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## The Psychometric Properties of the Physical Education Lesson Attitude Scale for Preservice Classroom Teachers

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*Abstract: The purpose of this study was to examine the psychometric properties of the Physical Education Attitude Scale for Preservice Classroom Teachers (PEAS-PCT). The study was conducted on 561 Turkish preservice classroom teachers at the end of the 2011-2012 Fall Semester. Exploratory and confirmatory factor analyses were conducted to ascertain the validity of the scale. For the reliability of the scale Cronbach Alpha reliability, Spearman Brown split-half test and item-total test correlations were calculated. Reexamination of the scale led to a new scale structure comprised of a single factor with ten items. The altered version of the scale proved psychometrically stronger. Based on the results of the study, it can be suggested that the PEAS-PCT is a valid and reliable scale.*

### Introduction

With the recognition of its importance for general education, physical education cemented its place as a compulsory course in almost all levels of school curricula in the developed world (Schmottlach & McManama, 1997). In today's education philosophy, physical education is considered as an integral part of the school curricula (Darst & Pangrazi, 2009), and physical activities are instrumental in every student's growth and development (Pangrazi & Beighle, 2009). Likewise, most scholars of elementary education stress the fact that physical education classes are *sine qua non* for the attainment of elementary education goals (Siedentop, 2001). In reality, however, the picture has been far from ideal outside the confines of the developed countries. According to Hardman and Marshall (2000a) the 'decline and/or marginalization of physical education in schools in many countries of the world' was a confirmed fact in the Berlin Physical Education World Summit in 1999. Global studies conducted on the state and status of physical education in elementary schools reveal significant shortcomings both in terms of legal requirements for physical education in schools and to what extent these requirements were implemented (Hardman, 2005; Hardman & Marshall, 2000b; Hardman & Marshall, 2005). There have also been differences between the countries based on the physical education curriculum allocation time, which does not offer a highly optimistic promise. In 40% of countries (Middle East 100%; Central and Latin America 67%; and Africa 66%) physical education lessons are more likely to be cancelled than other curriculum subjects. Similarly, between 2000 and 2005 physical education curriculum time allocation has decreased in 16% of countries and has remained the same in 60% of countries worldwide. Scotland, in this regard, was put as not a highly-promising country in Europe (Hardman & Marshall, 2005). Hardman (2005) also showed the backlash of 2002 No Child Left Behind Act in the USA stating that its implication

stole valuable time and resources from physical education classes. Although a majority of countries, 81% of all countries worldwide, have legal requirements for physical education in schools, in 5% of countries (40% in Africa; 17% in the Middle East), physical education is neither compulsory nor might it be offered for girls. The same regional discrepancy is more deliberate in the implementation of the physical education curriculum. Therefore, there has still been 'perceived deficiencies in curriculum time allocation, subject status, material, human and financial resources, gender and disability issues and the quality of programme delivery' worldwide (Hardman & Marshall, 2005) even though the benefits of physical education classes as a given historical fact and experience since the Ancient Greeks lending the name Gymnasium to German schools.

Physical education classes provide the school children with numerous benefits such as increased ability to move, physical fitness, new information on health issues, positive social skills and important life skills (Pangrazi & Beighle, 2009). Physical education classes also have essential social functions that help individuals become happy, peaceful, responsible and confident citizens with respectable social status. Additionally, the role of physical education classes in gaining physical exercise habits, embracing sports as a life philosophy, and achieving athletic success internationally is a fact that cannot be underestimated (Dalkiran & Tuncel, 2007). The modern understanding of physical education focuses on the development of all individuals in a society through participation in physical activities while concurrently adhering to major contemporary philosophical schools in education and psychology (Lumpkin, 2005). Therefore, in accordance with these theories such as educational progressivism, essentialism, social reconstructivism and perennialism, physical education instruction is differentiated for various age groups and grade levels. For instance in Turkey-based on early 20<sup>th</sup> century American curricula-, between ages six and nine the basic physical education activities are comprised of fundamental moves such as climbing, jumping, and playing simple games that require basic motor skills. In older age groups, however, sports activities are geared towards involvement in various team sports and individual sports such as swimming, gymnastics, and track-and-field (Aggon & Yazici, 2010; Lumpkin, 2005; Siedentop, 2001).

