PSYCHOMETRIC PROPERTIES AND INITIAL FINDINGS OF THE PHYSICAL ACTIVITY STAGES OF CHANGE QUESTIONNAIRE AMONG TURKISH MIDDLE SCHOOL STUDENTS[4]

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ABSTRACT

The purpose of this study is twofold: (1) to determine the concurrent validity and reliability of the Physical Activity Stages of Change Questionnaire among Turkish 6th to 8th grade students, and (2) to examine 6th to 8th grade students' stages of change for physical activity (PA) by sex. Participants (n=334) completed the Physical Activity Stages of Change Questionnaire and One-Week Physical Activity Recall questionnaire. The Pearson chi-square distribution was used to evaluate concurrent validity, and the test-retest calculation was used for reliability. The chi-square findings revealed a significant difference in PA scores at different stages of change. The test-retest value was also calculated as acceptable. Regarding the second research question, results indicated a significant difference by sex in stages of change. Further analysis revealed that a lower percentage of girls were in the maintenance stage than boys. Girls had a problem maintaining PA behavior compared to boys. It can be stated that the Turkish Physical Activity Stages of Change Questionnaire has indicated concurrent validity and reliability of evidence among Turkish 6th to 8th graders. Future intervention studies on girls' PA behaviors should be structured using the stages of change levels, and more PA opportunities should be made available to them.

Keywords: Physical activity stages of change, middle school, validity, reliability.

FİZİKSEL AKTİVİTE EGZERSİZ DAVRANIŞI DEĞİŞİM BASAMAKLARI ANKETİNİN TÜRK ORTAOKUL ÖĞRENCİLERİNDE PSİKOMETRİK DEĞERLERİ VE İLK BULGULAR

ÖZET

Bu çalışmanın amacı iki yönlüdür: (1) "Fiziksel Aktivite Egzersiz Davranışı Değişim Basamakları" anketinin 6-8. sınıf öğrencilerinde uyum geçerliği ve güvenirliğini belirlemek, (2) 6-8. sınıf öğrencilerinin egzersiz davranışı değişim basamaklarını cinsiyet değişkeni incelemektir. Katılımcılar (n=334) Fiziksel Aktivite Egzersiz Davranışı Değişim Basamakları ve Haftalık Fiziksel Aktivite anketini doldurmuşlardır. Uyum geçerliği için Pearson ki-kare analizi uygulanırken güvenirlik için test-tekrar testi yapılmıştır. Ki-kare sonuçlarına göre fiziksel aktivite (FA) değerleri ile egzersiz davranışı değişim basamakları arasında anlamlı fark tespit edilmiştir. Ayrıca, test-tekrar testi analizi sonucu kabul edilebilir çıkmıştır. Diğer araştırma sonucuna göre ise cinsiyet ile egzersiz davranışı değişim basamakları arasında anlamlı fark belirlenmiştir. İleri analiz bulguları kız öğrencilerin erkek öğrencilere göre daha düşük oranda devamlılık basamağında yer aldığını göstermiştir. Kız öğrencilerin FA davranışını devam ettirmekte sorun yaşadıkları görülmektedir. Elde edilen bulgulara göre Türkçe Fiziksel Aktivite Egzersiz Davranışı Değişim Basamakları anketi 6-8.sınıflar için uyum geçerliği ve güvenirliği sağlanmıştır. İleride yapılacak deneysel çalışmalarda kız öğrencilerin FA davranışlarını geliştirmede egzersiz davranışı değişim basamakları temel alınmalı ve daha fazla FA olanakları sağlanmalıdır.

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Anahtar Kelimeler: Fiziksel aktivite egzersiz davranışı değişim basamakları, ortaokul, geçerlik, güvenirlik.

