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Research Article

Investigating the Perceptions of Individuals with Disabilities Related to Participating into Exercise

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ABSTRACT

The aim of this study was to investigate the perceived benefit/barrier perceptions of individuals with disabilities. A total of 321 disabled individuals, N = 145 (45.2%) female, N = 176 (54.8%) male, participated in the study. Among these disabilities, N = 143 (44.5%) orthopedically impaired, N = 105 (32.7%) visually impaired, N = 73 (22.7%) hearing impaired individuals (aged 18-69.) In order to determine the participants' perceptions about exercise, the "Exercise Benefits/Barriers Scale (EBBS)" developed by Sechrist, Walker, and Pender (1987) was used. EBBS included 43 items with 29-item benefit and 14-item barrier sub-dimensions. To understand whether the data obtained from the scales show normal distribution or not, the Shapiro-Wilk normality test was applied first ($p>0.05$). T-test and ANOVA tests were used for the analysis of obtained data. Also, the post-hoc test was used to determine which group caused the difference in multiple comparisons. Aside from these, multiple regression analysis was used to determine the role of individuals' age, gender, and disability types on their perceptions of exercise. Perceptions of disabled individuals on participating in the exercise were found to differ significantly in both sub-dimensions (benefit and barrier sub-dimensions) according to gender, age, and exercising or not ($p<0.05$). There was a significant difference in the benefit sub-dimension of participants' perceptions of participating into exercise according to disability types ($p<0.05$), at the same time there was no difference in exercise perceptions of individuals with visual, hearing, and orthopedic disabilities related to disability sub-dimension ($p>0.05$). In conclusion, it could be said that perceptions of orthopedically, visually, and hearing-impaired individuals related to participating in exercise differed according to gender, age, type of disability, and exercising or not.

INTRODUCTION

Physical inactivity leads to social and psychological side effects in individuals besides physical adverse effects. However, improving technology has contributed to individuals' awareness of the disadvantages of inactive life that have gradually become a problem and understanding the benefits of exercise on health.

It is seen that the term "exercise" is sometimes used instead of "physical activity" (Taylor, 1983). However, when considered in terms of definition, physical activity has a more comprehensive meaning. Physical activity is any kind of body movement produced by skeletal muscles consuming energy. Moreover, exercise is defined as the planned and repetitive physical activities aiming to protect and develop one or more components of physical fitness (USDHHS, 1996). About this definition, it is possible to notice that the term of exercise is named as the sub-item of physical activity (Wilmore & Costill, 1994).

According to 2008 dated American Physical Activity Guide of American Health and Human Services Department, it is indicated that physical activity, in general, improves health. Regular exercise provides several benefits such as protecting and increasing muscle strength and amount, gaining balance increasing muscle-joint control, providing fit body composition, and strengthening the bones. Moreover, it has been known that it decreases cardiac problems (infarction, hypertension), type-2 diabetes, colon and breast cancer, obesity, gallbladder diseases and osteoporotic fractures, and depression and anxiety disorders, cognitively (Lee et al., 2012; Ehrman et al., 2005; Kesaniemi et al., 2001; Soares et al., 2018; Vuori, 1998). On the other hand, a physically inactive lifestyle can increase the risk for diseases more (Richards et al., 2006). Whereas exercise is important for all individuals, it is possible to gain importance for disabled individuals due to their limited living conditions. Disabled individuals can decrease the risk for secondary health problems by adopting a physically more active lifestyle, and enhancing their all motor functioning levels positively, as well (Van Der Ploeg et al., 2004). Several health specialists and researchers have emphasized that the highness of vitality level in exercising activities performed with a rehabilitation program positively affect biological and physiological properties of disabled individuals (Drewnowski & Evans, 2001). It has been indicated in various studies that physical activity has positive effects upon the health of disabled individuals, as well as in healthy individuals, besides its physiological benefits and positive psychological and social effects (Longmuir et al., 2000; Martin et al., 2006; Martin et al., 2012; Savucu, 2009). Besides all these benefits, exercise fulfills as essential remarkably important function for the "integration" aimed to be reached in unique education providing

opportunities for disabled individuals to come together with other disabled individuals and non-disabled individuals. In such an environment, disabled individuals maintain a positive attitude observing the problems of other disabled individuals, their creativity is encouraged, their feeling of loneliness is minimized, they become more sociable and grasp the chance for leading a happier life (Atay, 1995; Brouwer et al., 1997).

How participating in an exercise that has such remarkable importance for increasing the life quality of disabled individuals is perceived by disabled individuals is very important. Therefore, investigating the benefit/barrier perceptions of disabled individuals related to exercise was the purpose of this study to shed light on further studies to be carried out to understand the difficulty of participating in exercise, if available for the participants, and for revealing this difficulty. In addition, there are some similar studies in the world literature (Harrison et al., 2010; Valis et al., 2017; Anderson et al., 2005; Goodwin et al., 2004; Rauzon, 2003; Rimmer et al., 2000) about this topic, but a similar study in populations with disabilities has not been found in Turkey.

METHODS

Study Groups

The study was carried out on orthopedic, visually, and hearing impaired women and men living 18-69 in disabled associations, sports clubs, and rehabilitation centers in Ankara. The sample of the study was chosen by convenience sampling method. A total of 321 disabled individuals, N = 145 (45.2%) female, N = 176 (54.8%) male, participated in the study. Among these disabilities, N = 143 (44.5%) orthopedically impaired, N = 105 (32.7%) visually impaired, N = 73 (22.7%) hearing impaired individuals. Cronbach's alpha value was found as 0.82 in the reliability analysis. Before collecting the data, the consent form was signed by the participants. Also, this study was approved by Başkent University Institutional Review Board (Project no: KA19/16.) and supported by Başkent University Research Fund.