The teachers of physical education classes -Hardman (2005) refers the classroom teachers as 'generalists' and the physical education teachers as 'specialists' - are responsible for preparing curricula and applying lesson plans that help students gain physical activity habits (Darst & Pangrazi, 2009). In some countries like the United States, classroom teachers and physical education teachers (specialists) share the responsibility of teaching physical education at elementary school level (Allison, 1990; Hardman, 2005; Morgan, 2008; Siedentop, 2001). In many countries, however, this responsibility is left to classroom teachers or 'generalists' (Faulkner & Reeves, 2000; Hardman, 2005; Kirk, 2005; Siedentop & Locke, 1997). 'Thus, descriptions of primary teachers' experiences of physical education are particularly important as an avenue for creating qualitatively superior teacher training for teaching primary school physical education' (Tsangaridou, 2008).

In the same regard, Allison (1990) pointed out the need for physical education researchers to focus on classroom and pre-service classroom teachers' part in physical education due to classroom teachers' essential role in the introduction and teaching of physical education classes. In Turkey where this research was based on, for example, in grades K-1 through K-3 public classroom teachers function as physical educators as well. In grades K-4 through K-8 physical education teachers teach physical education classes. Therefore, in Turkey the classroom teachers are the first to introduce physical education classes to the students. Nevertheless, Arslan and Altay (2009) stated that classroom

teachers should possess important extra skills as they are responsible for teaching lessons in several areas. They stressed that these skills would provide the teachers significant benefits in working efficiently and with proficiency towards achieving national standards in terms of learning objectives as dictated by Turkish Department of Education.

Specifically, the classroom teachers are expected to meticulously conduct and organize physical education activities in order to help their students acquire physical skills and gain exercise habits. In some studies, however, there have been findings contrary to these expectations. For example, Kangalgil (1999) and Barney and Deutsch (2009) argued that many classroom teachers lack the capacity to conduct physical education classes in Turkey and the United States. Likewise, Thompson (1996) attributed this incapacity to the lack of quality teacher education programs in Australia. Moreover, studies by Brambaugh (1987), Xiang, Lowy and McBride (2009), and Arslan and Altay (2008) stated that many teachers who have not received quality physical education as students have negative attitudes toward physical education as teachers.

In practice, with the help of some undergraduate courses, classroom teacher candidates are directed to improve their competency for teaching physical education classes. The education programs for the pre-service classroom teachers differ among countries in the way they offer physical education training. In some countries such as France, Germany and Turkey they are required to take compulsory physical education classes (Kilimci, 2006). In other countries such as the United States and Australia the qualification for physical education instruction is provided by the elective courses-g geared towards acquiring minor degree in Physical Education- or by certificate programs after completing undergraduate studies (also called Graduate Certificate in Health and Sport Sciences in Australia), depending on the state they serve. For example, Missouri Certification Requirements in the state of Missouri, USA lists Physical Education in the required teaching method competencies, and a pre-service classroom teacher should complete minimum of fifteen semester hours to meet the competency in Physical Education (Missouri Department of Elementary & Secondary Education, 2008). In other cases classroom teachers can participate in professional development workshops, or take undergraduate or graduate courses in order to meet the requirements to teach physical education.

According to the Teacher Education Curriculum that was put into use in the 1998-1999 school year in Turkey, the undergraduate programs offered classroom teachers in the state universities three courses on physical education: Third semester *Physical Education I (Theory- 2 credits/2 hours per week)* course, fourth semester *Physical Education II (Theory- 2 credits/2 hours per week)* course, and sixth semester *Physical Education and Games Teaching (3 credits- Practice/2 hours per week and Theory/1 hour per week)* course. Since 2006-2007, these courses were combined into two courses that allocated one hour per week for theory and two hours per week for practice (Yuksekogretim Kurulu/The Council of Higher Education, 2007). The first of these courses is titled *Physical Education and Sport Culture*, and it is reserved for the third semester of the undergraduate program. The second course, *Physical Education and Games Teaching*, is reserved for the fourth semester. In Turkey, the content of the *Physical Education and Sport Culture* course in classroom teacher education programs is determined by The Council of Higher Education. The course content involves topics such as simple gymnastics exercises, sport injuries, first-aid, track-and-field applications, course materials in physical education classes, and steps, rotations and formations for parade walks in physical education classes. The content of the *Physical Education and Games Teaching* course, on the other hand, is comprised of subjects such as teaching

methods, class management, assessment and evaluation, lesson and work plans, educational games, modern folk games, and games teaching (Araci, 2007).