INTRODUCTION

Recent research has revealed a sharp increase in childhood obesity, inactivity and their negative effects on the well-being of school-aged children and youth (Sanchez et al., 2007; Turkish National Burden of Disease, 2004). Rapid modernization, changes in lifestyle, diets high in fat and sugar, and decreased physical activity have resulted in a greater incidence of obesity and overweightness in several countries. As a result, obesity has become the most widespread metabolic diseases in the world (Bauman et al., 2008; Kumanyika et al., 2010; Yang et al., 2012). The alarming rates of obesity among children need to be addressed by health and fitness educators, as well as by professional organizations. One effective preventive solution is to increase regular physical activity, which is understood to improve a variety of health risk factors across all age and sex categories (LeBlanc and Janssen, 2010; Tremblay et al., 2011; World Health Organization [WHO], 2003).

The promotion of physical activity and exercise should begin early in life, from childhood, in order to increase healthy behaviors that track into adulthood. The importance of assessing and determining children's physical activity levels towards the aim of healthy adulthoods should therefore not be underestimated. To that end, the Turkish Ministry of National Education (MoNE, 2007) adopted a standards-based physical education program with an emphasis on health-related fitness and physical activity in 2007, and again in 2012, based on recommendations by the National Association for Sport and Physical Education (NASPE, 2004) and the International Council for Health, Physical Education, Recreation, Sport, and Dance (ICHPER, 2006). The regular evaluation of health-related fitness and physical activity is crucial for tracking changes and developments among students. Additional methods for measuring the physical activity levels and exercise behaviors of children include issuing questionnaires, pedometers or accelerometers to students.

Various theories and models have been used to promote healthy behaviors. In the domain of health and exercise, stage models have primarily been used to understand motivational readiness for a variety of health-related behaviors (Prochaska et al., 1994). The Transtheoretical Model (Prochaska and DiClemente, 1983), also known as the Stages of Change (SOC) model, has been one of the most used models in health psychology (Spencer et al., 2006). Basically, the model was developed using various behavioral therapy methodologies to determine the structure of participants' exercise behaviors (Prochaska et al., 1994; Riebe et al., 2005). The main advantages of the model have been: (1) intervention development and implementation in different areas, and (2) provision of sensitive measures for progress. Basically, participants' intentions regarding physical activity behavior are defined through different constructs (e.g., self-efficacy, decisional balance, processes of change). The Transtheoretical Model has three dimensions: the temporal (i.e., stages of change), the mechanistic (i.e., self-efficacy, decisional balance, processes of change, and temptation), and the contextual (i.e., interrelated psychological issues that may be addressed during treatment). According to the model, people move through a series of stages in this process. Namely, these are: pre-contemplation,

contemplation, preparation, action, and maintenance (Marcus et al., 1992; Nigg, 2002; Prochaska et al., 1992).

The SOC model, accepted as the central organizing construct of the Transtheoretical Model, has the capacity to result in specific recommendations according to stage. Mainly, the stages of change make it possible to track physical activity patterns, to track specific interventions on the way to the next stages, and to raise consciousness regarding the importance of being regularly active. Prochaska et al. (1992) defined these five stages as follows: (1) The pre-contemplation stage: there is no intention on the part of individuals to change behavior. Studies have revealed that many are unaware of their problems. Outside pressure is thus necessary in order for pre-contemplators to initiate behavioral change. (2) The contemplation stage: individuals are aware of the problem and seriously think about overcoming it. However, they have not made a commitment to take action. Individuals in this stage intend to change within the next six months. They appear to struggle to reconcile positive evaluations of their problem behavior and the amount of energy or effort necessary to solve the problem. (3) The preparation stage: individuals combine intentions and behavioral criteria. They intend to take action within the next month and have unsuccessfully taken action in the past year. This stage is sometimes conceptualized as the early stirrings of the next stage and is actually called decision making. (4) The action stage: individuals modify their behavior and experiences to overcome their problems. This stage requires an extensive commitment of time and energy, and also involves behavioral changes. This stage is reached when individuals have successfully changed their problematic behavior for a period of from one day to six months. (5) The maintenance stage: individuals work to prevent relapse and sustain gains they made during the action stage. This stage is characterized as static, but not as one characterized by an absence of change. The maintenance stage extends from six months through an indeterminate period and can be considered a lifelong stage.