Considering the studies in which disabled individuals are participants, 321 participants is a high number. However, since there are three different types of disability, different age categories, and of course two different genders in this number, some statistical analyzes that are not required were not carried out due to the concern that the reliability would decrease. Therefore, this situation can be considered as a limitation of the study.

Demographical information of the participants was presented in the table below. It was performed upon orthopedically, visually, and hearing impaired females - males at 18-69 age

interval. Totally 321 disabled individuals including n=145 (45.2%) females and n=176 (54.8%) males participated in the research. Among these disabilities, n=143 (44.5%) were orthopedically disabled, n=105 (32.7%) were visually impaired, and n=73 (22.7%) were hearing impaired.

Table 1. Demographical information related to disabled individuals who participated in the research

Variable		Frequency	Percentage
Gender	Female	145	45.2
	Male	176	54.8
	Total	321	1000
Age	18-35	177	55.1
	36-52	121	37.6
	53-69	23	7.1
	Total	321	100.0
Type of Disability	Orthopedic	143	44.5
	Visual	105	32.7
	Hearing	73	22.7
	Total	321	100.0
Exercising	Yes	78	24.3
	No	243	75.7
	Total	321	100.0

Data Collection Tools

Exercise Benefits/Barriers Scale (EBBS):

Exercise Benefits/Barriers Scale was developed by Sechrist, Walker, and Pender (1987), and adapted into Turkish by Güven Karahan, Aşçı, and Esatbeyoğlu (2011) who also performed validity and reliability studies. The scale evaluates the benefits adult disabled individuals perceive on exercise and the barriers encountered while exercising. EBBS totally includes 43 items with 29-item benefit (Cronbach alpha value 0.98) and 14-item barrier (Cronbach alpha value 0.93) sub-dimensions and is organized as a Likert scale required only one choice to be selected among four choices.

Personal Information Form

The information related to age, gender, disability type, and their exercise or not was obtained with the Personal Information Form developed by the researcher.

Data Collection

All individuals who voluntarily participated in the study were informed about the research, and they signed the informed consent form. Each data set was provided to be filled in interviewing with each participant face to face. In some associations and rehabilitation centers, the researchers read the scale to the participants groups and ensured that it was answered.

Data Analysis

Obtained data were analyzed using the statistical software (SPSS) version 21.0 prepare for social sciences (IBM SPSS Statistics for Windows, Armonk, NY: IBM Corp.). In order to understand whether the data obtained from the scales show normal distribution or not, the Shapiro-Wilk normality test was applied first ($p>0.05$). According to the normality analysis of the data independent samples t-test was used for comparing two groups. Parametric tests (ANOVA) were performed for analyzing the differences between groups. The Post-hoc test was used to determine which group caused the difference in multiple comparisons. Aside from these, multiple regression analysis was used to determine the role of individuals' age, gender, and disability types on their perceptions of exercise. The results were evaluated at $p<0.05$ level of significance at 95% reliability interval.

RESULTS

The results indicating the perceptions of female and male disabled individuals who participated in the study were presented in Table 2.

Table 2. Comparing the Perceptions of Disabled Individuals on Participating in Exercise According to Gender

EBBS Sub-Scales	Gender	N	$\bar{x}$	Sd	t	p
Benefits Scale	Female	145	1.82	0.37	2.230	**.026***
	Male	176	1.72	0.42		
Barriers Scale	Female	145	2.66	0.47	-4.142	**.000***
	Male	176	2.88	0.46		

***p<0.05**

According to the result of the Levene test, group variances were homogenous because the p-value related to the benefits scale was (0.073) > 0.05. Moreover, the group variances were also homogenous because the p-value related to the barriers scale was (0.293) > 0.05.

Because the p-value related to the benefits scale at the end of the t-test was (0.026) < (0.05), the benefits of disabled individuals related to participating in exercise differed significantly according to gender.

Table 3. Comparing the Perceptions of Disabled Individuals on Participating in Exercise According to Age

EBBS Sub-Scales	Age	N	$\bar{x}$	Sd	F	p
Benefits Scale	18-35	177	1.71	0.40	3.83	**.023***
	36-52	121	1.81	0.39		
	53-69	23	1.90	0.44		
	Total	321	1.76	0.40		
Barriers Scale	18-35	177	2.85	0.47	3.96	**.020***
	36-52	121	2.72	0.46		
	53-69	23	2.63	0.50		
	Total	321	2.78	0.48		

***p<0.05**

At the end of the ANOVA test, because the p-value related to the benefits scale was (0.023) < 0.05 and the p-value found for the barriers scale was (0.020) < 0.05, both variables differed significantly according to age groups.

As could be seen in Table 3, there was a significant difference between the groups with the p-value lower than 0.05 at the end of the ANOVA test performed on disabled participants. Namely, there was a significant difference between all age groups except from the comparison of 36-52 age group and 53-69 age groups in terms of benefits scale. According to post-hoc test, this difference arose from the 18-35 age group.

In terms of the barriers scale, there was a significant difference between the comparisons except from the 36-52 age group and the 53-69 age group. Here, the perceived barrier average of the 18-35 age group was higher rather than the 36-52 and 53-69 age groups.

Table 4. Comparing the Perceptions of Disabled Individuals on Participating in Exercise According to Disability Type

EBBS Sub-Scales	Type of Disability	N	$\bar{x}$	Sd	F	p
Benefits Scale	Orthopedic	143	1.72	0.41	4.868	**.008***
	Visual	105	1.86	0.42		
	Hearing	73	1.70	0.32		
	Total	321	1.76	0.40		
Barriers Scale	Orthopedic	143	2.74	0.52	1.161	.314
	Visual	105	2.79	0.47		
	Hearing	73	2.85	0.39		
	Total	321	2.78	0.48		

***p<0.05**

As could be seen in Table 4, because the p-value related to the barriers scale was (0.314) > 0.05 at the end of the ANOVA test, there was no significant difference between the barriers perceived according to disability type. However, because the p-value related to the benefits scale was (0.008) < 0.05, there was a significant difference between benefits perceived according to disability type. The post-hoc test was performed in order to find from which groups this difference arose.