The classroom teachers' attitudes toward the physical education courses taken during the above-mentioned undergraduate programs affect their roles significantly throughout all the activities they conduct in their teaching years (Bagci, 2007). The attitudes of the teachers effectively form and influence student behavior and feedback (Aggon & Yazici, 2010). In educational studies, it has been observed that the students' attitudes toward the teacher, subject, and course material affect their school success (Erden, 1995; Pehlivan, 1994). On the other hand, in educational environments where the student attitudes are disregarded, studies point out that the formation of a healthy educational life proves to be difficult, and thus educational activities are not completely fulfilled (Meyveci, 1997, cited Hancer, Uludag & Yilmaz, 2007). Likewise, Sisko and Demirhan (2002) stressed the important effect of developing positive attitudes in teaching-learning environments on the reinforced behavior formation of the students.

The scientific study and analysis of the term "attitude" began in the 19<sup>th</sup> century. The etymological origin of the term goes back to Latin *aptitudo*, which roughly corresponds to "ready to move" (Arkonac, 2001). In modern terminology, attitude is defined as one's tendency or emotional readiness/ predisposition to behave/act in order to accept or reject a subject, person, object, group, institution or an idea (Ozguven, 1998). Petty and Cacioppo (1981) defined attitude as one's general, consistent, and positive or negative feeling about an object, person or a subject. For Freedman, Sears and Carlsmith (2003) an attitude is a lasting system formed by individuals. It involves a behavioral disposition and cognitive/emotional elements about a certain object, idea or a person. According to another definition, attitude is a continuous state of readiness to give positive or negative emotional reactions over a situation or an object that has been subjected to a value judgment of a psychological process (Sherif & Sherif, 1996). Although there are minor variations among the definitions, the common point stressed in each definition is "attitude" involves a process in which there is an evaluation or judgment on an object or a subject (Maio & Haddock, 2009).

Attitudes, and the formation, changing and assessment/measurement of the attitudes, constitute an integral, if not the focal, part of psychology in general and social psychology in particular (Bohner & Wanke, 2002; Erkus, 2003). The importance of the subject stems from the fact that attitudes not only form systems that facilitate an individual's adaptation to the environment but also possess the capacity to manipulate an individual's behavior. Therefore, the analyses of the attitude dynamics help to determine the ways the attitudes function and to predict expected behaviors on one hand. Moreover, the conditions of the attitudinal change process and managing human behavior by controlling the attitudes can be determined (Inceoglu, 1993). By the same token, Tezbasaran (1997) also argued that attitudes are very influential in determining human behavior. He stated that measuring attitudes or determining the level of attitudes is beneficial in many academic fields.

Based on the aforementioned research, it is essential to determine the teacher candidates' attitudes toward the field courses in order to identify how they will teach the respective courses in the future (Dogan, 2004). Richardson (1996, cited Tsangaridou, 2008) argued that 'attitudes and beliefs are important concepts in understanding teachers' thought processes, classroom practices, change, and learning to teach' (p. 102). Equally important, such research will help to isolate potential problems and solve them, thus shaping the context of the teacher education programs. The literature reveals that there has been extensive research on the competence, attitudes (Erkan, 2006; Faulkner and Reeves, 2000; Matanin & Collier, 2003; Morgan, 2008), perceptions (Brumbaugh,

1987; Lourenco, 2009; Morgan & Vibake, 2008; Woods & Langley, 1998), opinions (Can, Okmen & Durukan, 2011; Carney & Chedzoy, 1998), observations (Allison, 1990), efficacy (Kara, 2007; Parks, Solmon & Lee, 2007; Ipek & Bayraktar, 2009) and inefficiencies (Yildiz, 2010) of classroom and preservice classroom teachers on physical education classes. On the other hand, both in Turkey (Demirhan & Altay, 2001; Gullu & Guclu, 2009; Pehlivan, 1998; Oncu & Guven, 2011; Ozer & Aktop, 2003; Sarac et al., 2002) and abroad (Atkins, 1995; Ennis & Hooper, 1988; Jones, 1988; Martens, 1979) numerous studies have been conducted on different samples regarding developing attitude, belief and value orientation scales about the physical education. These studies, however, are very limited in their relation to the classroom and preservice classroom teachers (Barney & Deutsch, 2009; Faulkner & Reeves, 2000; Yıldız, 2010; Oncu & Cihan, 2012). For this reason, this paper aimed to analyze the psychometric properties of the Physical Education Lesson Attitude Scale for Preservice Classroom Teachers that was developed by Oncu and Cihan (2012). The reexamination of the psychometric properties of the original scale was necessitated by the apparent limitations of the original study. First, the original study sample was relatively small in numbers (Oncu & Cihan, 2012). Second, the curriculum of the undergraduate classroom teacher education program that was in effect at the time of data collection has been changed in the lights of decisions made by The Council of Higher Education in 2007. Third, the results of the original study revealed that a scale with fewer items could be more useful in potential multiscale studies. Finally, in a dynamic field like education, it is necessary to test the coherence of developed scales with up-to-date studies in terms of validity and reliability.