The Transtheoretical Model had received lots of empirical support over the last two decades in research on different age groups (Cengiz et al., 2009; Hausenblas et al., 2002; Spencer et al., 2006; Walton et al., 1999). In their review article, Spencer et al. (2006), indicated that an increasing number of studies has focused the Transtheoretical Model on general populations, adults, women, work sites, medical patients and other specialized populations. It has been hypothesized that physical activity patterns are established in childhood and adolescence (Corbin et al., 2004), so it is important to examine the exercise behaviors of middle school-aged children in order to contribute data on effective physical activity intervention for this age group. However, there is little in the literature that is focused on children's stages of change (Cardinal et al., 1998; Haas and Nigg, 2009; Marshall and Biddle, 2001). Additionally few of these studies have examined the validity of the SOC model among children (Haas and Nigg, 2009; Hausenblas et al., 2002).

Several studies on SOC have examined sex differences in different contexts. Walton et al. (1999) examined 5th. and 6th. graders' physical activity and stages of change in the US. The results showed that boys were more active than girls, and that their attitudes towards physical activity were more positive. In another study, Cardinal et al. (1998) examined first- through fifth-grade students' stages of exercise change, exercise beliefs, and exercise knowledge in the US. Contrary to the findings of Walton et al. (1999),

Cardinal et al. (1998) reported that girls were actually more likely to be in the maintenance stage than boys were. In the Turkish context, sex differences in the SOC model have been examined among the university population (Cengiz et al., 2009; Micoogullari et al., 2010). In these studies, female students and adults remained in lower stages; namely pre-contemplation, contemplation, and preparation. Specifically, females remained in the lower stages and had lower physical activity and self-efficacy (Micoogullari et al., 2010). The states of change construct has not been used with Turkish 6th to 8th grade students prior to this study.

Based on these results, the stages of change instrument has also been adopted to determine stages of change in children. Therefore, the purposes of this study are (1) to determine the concurrent validity and reliability of the "Physical Activity Stages of Change Questionnaire" among Turkish 6th to 8th grade students, and (2) to examine their exercise stages of change by sex.

METHODS

Participants

The participants were 334 sixth to eighth grade students (n_{male} =161 and n_{female} = 173) from 3 different schools in suburban areas of Ankara. Their age range was 12 to 14 years old. 142 of the students were in 6th grade, 31 of them were in 7th grade and 161 of them were in 8th grade. The mean physical activity level based on the MET (metabolic equivalent) scores of participants was 68.24 (SD=69.57). Participants' average height was 154 cm (SD=9.73), and average weight was 47 kg (SD=11.60). The distributions of participants by sex and grade is presented in Table 1.

The reason for choosing 6th to 8th grade students was that at one point in the study these grades constituted the middle school years. The Turkish MoNE has since reorganized the national educational structure: as of 2013, 1st through 4th grade constitutes elementary school (MoNE, 2013), 5th through 8th is middle school and 9th through 12th grade is high school.

Table 1. *Metabolic equivalent scores of students by sex and grade*

Variables	Metabolic Equivalent (MET)					
	n		$\overline{X}$		SD	
	Girls	Boys	Girls	Boys	Girls	Boys
6th Grade	68	74	52.42	83.66	41.04	62.78
7th Grade	20	11	105.65	134.09	144.19	98.82
8th Grade	85	76	39.06	80.63	37.03	73.86
Total	173	161	52.01	85.68	63.56	71.70