At the end of the multiple comparisons, whereas no significant difference was found between physically disabled and hearing-impaired individuals, there was a significant difference between orthopedic disabled and visually impaired individuals. Perceived benefit scores of the visually impaired individuals were higher. Furthermore, there was a significant difference between hearing and visually impaired individuals. Perceived benefit scores of the visually impaired individuals were higher.

Because the variable of exercising or not included two independent groups, performing independent samples t-test was considered to be appropriate for the hypothesis test. The results were presented in Table 5.

Table 5. Comparing the Perceptions of Disabled Individuals on Participating in Exercise According to Exercising or not

EBBS Sub-Scales	Group	N	X	Sd	t	p
Perceived Benefit	Exercising	78	1.57	0.37	-5.035	**.000***
	Not exercising	243	1.82	0.39		
Perceived Barrier	Exercising	78	3.04	0.46	5.830	**.000***
	Not exercising	243	2.70	0.45		

***p<0.05**

As seen in Table 5, as a result of the Independent sample t-test, it was found that the perceived benefit and perceived barriers scores of the participants regarding exercise differ significantly according to whether they are regular exercise participants or not ($p < 0.05$).

The results of the multiple regression analysis in which the perceived benefit is taken as the dependent variable; the gender, age, and disability type are used as independent variables are given below in Table 6.

When we examine the results, the negative beta of the gender variable indicates that it does not have a significant effect. On the other hand, when the results of the age variable are examined, it can be said that it has a significant effect since the b value is in the confidence interval and the p value is less than 0.05, but it should also be taken into account that it does

not agree with the correlation analysis. Finally, when the effect between the disability type and the utility-scale is examined, it shows that although it is in the confidence interval, it has no statistically significant effect since the p-value is greater than 0.05.

Table 6. Multiple Regression Analysis for Age, Gender, and Disability Type of Perceived Benefit

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
	B	Std Error	Beta			Lower Bound	Higher Bound	Tolerance	VIF
Constant	1.686	.113		14.972	.000	1.465	1.908		
Gender	-.104	.045	-.129	-2.336	.020	-.192	-.016	.995	1.005
Age	.006	.002	.163	2.953	**.003**	.002	.010	.997	1.003
Disability type	.016	.028	.031	.571	.568	-.039	.071	.993	1.007

The results of the multiple regression analysis in which the perceived barrier is taken as the dependent variable and the gender, age, and disability type are used as independent variables are given below in Table 7.

Table 7. Multiple Regression Analysis for Age, Gender, and Disability Type of Perceived Barrier

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
	B	Std Error	Beta			Lower Bound	Higher Bound	Tolerance	VIF
Constant	2.653	.131		20.298	.000	2.396	2.911		
Gender	.216	.052	.225	4.173	**.000**	.114	.319	.995	1.005
Age	.008	.002	-.173	-3.210	**.001**	-.012	-.003	.997	1.003
Disability type	.037	.033	.061	1.140	.255	-.027	.102	.993	1.007

As seen in Table 7, as a result of the multiple regression analysis, the beta value of the gender is in the confidence interval, and the p-value is less than 0.05, so it appears that it has a statistically significant effect. On the other hand, when the effect of the age variable is examined, it is seen that the beta value is not within the confidence interval, so a significant effect was not found. Lastly, when the effect of the disability type was examined, it was seen that although the beta value was in the confidence interval, it did not have a statistically significant effect due to the p-value greater than 0.05.

DISCUSSION

According to the findings of this study, there was a significant difference between perceived benefit and perceived barrier sub-dimensions of orthopedic disability, visually and hearing-impaired individuals who were resident in Ankara province in terms of doing exercise. Perceived benefits of disabled individuals related to doing exercise differed significantly according to gender. In the literature, there were several studies supporting these results. For example; In the study carried out by Hughes & Hughes in 1997, whether daily physical activities differed significantly or not according to gender in old individuals was investigated, and 5151 individuals participated in this study. In the study, 1837 of the individuals were female, and 3255 were males. For six years between 1984 and 1990, longitudinal data analysis was performed for disabled old individuals, and gender differences were obtained in disabled old individuals. According to these results, disabled individuals lost their physical activity capabilities more as they got older. However, this differed according to gender in females and males. In the researches, there was a lack of knowledge on experiences of disabled old female individuals in terms of taking part in exercise, healthy life, and health developing activities (Harrison et al., 2010). This lack of knowledge in female disabled individuals can cause difference with males in terms of exercise perceptions. In another research, perceived barrier levels related to exercising differed significantly according to gender (Valis et al., 2017). In the same study, whereas there was no difference between learning-disabled students and students with hyperactivity disorder, effects of gender upon physical activity were noticed (Valis et al., 2017). The research carried out on exercising according to gender determined personal or individual barriers in terms of females' participation in exercises. The researchers defined that low exercise participation of females caused due to lack of time, energy, and motivation (Anderson et al., 2005; Goodwin et al., 2004; Rauzon, 2003; Rimmer et al., 2000).

Some researches were not similar to the findings obtained in the literature besides supporting these findings. For example, in the research carried out by Demir and İlhan (2019), 80 licensed athletes from the visually impaired sports federation participated. At the end of the research, no significant difference was found in exercising of visually impaired athletes according to gender (Demir et al., 2019). However, it was revealed in terms of participating in sports that the motivations of visually impaired athletes were at a high level. Equivalent results were also obtained in another research. For example, 152 individuals (69 males and 83 females) participated in the research carried out by Malone (2012). The purpose of the study

was to investigate the perceived benefits and barriers of exercising among individuals with a physical disability. According to the result of the study, no significant difference was determined between genders, age groups, or physical activities, and participation (Malone et al., 2012).