## **Method**

This study utilized the survey method that is used most commonly in descriptive research models (Thomas & Nelson, 1996). In the survey method, samples consist of large groups, and each member of the group is asked about his/her opinions in order to learn attitudes on a case, fact or a situation. Researchers try to describe the facts or situations as they are and in their respective conditions (Karakaya, 2009; Karasar, 2005).

## **Participants**

The sample consisted of 380 female and 181 male students who attended the Classroom Teacher Education Program in the Fatih Department of Education at Karadeniz Technical University during the 2011-2012 Fall Semester. At the time the data were collected, 206 students of the sample were sophomores, 162 were third-year students, and 193 were fourth-year students. Eighty-nine of the students stated that they exercised on a regular basis, and 249 of the sample had at least one friend or family member actively involved in sports.

## **Instrument**

In this study, the “Physical Education Lesson Attitude Scale for Preservice Classroom Teachers” was used as a data collection tool. This scale was developed by Oncu and Cihan (2012) in order to measure the attitudes of preservice classroom teachers on the practical part of physical education lessons. The scale consisted of 25 items and all items were measured and sorted using a five-point Likert scale (Completely Agree-5,

Agree-4, Undecided-3, Disagree-2, Completely Disagree-0). Reliability and validity tests of the scale was conducted on the data collected from 164 preservice classroom teachers who attended the classroom teacher education program in 2005-2006 during the spring semester. The scale had a one-factor structure, and the total variance of the scale was 66.79%. The factor loadings of the items that formed the scale ranged between 0.739 and 0.884, and factor variances ranged between 0.546 and 0.781. Cronbach Alpha reliability coefficient was determined as 0.98, and Spearman Brown split-half test correlation coefficient was 0.96. Item-total test correlations varied between 0.72 and 0.87.

### Data Analysis

The data were analyzed using SPSS 20.0 and LISREL 8.54 statistics package programs. For determining the coherence of the data in regards to factor analysis, Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy coefficient and Bartlett's test of sphericity were used (Buyukozturk, 2008); for determining the factor structure, exploratory factor analysis (EFA), and for providing evidence for the factor structure, confirmatory factor analysis (CFA) were used (McIntire & Miller, 2000). In the first level CFA, chi-square goodness of fit ( $\chi^2$ ), chi-square/degree of freedom ( $\chi^2/df$ ), root mean square error of approximation (RMSEA), root mean square residuals (RMR), comparative fit index (CFI), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), normed fit index (NFI) and non-normed fit index (NNFI) coherence values were analyzed (Cokluk, Sekercioglu & Buyukozturk, 2010). In order to provide evidence for validity, t and One-Way ANOVA tests were processed for the groups not subjected to parametric tests in order to demonstrate whether there were significant differences between the scores of some independent variables acquired from the scale. Levene and Kolmogorov-Smirnov tests were utilized to determine if the data meet the pre-conditions of parametric tests such as normal distribution and variance parity (Buyukozturk, 2008). In the ANOVA analysis, post-hoc Scheffe test, recommended by Kayri (2009) in situations where the variances are equal and the sample sizes are not, was conducted in order to determine which groups show differences among their units. The impact magnitude of the acquired differences was evaluated by calculating the eta square value ( $\eta^2$ ), and the interpretation of the results was based on the Cohen (1988) criteria (0.01: small, 0.06: medium and 0.14: large). To ascertain reliability, the reliability coefficient developed by Cronbach (1951) and the Spearman Brown split-half test correlation coefficient (McIntire & Miller, 2000) were calculated. Additionally, item validity evidence item-total test correlations (r) were calculated (Ozdamar, 1999). Also, in terms of scale reliability, the t test was conducted in order to determine the correlation between the mean average score scores of the lower and upper 27 percentile groups (Buyukozturk, 2008).

### Findings

According to the results of the analysis to determine the aptness of the data derived from the study sample, KMO was found to be 0.98, and Bartlett's Sphericity test was found meaningful.

As a conclusion of the principle component factor analysis of the 25 items in the scale using Varimax rotation method, two factors with Eigen values bigger than 1 were obtained (13.90 and 1.16, respectively). These two factors represented 60.24% of the total variance. The first factor represented 55.60%, and the second factor represented 4.64% of

the variance. The Scree Plot was examined in order to determine the component numbers. It was observed that the graph ascertained strong evidence for the single-factor interpretation of the scale.