Measures

Physical Activity Stages of Change Questionnaire: The Physical Activity Stages of Change Questionnaire (PASOCQ) was developed by Marcus et al. (1992) to promote healthy behaviors in adults. Recently, this instrument was adapted by Haas and Nigg (2009) to evaluate exercise-related intentions among children. For the current study, PASOCQ was used to determine Turkish 6th to 8th grade students' stages of change. Physical activity was defined for the participants as any activity resulting in

heavier breathing and a faster heart rate. Walking briskly, biking and swimming were cited as examples of aerobic exercises. The expression "regular" physical activity is defined by PASOCQ as 4 days or more per week for at least 30 min each day. Participants were asked to select one of five possible answers to the following question: "Do you do regular physical activity as described below". Each selection corresponded to one of the five stages of the Transtheoretical Model (Prochaska et al., 1992). The possible answers were: "No, and I do not plan to start doing regular physical activity in the next 6 months" (PC); "No, but I plan to start doing regular physical activity in the next 6 months" (C); "No, but I plan to start doing regular physical activity in the next 30 days" (P); "Yes, I have been doing regular physical activity, but for less than 6 months" (A); "Yes, I have been doing regular physical activity for more than 6 months" (M).

One-Week Physical Activity Recall Questionnaire: The One-Week Physical Activity Recall Questionnaire was administered to all students in order to check the concurrent validity of PASOCQ. This questionnaire was developed by Sallis et al. (1993) and translated into Turkish by Kocak et al. (2002). In it, students were asked to recall whether they had performed any of 21 listed physical activities outside school for at least 15 continuous minutes. The physical activity levels of students were classified according to their MET scores. Based on this questionnaire, students' physical activity scores were categorized (as either low or high) using the median split method.

Procedures

Volunteer participants were secured for the study prior to data collection. Permissions were obtained from the school districts, the school principals, and physical education teachers, in addition to obtaining written parental consent for the students to participate. The purpose of the study and its requirements were explained by researchers before students completed the questionnaires during their physical education class.

Statistical Analysis

Descriptive statistics (frequencies and percentages) and the Pearson chi-square distribution were used to analyze the data ($p < 0.05$). A statistical analysis was performed after checking normality assumptions, using the Statistical Package for Social Science (SPSS) for Windows.

RESULTS

For the first research question, PASOCQ (Haas and Nigg, 2009) was adapted into Turkish. To that end, two independent translators first translated the English version into Turkish. After reaching a consensus on each item of the questionnaire in Turkish, another translator performed a back-translation into English. The original English version and back-translated version were then compared by a specialist from the field of physical education to shape the final version of the Turkish PASOCQ (Brislin, 1980). The Turkish version was pre-administered to 26 sixth to eighth grade students to determine test-retest reliability. There was a two-week interval between the test and retest sessions. The test-retest reliability of the Turkish PASOCQ was determined to be at an acceptable level (Intra-Class Correlation [ICC] = 0.92). The Turkish version of the *One-Week Physical Activity Recall* questionnaire (Sallis et al., 1993; Kocak

et al., 2002) was used to check the concurrent validity of PASOCQ. Based on the results of this questionnaire, students' physical activity MET scores were categorized as either low or high using the median split method. The Pearson chi-square analysis revealed a significant difference in physical activity scores at different stages of exercise behavior X^2 (4, n = 334) = 10.99, $p < 0.05$. According to the results, it can be stated that the Turkish PASOCQ indicated concurrent validity and reliability of evidence in the Turkish 6th to 8th grade sample.

In the current study, the Pearson chi-square analysis was also used to examine students' stages of change for physical activity by sex. The results revealed a significant difference in stages of change between the sexes among 6th to 8th grade students (X^2 (4, n = 334) = 12.60, $p < 0.05$). Descriptive statistics (frequencies and percentages) are presented in Table 2. Statistical analysis indicated that a lower percentage of girls were in the maintenance stage than boys.