The results of disabled individuals' perceptions related to exercising according to age indicated a significant difference between all age groups including 18-35, 36-52, and 53-69 in terms of benefits scale. Furthermore, in terms of the barriers scale, there was a significant difference in all age groups (18-35, 36-52, and 53-69). In the literature, there were studies supporting these results. For example, in the studies carried out by Jin, Yun, and Agiovlasitis in 2017, whether school-based physical activity programs were beneficial for healing health of disabled students or not in case performed regularly was investigated. It was suggested as a hypothesis that school-based and entertaining physical activities had a positive effect upon the physical health of students when more participation was provided, and this changed between age groups of disabled children. At the end of the research, a relationship was noticed on general health to get better after regular physical activity participation. The children who participated in physical activities more were determined to be healthier rather than their friends. However, this relationship was noticed in children at 12-15 age groups that were older than the others when considered in terms of age groups (Martin et al., 2006). Another study supporting the results related to participation in an exercise in terms of age was analyzed, and according to this study carried out by Diana et al., the data of 2009-2012 National Health Interview Survey (NHIS) were obtained from 86.361 disabled adult individuals at 18-64 age groups. Types of disability hear, visual, cognitive, and physical impairment. The possibility for individuals to contract a chronic disease, individuals' participation in physical activity, exercise, and being active was analyzed. According to obtained results, it was revealed at the end of the study that nearly half of disabled individuals were not physically active and had a higher possibility to have a chronic disease (Carroll et al., 2014). In another study carried out by Jaarsma et al., 27 individuals with spinal cord injury participated. At the end of the research, it was concluded that experiencing the barriers and facilitators before participating in exercise depended upon age, and disability type (Jaarsma et al.,2014). Experiencing the barriers and facilitators before participating in an exercise was related to age. This should be taken into consideration while offering suggestions to disabled individuals on sports and exercise. Especially the content of participation in an exercise in terms of Orthopedically, disability and visually impaired individuals could be increased by selecting the most appropriate exercise for age.

It was revealed that whereas there was a significant difference in perceptions of disabled individuals related to participation in an exercise according to disability type in terms of the benefit of exercise, there was no significant difference in their barrier perceptions. According to this, the results revealed for benefit and barrier perceptions of disabled individuals related to exercise were similar to the results of some researches.

Experiencing the barriers and facilitators before participation in sports was possible depending upon disability type. For example, in the study carried out by Kehn & Kroll (2009), the exercising experiences of individuals with spinal cord injury were investigated. Totally 26 individuals with spinal cord injury participated in the study; 15 of these individuals defined themselves as doing exercise and 11 defined as disabled individuals who did not do exercise. The participants expressed their experiences related to active and perceived benefits and barriers before perceived health effect before and after spinal cord injury through semi-structured telephone calls. As a result, the participants defined motivation and socio-environmental factors for participation into exercise. However, although the individuals with spinal cord injury who participated in exercise regularly had the motivation to participate in exercise, they mentioned their several encountering barriers (Kehn & Kroll, 2009). Revealing or facilitating the barriers/obstacles encouraging the facilitating factors in participation in exercise and availability of exercise according to disability type could increase participation in the exercise. Perceived benefit difference revealed in this study could be arisen from the difference of needed benefits. Besides not finding a significant difference in barrier perceptions according to disability types of the participants, the result averages revealed here indicated the presence of barriers related to exercise in all disability types. Urban/regional planners should never forget that each disability type could require different environmental facilitators. According to the results of multiple regression analysis, it was revealed that age had a significant effect on perceived benefit, while age and gender had a significant effect on the perceived barrier. Güven et al. (2019) stated that women with disabilities faced more significant barriers than men in their participation in sports/exercise. This result is similar to the result of the study.

According to the results of this study, the difference was determined between perceived benefit and perceived barrier sub-dimensions related to exercising of licensed Orthopedically disability, visually and hearing-impaired individuals who were resident in Ankara province. Several studies supporting these results in the literature (Groff et al., 2009; Côté-Leclerc et al., 2017; Te Velde et al., 2018). In the study carried out by Groff, Lundberg & Zabriskie (2009), the effect of participating in sports upon athletic identity and the effect of

doing sports upon life quality for the individuals with cerebral palsy (CP) who attended to CP World Games were aimed to be investigated. Totally 73 international athletes who attended to CP World Games were included in the study. At the end of the research, a meaningful relationship was found between the effect on the life quality of disabled individuals and athletic identity. The effect of athletic identity of disabled individuals upon life quality was possible to increase participation in exercise. Several health specialists and researchers have emphasized that the highness of vitality level in exercising activities performed with a rehabilitation program is possible to have positive effect on the biological and physiological properties of disabled individuals (Drewnowski & Evans, 2001). And this could affect the participation of licensed disabled individuals in exercise positively. In a similar study carried out by Demir and İlhan (2019) upon 80 licensed visually impaired athletes, it was concluded that motivations of visually impaired athletes into exercise and sports were high. In the literature, there were studies supporting these obtained findings besides the ones that were not similar to these. For example, in the study carried out by Tasiemski et al., Athletic Identity Measurement Scale was used for individuals with spinal cord injury (SCI), and the barriers against participating in exercise were investigated. Totally 678 individuals with SCI participated in the research. At the end of the research, no relationships were found between athletic identity and depression, anxiety or life satisfaction, and participation in sports (Tasiemski et al., 2004).

The increase in the number of studies aiming to encourage physical activity in disabled adult individuals is an optimistic tendency for exercise participation and disability. Previous studies underlined that the maturity of disability literature was still at its early stage and should be developed more (Nery et al., 2013). At this point, the presence of licensed athletes was remarkable for potential athletes' heading towards sports. In the general sense, this could be considered as an opportunity that would enable disabled individuals to be healthier at later ages.

