of the present study showed that OPAQA had an adequate reliability and content validity for assessing OPA in adolescents and it presents advantages over others instruments. In the OPAQA students were asked to provide detailed information (i.e. type, frequency, duration, age of engagement and time spent) about current and previous OPA performed and this information is considered a public health interest. Professional and researches can use it in order to evaluate participation in OPA (current and previous), identifying and understanding their lifetime exposures, which might facilitate regular participation and decrease dropout in OPA. However, although the OPAQA was considered fairly valid for adolescents, some evidence from our result suggests that reliability were better among boys and additional research is needed, in order to more systematically evaluate gender differences.

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