Table 2. *Students' physical activity stages of change levels by sex*

Variables	Physical Activity Stages of Change				
	PC* / %	C* / %	P* / %	A* / %	M* / %
Boys	26 / 16	29 / 18	31 / 19	38 / 24	37 / 23
Girls	32 / 19	43 / 25	44 / 25	37 / 21	17 / 10
Total	58 / 17	72 / 21	75 / 23	75 / 23	54 / 16

*PC: Pre-contemplation, *C: Contemplation, *P: Preparation, *A: Action, *M: Maintenance

DISCUSSION

The purposes of this study have been to examine the concurrent validity and reliability properties of PASOCQ with physical activity among Turkish 6th to 8th grade students. Students' exercise stages of change by sex were examined as a second research question. The validity and reliability properties of the instrument had not previously been examined with a Turkish population. Moreover, there were no studies in the literature documenting a profile for the Turkish SOC construct among 6th to 8th grade students.

Evidence from the present study validates the use of PASOCQ among children, opening the door for its use in research with adolescents (Hausenblas et al., 2002), college students (Cardinal et al., 2004; Cengiz et al., 2009; Juniper et al., 2004) and adults (Umstattd and Hallam, 2006). That is, the research presented here supports the validity and reliability scores of previous findings for the case of Turkish 6th to 8th grade students. For validity purposes, general physical activity level or MET and stages of change were used (Hellsten et al., 2008). At the higher stages (action and maintenance), a high level of physical activity was expected, and in the current research, similar results were evident. The findings were remarkably consistent, confirming the initial outcomes and serving as evidence in favor of extending validation of the instrument for use with adolescents, college students and adults.

Another main finding was that the physical activity level of students was statistically significant on the basis of sex. The findings showed that girls had a greater problem with maintenance of physical activity than boys. In their study, Walton et al. (1999) had similar findings, reporting that more boys were in the maintenance stage than were girls. Similar findings were evident among university students and adults in the

Turkish population. Cengiz et al. (2009) studied the Turkish university population and found females, on average, to be in lower stages (pre-contemplation, contemplation, and preparation) than their male counterparts. Yildirim et al. (2012) also examined female adults using SOC, and the results also supported the original findings. Therefore, future research should qualitatively investigate the underlying reasons for why females do not continue physical activity and retain their motivation in the upper stages (action and maintenance) between childhood and adulthood. In relation to the findings, helping students to increase their awareness about physical activity and its related health benefits could improve their participation in physical activity.

The stages of change for physical activity construct would help researchers make specific recommendations on how to shape the exercise behavior of pupils. Therefore, it is fairly important that PASOCQ be adapted to the Turkish language. Future studies may then use the instrument to determine the SOC levels of middle school students for guiding interventional studies. This might be useful for educators tracking children's stage levels and encouraging them to be physically active using recommendations tailor-made for students at different stages (Marcus and Forsyth, 2009).

When evaluating the current study a number of limitations should be taken into consideration. Firstly, improving the representativeness of the data should be a goal, and this can be done by expanding the number and type of schools involved (e.g., private and public) using random sampling. Otherwise, generalizations will be limited to those from this study, which was limited to students at similar suburban Ankara schools. Secondly, information regarding the intensity of participant physical activity needs to be collected so that it may be sorted into different levels. This data will ensure a check of the construct validity of PASOCQ for children. However, using another physical activity self-report questionnaire to measure the validity of SOC results has reinforced the findings in the present study. Lastly, the self-report questionnaire of physical activity may be hindered by subjectivity.

In conclusion, the Turkish Physical Activity Stages of Change Questionnaire was found to be a reliable and valid instrument for the case of 6^{th} to 8^{th} grade students. Also, the stages of change analysis found a disparity in the results based on sex. Specifically, SOC-based interventions should direct adolescent girls towards implementing an exercise plan and towards problem solving to prevent future relapses into inactivity. Due to the current limitations of the literature regarding the PASOCQ results of school-aged children, this study should be replicated in other countries so that cross-cultural comparisons can be made.

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