CONCLUSIONS

In conclusion, it was possible to mention that perception of orthopedically disabled, visually and hearing-impaired individuals' resident in Ankara province related to participating in exercise differed according to gender, age, disability type, and whether exercising or not. Based on this study, the comparison of regular exercise participation and adaptation periods in the literature such as disabled individuals with the environment can be examined. Also, what kind of motivation sources licensed athletes with disabilities have to

participate in the exercise and whether this varies according to the disability type can be investigated. In detail, gender and age variables can be analyzed separately for a disability type. The most important thing is state encouragement for the authorities to develop and implement projects on persons with disabilities, such as the European Union, which will provide opportunities for further advancement in the field of disability and physical activity.

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Authors' contributions

The first author contributed to this paper by taking responsibility of data collection, data analysis, interpretation processes, preparation, and critical analysis of the manuscript. The second author contributed to this paper by determining its main ideas and hypothesis and designing the methodology of the study. She also mentored the first author and contributed to his responsibility areas with her expertise. Both authors have read and approved the final version of the manuscript and agree with the order of the presentation of the authors.

Declaration of conflict interest

The article does not find any personal or financial conflict of interest of the authors.

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Research Article

Investigation of the Relationship Between the Coach - Athlete Relationship and Sport Confidence in Adolescent Elite Taekwondo Athletes

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ABSTRACT

The purpose of this study is to investigate adolescent taekwondo athletes the relationship between coach-athlete relations and sport confidence in terms of gender. A total of 108 athletes ($\bar{X}_{age}$=14.73±1.43), 52 females ($\bar{X}_{age}$=14.98±1.42), 56 males ($\bar{X}_{age}$=14.50±1.41) participated in the study voluntarily. Data were collected with the demographic form, coach-athlete relationship questionnaire, and sport confidence inventories. Descriptive analysis, Mann-Whitney U test, and Spearman rho correlation analysis were used to analyze the data. There was no significant difference between the female and male athletes in all subscales of the coach-athlete relationship questionnaire and sport confidence inventories (p>.05). As a result of the Spearman correlation analysis, while there was a moderate positive correlation between the closeness subscale of the coach-athlete relationship questionnaire and trait sport confidence (r=.35, r^2=.12, p<.05) and state sport confidence (r=.34, r^2=.12, p<.05); there was no correlation between commitment and complementarity subscales and sport confidence inventories in female athletes (p>.05). In male athletes, there was no significant correlation between the subscales of the coach-athlete relationship questionnaire and the sport confidence inventories (p>.05). In conclusion, while the closeness of the coaches to the female taekwondo athletes in the sports environment increased the trait and state sport confidence of the female athletes, it did not change the level of the trait and state sport confidence of male athletes.

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INTRODUCTION

Sport confidence, built on self-efficacy theory, expresses the athlete's opinion or self-confidence in his abilities for successful performance in sports (Vealey, 1986). The original model of sport confidence has elements such as state sport confidence (the confidence just before an event) and trait sport confidence (how confident athletes generally feel about their ability) (Vealey & Chase, 2008).

The extended sport confidence model created within the framework of sport confidence theory has four components: factors influencing sport confidence, sources of sport confidence, constructs of sport confidence, and consequences of sport confidence. Factors that influence confidence in sports include the organizational culture in which the athletes are engaged, the characters of athletes, and their demographic features (Vealey et al., 1998). Corporate culture represents the structural and cultural characteristics of sports subcultures such as motivational climate, competition level, and coach behavior. In addition, the coach's role in the model is also seen in the sources of sport confidence. Sources of sport confidence are divided into nine categories under three main categories: achievement, self-regulation, and climate. Social support among these categories can be defined as encouragement by families, teammates, and coaches (Öncü, 2015). Coaches have vital roles in many steps of the sport confidence model. When senior athletes were asked about their success behind the scenes, they mentioned that the coaches have critical importance (Gould et al., 1999). Another study indicates that the coach-athlete relationship plays a central role in athletes' physical and psychosocial development (Jowett & Cockerill, 2002).

The coach-athlete relationship is defined as a social situation (Jowett & Shanmugam, 2016). This social situation is constantly shaped by the coach's interpersonal thoughts, feelings, and behaviors and the athlete's interpersonal thoughts, feelings, and behaviors. This definition also puts forth that a coach and an athlete are mutually and causally interdependent; thereby one's emotion, thoughts, and behavior the other's feelings, thoughts, and behaviors (Jowett, 2017).

Researchers have identified three subscales that reflect these interrelated feelings, thoughts, and behaviors: closeness, commitment, and complementarity (3C model) (Adie & Jowett, 2010; Jowett & Ntoumanis, 2004; Jowett & Meek, 2000). In the coach-athlete relationship, closeness is characterized as a feeling of emotional closeness that expresses confidence, respect, appreciation, gratitude, and a propensity to love each other. Commitment is characterized by the intention of coaches and athletes to maintain long-term sports

relationships. Complementarity refers to complementary or collaborative coach-athlete interactions, especially during training. In the 3C model, these three subscales are thought to be the indicator of coach-athlete relationship quality.

Many studies in the literature stated that sport confidence is affected by gender and that coach support is an essential source in creating sport confidence as a social support component (Kingston et al., 2010; Hays et al., 2007; Vealey et al., 1998). Thus, it is emphasized that it is essential to present social climates which are organized according to the gender of the athletes to show the optimum performance (Öncü, 2015); yet, the lack of these environments may decrease the confidence of the athletes (Thomas et al., 2019; Weiss et al., 2009). In the literature, the relationship between coach and athlete in team sports such as football (Tolukan & Akyel, 2019), basketball (Görgülü, 2019), volleyball (Avcı et al., 2018), handball (Güllü, 2018), wrestling (Gencer & Öztürk, 2018) and American football (Jowett & Frost, 2007) in adult athlete samples was also studied. It seemed that the examined studies were reviewed in adult athlete samples.