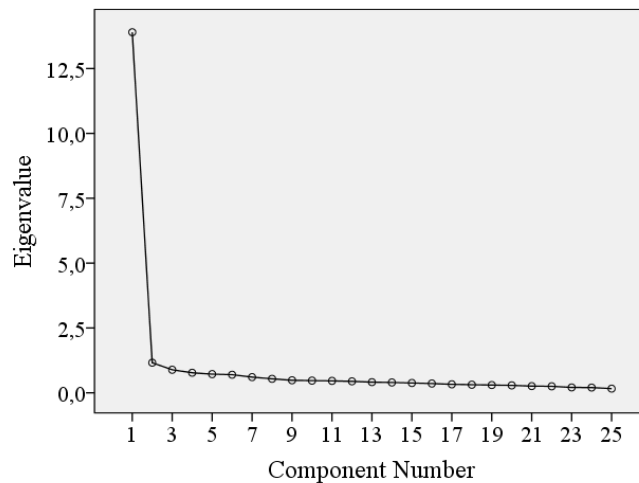


Figure 1: Scree Plot

After the second principle components factor analysis, 15 items were omitted from the scale; the item number was reduced to 10, and the factor number was reduced to 1. These 15 items either had low variance or had factor loadings for more than one component. Moreover, these items did not fit the structure of the scale. The factor variance of the items that make up the improved scale ranged between 0.641 and 0.812, whereas the factor loading values differed between 0.801 and 0.901. The table below provides item and test statistics for the restructured scale:

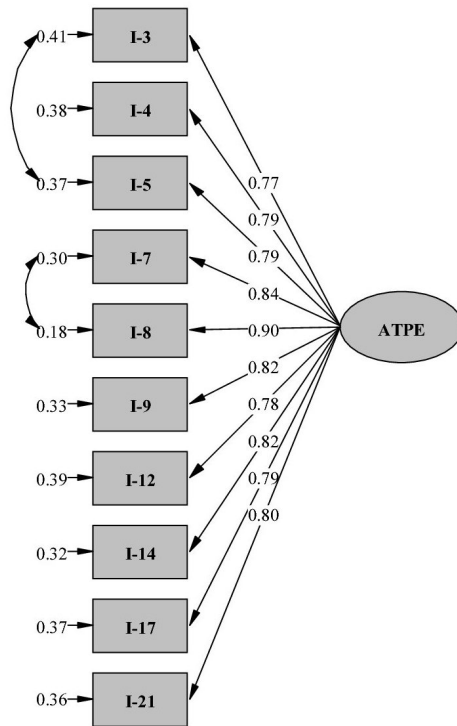
Item No.	Items	Factor Variance	Factor Loading
3*	I hardly want to attend the physical education classes.	0.668	0.817
4	I feel happy in physical education classes.	0.641	0.801
5*	If it were not compulsory, I would not attend physical education classes.	0.692	0.832
7	I find physical education classes just the type of classes I would enjoy.	0.727	0.852
8	I attend physical education classes willingly.	0.812	0.901
9	I have so much fun in physical education classes.	0.662	0.814
12*	I find the physical education class so boring.	0.665	0.815
14	I find the physical education class very appealing to my interests.	0.693	0.833
17	I try not to miss the physical education class.	0.649	0.806
21	I like the physical education class.	0.673	0.820
<i>Eigenvalue</i>		6.88	
<i>Total Variance Explained (%)</i>		68.82	

\* Reverse item

Table 1: EFA Results

The single factor structure, from which EFA was obtained, was tested with CFA. The modification indices suggested changes in the correlations between the items 3 and 5 and between the items 7 and 8. The analysis results yielded relative improvement in the goodness-of-fit indexes. Figure 2 shows the parameter estimations for the model, whereas Table 2 shows all the indices after the CFA results.





Chi-Square=127.82, df=33, P-value=0.00000, RMSEA=0.072

ATPE: Attitude toward physical education

**Figure 2: Path Diagram**

According to the Path Diagram, the error variances were found to be very low and the  $\chi^2$  value was meaningful for the observed variables.