It is known that coaching practices designed specifically for adult elite athletes are not suitable for young athletes (Özdurmuş, 2015). In adolescent athletes, it is known that coach-created motivational climate and coaching feedback increase adolescents' motivation to participate in sports (Weiss et al., 2009). Self-confidence and entertainment are individual factors that enable female adolescent athletes to continue with sports (Öztürk & Koca, 2017). Nevertheless, studies that examine the coach-athlete relationship in adolescent athlete samples are limited in Turkey (Keskin et al., 2018).

In this context, the purpose of this research is to investigate the relationship between coach-athlete relationships and sport confidence of adolescent elite taekwondo athletes in terms of their gender. The hypotheses determined for this purpose are as follows: (1) there is a significant difference between adolescent taekwondo athletes' coach-athlete relationships and their sport confidence in terms of gender, (2) there is a positive correlation between coach-athlete relationships and sport confidence of adolescent male taekwondo athletes and (3) there is a positive correlation between coach-athlete relationships and sport confidence of adolescent female taekwondo athletes.

METHODS

This research is a survey (correlational) model research carried out to investigate the correlation between sport confidence and coach-athlete relationship (Büyüköztürk et al., 2013).

Study Groups

The research was conducted with athletes in the Athlete Development Camp organized by the Taekwondo Federation of Turkey. According to the equation for elite athlete classification based on the 'athletes' highest standard of performance, their success, and experience at that level, the research group was classified as the semi-elite athletes (Swann et al., 2015). Athletes were determined by stratified purposeful sampling method (Büyüköztürk et al., 2013), which is one of the non-random sampling methods. A total of 108 athletes ($\bar{X}_{age}$=14.73±1.43), including 52 females ($\bar{X}_{age}$=14.98±1.42) and 56 males ($\bar{X}_{age}$=14.50±1.41) aged between 12-17 participated in the study voluntarily.

The data were collected during a development camp attended by athletes. In the process of data collection, information related to the content of the study, rights of the participants, and information of the researchers were provided to the participants and the Camp Authority of Taekwondo Federation of Turkey, and their approval was obtained.

Data Collection Tools

Demographic Information Form:

In this form, gender and age information were asked by the researchers.

Coach-Athlete Relationship Questionnaire:

Altıntaş, Kazak Çetinkalp and Aşçı (2012) adapted the questionnaire to Turkish culture, which was developed by Jowett and Ntoumanis (2004). The seven-point Likert questionnaire has subscales of closeness, commitment, and complementarity. According to the reliability analysis performed in the Turkish version of the scale, Cronbach Alpha values were .90 for Closeness and Commitment subscales and .82 for the Complementarity subscale.

State and Trait Sport Confidence Inventories:

State Sport Confidence and Trait Sport Confidence inventories developed by Vealey (1986) were adapted to Turkish culture by Engür, Tok, and Tatar (2006). There are 26 items in total, having 13 items in each inventory. Cronbach Alpha values of State Sport Confidence and Trait Sport Confidence inventories, which is a nine-point Likert, were determined as .94 and .91, respectively.

Data Collection

The study followed the ethical procedures outlined in the Declaration of Helsinki and was approved by the ethics committee of Eskisehir Technical University. The data were

collected during the development camp attended by athletes. In the process of data collection, the information related to the content of the study, rights of the participants, and data of the researchers were provided to the participants and the Camp Authority of Taekwondo Federation of Turkey, and their approval was obtained.

Data Analysis

SPSS 25 package program was used in the analysis of the data. The data entered into the program were checked for suitability of extreme values, linearity, covariance, and normality assumptions for correlation analysis (Pallant, 2011). The data of two participants who did not meet the extreme value requirement in the control process of assumptions were excluded from the analysis process. Then, as a result of scatter plot analysis for linearity and covariance conditions, assumptions were provided. For normality assumption, ±1 interval was used for kurtosis and skewness values (Can, 2016). Since the data were not normally distributed, they were analyzed by Spearman rho correlation and Mann-Whitney U test. Correlation ranges were considered to be: .10-.29 small; .30-.49 medium; .50-1.00 large (Cohen, 1988). The variance value shared by the variables used in the research, that is, what percentage of the change in variables is explained by the change in other variables, was calculated by the determination coefficient (r2) (Can, 2016; Pallant, 2011). Cronbach Alpha was used for the internal consistency coefficient. The provided internal consistency coefficients are .88 and .87 for trait sport confidence and state sport confidence inventories and .70, .77, and .46 for closeness, commitment, and complementarity subscales. These results showed that the findings obtained from the data collection tools used in the research were reliable (Can, 2016). Analyzes were carried out at $p<.05$ level.

RESULTS

The findings of the Mann-Whitney U test, which showed the difference between the sport confidence and the coach-athlete relationship of the taekwondo athletes participating in the study in terms of their gender, were provided in Table 1.

According to the findings, there was no significant difference between the closeness ($U=1.49$, $p>.05$); commitment ($U=1.66$, $p>.05$) and complementarity ($U=1.71$, $p>.05$) subscales of the coach-athlete relationship questionnaire in terms of gender of the athletes. Also, there was no significant difference between the trait sport confidence ($U=1.26$, $p>.05$) and state sport confidence ($U=1.24$, $p>.05$) inventories in terms of gender of the athletes.

The findings showing the relations in terms of gender between the relationship of the coach-athlete relationship questionnaire and the sport confidence inventories of the taekwondo athletes participating in the study were given in Table 2.