	$\chi^2$	d f	$\chi^2$ /d f	RMS EA	R M R	SR MR	C F I	G F I	A G F I	N F I	N N F I
<b>B M</b>	2										
	0	3	5.		0.	0.0	0	0.	0.	0.	0.
	1.	5	7	0.09	0	3	9	9	8	9	9
	0		4		3		9	3	9	8	8
	6										
<b>A M</b>	1										
	2	3	3.		0.	0.0	0	0.	0.	0.	0.
	7.	3	8	0.07	0	2	9	9	9	9	9
	8		7		3		9	6	3	9	9
	2						9				

BM: Before the modification AM: After the modification

**Table 2: CFA Results**

In the scope of validity analysis, the t test was conducted in order to determine the scale's degree of differentiation between the independent groups. The results indicated that the attitudes of the preservice classroom teachers toward the physical education lessons showed significant differences according to the gender factor [ $t(559)=6.662$ ;  $p<0.001$ ;  $\eta^2=0.074$ ]. The effect size of the differences between the groups was medium level, and the mean score of attitudes of the male teacher candidates ( $M=41.31$ ) was higher than of the female teacher candidates ( $M=36.01$ ). The analyses also indicated that the difference between the mean scores of teacher candidates according to their years in college was meaningful [ $F(2,558)=7.085$ ;  $p<0.001$ ;  $\eta^2=0.024$ ]. While the effect sizes of the differences were small, the differences were between juniors ( $M=39.90$ ) and

sophomores (M=36.40) and between juniors (M=39.90) and seniors (M=37.29). Another analysis was made in order to determine whether the attitude scores of preservice classroom teachers who regularly exercised were different from those who did not [t(559) =4.999; p<0.001;  $\eta^2=0.043$ ]. The results revealed that the mean scores of teacher candidates who exercised regularly teacher candidates (M=42.08) were higher than the teacher candidates who did not regularly exercise (M=36.90). The scores also showed significant differences between teacher candidates who had friends or family members actively involved in sports and those who did not [t(559) =4.161; p<0.001;  $\eta^2=0.030$ ]. The mean scores of those preservice teachers who had friends or family members actively involved in sports (M=39.49) were higher than of those who did not (M=36.90).

For the 10 items that make up the restructured scale, Cronbach Alpha reliability coefficient was calculated as 0.95, and Spearman Brown split-half test correlation coefficient was obtained as 0.94. Table 3 shows that item-total correlation coefficients ranged between 0.75 and 0.87, and it was observed that exclusion of any item from the scale did not cause a decrease in the Cronbach Alpha coefficient. When the results of the t test (conducted to ascertain the internal consistency of the scale) that belonged to the item mean scores of the lower and higher 27 percentile groups were analyzed, the t values proved meaningful.

Item	M	Sd	r	Alpha if item deleted	t	p
3	4.03	1.09	0.77	0.95	21.150	0.000*
4	3.89	1.06	0.75	0.95	22.086	0.000*
5	3.86	1.20	0.79	0.95	29.811	0.000*
7	3.51	1.19	0.81	0.94	29.528	0.000*
8	3.82	1.08	0.87	0.94	31.752	0.000*
9	3.71	1.10	0.77	0.95	26.155	0.000*
12	3.96	1.07	0.77	0.95	21.442	0.000*
14	3.61	1.09	0.79	0.94	26.731	0.000*
17	3.54	1.10	0.76	0.95	25.418	0.000*
21	3.78	1.08	0.78	0.94	23.620	0.000*
<i>Cronbach Alpha reliability coefficient (α)</i>					0.95	
<i>Spearman Brown split-half test correlation coefficient</i>					0.94	

\*p<0.001

**Table 3: Reliability Results**

The scale consisted of 7 positive and 3 negative statements. The total score ranged between 10 and 50. In the scope of this study, the mean score was calculated as 37.72, whereas the standard deviation was found as 9.16.

## Discussion

Many recent studies in physical education have stressed the significance of determining the belief systems and attitudes in the development of teacher education programs (Graber, 2001; O’Sullivan, 2005; Tsangaridou, 2006, cited Tsangaridou, 2008). Especially studies conducted by Ennis and colleagues provided in depth discussion and analyses of value orientation in determining teachers’ belief systems and attitudes (Ennis & Chen, 1993; Ennis & Chen, 1995; Ennis, Chen & Ross, 1992; Ennis & Zhu, 1991). The classification of value orientations in Ennis and colleagues’ both original and revised Value Orientation Inventory [(VOI) (Ennis & Chen, 1993) and (VOI-2) (Ennis & Chen, 1995)] included five orientations (discipline mastery, learning process, self-actualisation,

ecological integration, and social responsibility), of which our scale mostly dealt with self-actualisation and to a lesser extent, learning process (Ennis & Chen, 1993; Timken, 2000). Our scale focused on the processes of building self-worth, self-knowledge, enjoyment in learning, and emotional factors affecting the general course of the learning process of the pre-service classroom teachers (Gillespie, 2011). In the conceptual framework and theoretical level, the determination of the items of our scale was based on these self actualization concerns. However, our study focused more on the cognitivist discussion of the methods used in creating and analyzing a much-needed scale that can serve the psychological processes of the value orientation of pre-service classroom teachers.

General studies concerning teacher education regarding the discussion and analyses of learning processes and motives of teacher candidates have contributed a great deal to the literature, but specific studies focusing on the physical education training of pre-service classroom teachers are still not at desired level (Tsangaridou, 2008). One of the important factors contributing to this marginalization in literature is the lack and inadequacy of measurement tools and scales. A brief survey of the literature demonstrates that studies on the subject mostly use qualitative data collection methods (Matanin & Collier, 2003; Tsangaridou, 2008). Therefore, this study tried to contribute to the literature by the application of a specific quantitative data collection tool on the subject. The Physical Education Lesson Attitude Scale for Preservice Classroom Teachers, which developed by Oncu and Cihan (2012) was used as the data collection tool, and its psychometric properties were re-examined in the light of recent studies conducted on the physical education training of preservice classroom teachers.

In this study, the tests were applied in order to determine whether the data were fit for the factor analysis. The results of the tests yielded positive fit values. Other findings of this study were also found in compliance with the major hypotheses in the literature. Tavşancıl (2002) stated that the KMO is considered perfect as the KMO value approaches 1, and the value is unacceptable when it is below 0.50. On the other hand, when the Bartlett Sphericity test is found meaningful, it shows that the data is obtained from a multi-variable normal distribution (Buyukozturk, 2008). The sample size was adequate for factor analysis as the sample size used in this study was above 500 (Bryant & Yarnold, 1995; Comrey & Lee, 1992; Cureton & D'Agostino, 1983; Kline, 1994).

The results of EFA, which was administered in order to determine the factor structure, demonstrated that the total variance of the scale explained by a single factor was 68.82%. The factor loadings of the items weighed between 0.801 and 0.901, and common factor variances ranged between 0.641 and 0.812. When compared with the results of the original study, these results indicated significant increases that would contribute to the validity of the scale. These findings of the factor analysis are also supported by the literature on the subject. The factor number covers two thirds of the total variance of the variables subjected to the analysis, and it is considered as an important factor number. However, it is especially difficult to achieve this value in social sciences. Therefore, in single-factor scales, the variance is expected to be at least 30 percent; in multi-factor scales, this number is expected to be much higher (Bayram, 2004). While Tabachnick and Fidel (2001) argued that the loading values of the items in the factor should be at least 0.32, Buyukozturk (2008) regards values equal to or greater than 0.45 as appropriate for selection. Kline (1994) defined loading values equal to or greater than 0.60 as high loading values. In this regard, Buyukozturk (2008) pointed out that in practice it is not easy to arrive at the values above or 0.66 or close to 1 for common factor variances of the items. Having high common factor variance values would increase the total variance on the model. When Figure 1 is analyzed, it can be observed that the

component that had a sharp drop on the line graph was component number 1. Component number 2 on the line graph started to adopt a horizontal look. Theoretically, scree plots are formed by combining the eigenvalues of the items, ergo it is estimated that the sharp drops in the graph can provide the factor number (Buyukozturk, 2008). It is also proposed that the number of factors that would be included in a model is equal to the number of factors whose eigenvalues are equal to or higher than 1 (Balci, 1995; Turgut & Baykul, 1992).

To ascertain the single factor structure of the scale, CFA was administered. The results of the CFA verified the factor structure that was obtained by administering the EFA. The CFA signaled relative improvement in some attitude indices that had low values in the study by Oncu and Cihan (2012) such as GFI (0.80) and AGFI (0.75). In addition, the CFA results demonstrated increases in  $\chi^2$  and RMSEA values. In our study,  $\chi^2$ /sd ratio was below 5, a value acceptable for a medium level fit between the model and the data (Sumer, 2000, cited Cokluk, Sekercioglu & Buyukozturk, 2010). The results also demonstrated that the  $\chi^2$  value was sensitive to the sample size, and the  $\chi^2$  value increased as the sample size grew (Schumacker & Lomax, 1996; Tabachnick & Fidel, 2001). In this regard, the RMSEA showed good coherence as it was equal or less than 0.08 (Jöreskog & Sörbom, 1993), whereas the RMR and the SRMR had perfect coherence as it was equal to or less than 0.05 (Brown, 2006). Moreover, the CFI corresponded to perfect coherence as it was equal to or greater than 0.95 (Hu & Bentler, 1999), whereas the GFI represented perfect coherence with its value equal to or greater than 0.95 (Schermelleh-Engel, Moosbrugger & Müller, 2003). Lastly, the value of the AGFI equal to or above 0.90 pointed to good coherence (Schumacker & Lomax, 1996), and the values of the NFI and the NNFI equal to or above 0.95 pointed to perfect coherence (Hu & Bentler, 1999).