Table 1. Findings of the comparison test between coach-athlete relationship and sport confidence by gender

Instruments	Subscales	Gender	n	Mean Rank	Min	Max	25th	50th	75th	U	p
Coach-Athlete Relationship Questionnaire	Closeness	Female	52	53.76	2.50	7.00	6.81	7.00	7.00	1.49	.75
		Male	56	55.19							
	Commitment	Female	52	50.46	1.67	7.00	6.08	7.00	7.00	1.66	.15
		Male	56	58.25							
	Complementarity	Female	52	49.10	2.50	7.00	5.75	6.50	7.00	1.71	.10
		Male	56	59.04							
Trait Sport Confidence Inventory		Female	52	58.10	4.15	9.00	6.46	7.08	8.04	1.26	.25
		Male	56	51.16							
State Sport Confidence Inventory		Female	52	58.56	3.92	9.00	6.62	7.42	8.08	1.24	.19
		Male	56	50.73							

Table 2. Correlation analysis findings between coach-athlete relationship and sport confidence

Gender	Variables	Commitment	Complementarity	Trait Sport Confidence	State Sport Confidence
Female (n=52)	Closeness	**.523*** **	**.479*** **	**.349***	**.335***
	Commitment		**.512*** **	.218	.083
	Complementarity			.158	.088
	Trait Sport Confidence				**.865*** **
Male (n=56)	Closeness	**.673*** **	**.518*** **	.004	.004
	Commitment		**.397****	.095	.069
	Complementarity			.254	.198
	Trait Sport Confidence				**.812*** **

***p<.001 **p<.01 *p<.05

The relationships between athlete-coach relationship questionnaire subscales and sport confidence inventories were not significant in male athletes (p>.05) (Table 2). The relationships between the closeness subscale and trait sport confidence (r=.35, r2=.12, p<.05) and state sport confidence (r=.34, r2=.12, p<.05) were significant in female athletes. The relationships between the commitment and complementarity subscales of the coach-athlete relationship questionnaire and the trait sport confidence and state sport confidence inventories were not significant (p>.05).

DISCUSSION

The purpose of the research was to investigate the correlation between the sport confidence and the coach-athlete relationship of adolescent elite taekwondo athletes in terms of their gender. Three hypotheses were written for this purpose.

The study's first hypothesis was based on the significant difference of the adolescent taekwondo athletes between their coach-athlete relationships and their sport confidence in terms of gender. In line with the findings obtained as a result of the analyzes, it was rejected. While the findings indicated that male and female taekwondo athletes have similar levels of trait and state sport confidence, they also showed that the athletes experienced the coach-athlete relationship at similar levels. This result might have stemmed from the study sample comprised of the athletes having achieved similar successes with the same rankings, and that deserved to attend the Athlete Development Camp organized by the Taekwondo Federation of Turkey.

Keskin et al., (2018), examined the relationship between coach and athlete from the point of sports branch and gender variables in the sample of high school teams in their study. According to the result, while the relationship between coach and athletes was affected regarding the athletes whether they were a team or individual sports branch athletes, the gender difference did not affect this relationship. These two studies involving Taekwondo athletes showed that adolescent athletes experience similar coach-athlete relationships in their relationships with their coaches. In other words, it could be deduced that coaches of adolescent athletes had similar relationships with male and female athletes.

Mills and Gehlsen (1996), examined state sport confidence on the starts and starting preferences of the swimmers in the swimming branch in terms of gender. In their study with 10 female and 10 male swimmers who competed at the highest level, who were in the university team and experienced for at least five years, they found that gender was an indication of the state sport confidence in the performance of the athletes. However, in another study conducted with 125 athletes from different branches such as Judo, Taekwondo, Boxing, where athletic identity and trait sport confidence were examined in terms of variables such as gender, branch, and active sportsmanship years, it was found that there was no significant difference between genders and trait sport confidence (Şekeroğlu, 2017). The results of this study were similar in terms of trait sport confidence in adult athletes who compete in different branches in individual sports, while it differed in terms of state sport confidence. In other words, the confidence levels of individual athletes just before the competitions could be at different levels according to gender in both adult and adolescent athletes. It was a great point that the trait sport confidence levels, which described how the athletes feel in general about their abilities, were at similar levels in individual athletes for both adult and adolescent athletes in terms of gender. These results showed that, as stated by Vealey et al. (1998) in the

sport confidence model, the organizational culture of the athletes causes differences in the athletes' confidence levels.

The study's second hypothesis was based on the positive correlation between the coach-athlete relationships and the sport confidence of the adolescent male taekwondo athletes who participated in the study. Based on the findings, it was rejected. There was no correlation between the coach-athlete relationships and the sport confidence of male taekwondo athletes. According to the results of a study conducted with adult male footballers, low and medium-level relationships were found in the subscales of trait sport self-confidence, closeness, commitment, and complementarity (Tolukan & Akyel, 2019). In a study conducted with 119 national male wrestlers who compete in the categories of stars, youth, and seniors, the relationship between coach-athlete relationship and trait sport confidence was examined. According to the results, it was found that trait sport confidence was moderately related to the coach-athlete relationship (Gencer & Öztürk, 2018). In the literature, it was studied that the relationship between coach-athlete relationship and sport confidence changes in different branches and athletes of different levels. This variability might be due to the difference in the relationship between coaches and athletes in various sports branches.

The third hypothesis of the research was based on the positive correlation between the coach-athlete relationships and the sport confidence of the female adolescent taekwondo athletes who participated in the study. This hypothesis was accepted considering the findings of the closeness subscale. These results might have stemmed from the closeness subscale, which states that female athletes' emotional state with their coaches might correspond. It might correspond to the coach support expressions preferred by female athletes to create self-confidence in sports environments (Adie & Jowett, 2010).