The results of the analyses regarding whether there are significant differences between the scores that were obtained from the scale according to some independent variables showed parallels with other studies (Arslan & Altay, 2009; Matanin & Collier, 2003; Morgan & Vibake, 2008; Oncu & Cihan, 2012; Yildiz, 2010) on the subject. This can be evaluated as the scale differentiated well between the groups, and thus provided strong evidence for the validity of the scale.

The analyses that were made to determine the reliability level of the scale indicated that the scale has a high reliability level. Buyukozturk (2008) stated that when Cronbach Alpha and Spearman Brown split-half correlation coefficients are equal to or above 0.70, it is evidence for the reliability of a scale in general. The positive and high values for the item-total correlation that defines the correlation between the scores obtained from the test items and the total score of the test indicated that the test items exemplified similar behavior patterns. Thus, there is strong evidence for the internal consistency of the test (Ozdamar, 1999). Likewise, the differences observed between the lower and higher 27 percentile groups are an indicator for the internal consistency of the scale. This proved that the test items served the purpose of measuring the same behavior patterns (Buyukozturk, 2008).

The findings of our study revealed that the attitudes of pre-service classroom teachers towards physical education lessons were in the positive direction but only slightly above average (neutral) levels. Contrary to our findings, some studies in the literature, both in Turkey and abroad, have found that teachers hold quite negative feelings towards physical education (Arslan & Altay, 2008; Faucette & Patterson, 1989; Howarth, 1987; Xiang, Lowy & McBride, 2002). Several factors might be responsible for the findings of these studies. The curricula and structure of the teacher education programs, the quality of the educators, gender, age and cultural differences, value

orientations and judgments, previous experience with sports and physical education, academic motivation and self-efficacy (confidence) levels can all play role in the formation of negative attitudes. For example, Gillespie (2011) argued that the quality of the educators and the interaction between the educators and teacher candidates are quite important in the formation of value orientation of teacher candidates towards physical education programs. This is a logical result of the teacher educators' coherent views towards different courses, and their impact on the beliefs of teacher candidates. Likewise, this correlation proved viable in studies completed in other countries. Ennis and colleagues emphasized in their studies that the different value orientations of physical education teachers can lead to different curriculum implementations (Ennis & Chen, 1993; Ennis & Chen, 1995; Ennis, Chen & Ross, 1992; Ennis & Zhu, 1991). Taking both Turkey's peculiar cultural characteristics and cultural diversity in consideration, it is not surprising to have different findings than the studies conducted internationally.

## Conclusion

This study was conducted to restructure and improve the Physical Education Lesson Attitude Scale for Preservice Classroom Teachers, which was originally developed in order to measure the attitudes of preservice classroom teachers toward the practical part of physical education classes. The results obtained after reliability and validity testing demonstrated that the scale, which consisted of 10 items and a single factor, can be applied to the preservice classroom teachers. In future studies, the scale may be administered to different samples on different levels of education (i.e. preschool teacher candidates who would teach physical education lessons). Such an administration may further contribute to the reliability and validity of the scale. This study did have its limitations in terms of its sample characteristics and target sample. The study sample consisted of the teacher candidates from only one university, and the students were asked about their attitudes on the practical parts of the physical education lessons. Therefore, it is suggested that further studies should target the teacher candidates from several universities as their sample population or develop scales that can measure the attitudes of the teacher candidates toward the theoretical parts of the physical education classes.

The scale subjected to this study was developed on Turkish pre-service classroom teachers. The curricula of classroom teacher education programs in some other countries show similarities with the Turkish curriculum while some countries have curricula very different than the Turkish one. Despite the differences in curricula, pre-service classroom teachers receive physical education training at certain stages of their education. Therefore, The Physical Education Lesson Attitude Scale for Preservice Classroom Teachers can be adapted to pre-service classroom teachers worldwide. Last but not least, the scale can provide basis for the measurement tools that will be developed to determine the views of pre-service classroom teachers toward the teacher educators and the curricula of teacher education programs. It can also be helpful in a holistic fashion to identify the problems the teacher candidates meet in teacher education programs, their self-efficacy levels, and thus, the values that shape their teaching methods in physical education.

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