The results of the second and third hypotheses were suitable with the studies investigating the sources of sport confidence in the sport confidence model in terms of gender (Weiss et al., 2009; Hays et al., 2007; Vealey et al., 1998). Hays et al. (2007) found that in the study they showed on seven male and seven female athletes holding degrees and awards in the Olympic and world championships, these athletes created self-confidence most with the achievements they achieved. In addition, it was stated that both genders benefited from social support and coach support as a source of self-confidence, but while defining social support, they described their family, partner, and friends under social support whereas the coaches as staff. While female athletes created self-confidence, they experienced coach support with positive feedback, praise, and encouragement; male athletes, on the other hand, shared this with belief that their coaches created an excellent training program. In another study

supporting the results of this research (Weiss et al., 2009), it was stated that the motivational climate and feedback provided by the coach made a significant contribution to the adolescent girls' motivation to participate in sports. In this study, the results obtained from female adolescent athletes were emphasized in the methods to meet the emotional closeness or relationship need in their strategies to create sports environments that would meet the needs of young athletes (Özdurmuş, 2015).

The results of this research are limited to the adolescent taekwondo athletes attending the camp, which the Taekwondo Federation of Turkey had. In this regard, the research is limited to adolescent elite athletes who compete within an individual branch.

CONCLUSIONS

In conclusion, while the closeness of the coaches to the female taekwondo athletes in the sports environment increased the trait sport confidence and the state sport confidence of the female athletes. The closeness of the coaches did not change the level of the trait sport confidence and the state sport confidence of male athletes.

Concerning the current results, coaches and governing bodies working with adolescent taekwondo athletes should consider strategies that balance sport confidence and coach-athlete relationships of male and female adolescent taekwondo athletes who were invited to the athlete development camp. Furthermore, male and female adolescent taekwondo athletes have different responses on the relationship between coach-athlete relationship and sport confidence, and these differences should be considered while organizing social climates.

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Authors' contributions

The first author conceived the idea, wrote the first draft, collected data and worked on all drafts. The second author handled article writing, analyzes, and editing process. The third author handled concept and methodology. The fourth author handled statistics and resources. All authors have read and approved the final version of the manuscript and agree with the order of presentation of the authors.

Declaration of conflict interest

We have no known conflict of interest to disclose.

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Research Article

The Validity and Reliability of General Measurement and Evaluation Efficiency Scale for Physical Education Teachers

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ABSTRACT

Measurement and evaluation are critical elements in curriculum programs and for physical education (PE) teachers. Therefore, the purpose of this study is to establish the validity and reliability of the Measurement and Evaluation of Common Competency Perception (MECCP) Scale for in-service PE teachers (n=878). For construct validity, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) (n=440) were conducted with two different samples. According to the EFA results (n=438), the three-factor MECCP Scale contained 23 items. After CFA (n=440), the three-factor structure was 23 items using Schumacker and Lomax LISREL analyses. Findings indicated good fit indices with $\chi 2/sd=4.83$, RMSEA=0.09, CFI=0.96, IFI=0.96, and NFI=0.95. In addition, Cronbach alpha scores were calculated as 0.50-0.77. In conclusion, the MECCP Scale was found to be valid and reliable for Turkish in-service PE teachers and is therefore highly recommended to evaluate in-service PE teacher's perceptions of the measurement and evaluation of common competency and also to establish new experimental designs to support the development of general efficiency levels of measurement and evaluation by PE teachers.

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INTRODUCTION

Education is the most effective tool for shaping the future of a country and a critical factor in the development of an individual, as well as the development of society (Brennan & Teichler, 2008; Yeşilyaprak, 2006). In this context, measurement means tracking the qualifications of individuals and expressing the results with digits or symbols under specific rules; while evaluation describes the interpretation of the obtained measurement results and completion of the decision-making process utilizing specific criteria (Bell, 2001; Çelik, 2005; Turgut & Baykul, 2010).

Measurement and evaluation are used to determine if a specific education program is as successful as desired and whether the students have gained the intended knowledge, qualifications, and attitudes. Similarly, measurement and evaluation ensure the determination and solving of problems at each level of the education process by continuous monitoring (Ministry of National Education (MoNE), 2009; 2013; 2018). In physical education (PE), measurement and evaluation are defined as the determination of students' level of success with different resources and the collection of information about student performance, which includes the quantization stages of this information (Harrison et al., 2001).

When constructivism emerged from behaviorism in educational psychology, curriculum theorists and developers began to develop curricula based on constructivist learning theories (Von Glaserfeld, 1995). This approach mainly focuses on the understanding and knowledge learned through new experiences and in a social context (Zuckerman, 2003). Different forms of cooperative learning have proved motivating and effective (Perrenet & Terwel, 1997). The constructivist approach has three implications in the learning environment; (1) learning is an active process, (2) the learner has prior knowledge, and (3) the learner takes responsibility for their learning (MoNE, 2009; 2013; Yager, 1991). Therefore, the purpose of measurement and evaluation is to improve the quality of student learning by providing specific needs and measuring the characteristics of teachers and students. Assessment must be integrated with instruction in the classroom environment, which indicates that the meaning of assessment tasks will depend on the environment. Assessment data and use become part of the daily reality of the classroom and the role of learning. Many researchers have successfully implemented PE curricula in different periods and contexts (Azzarito & Ennis, 2003; Dyson, 2012; Rovegno & Dolly, 2006). Constructivist perspectives on learning focus on students being actively engaged in constructing knowledge and understanding. This puts the teacher in a critical position; in that, the teacher should encourage students to explore their surroundings,

discover knowledge, solve problems, and pursue critical thinking (Grennon-Brooks & Brooks, 1993).

As in all other school subjects, measurement and evaluation are crucial for PE teachers and their lessons, which support theoretical education with practical physical motion. In this context, it is a professional necessity for PE teachers to apply measurement and evaluation as required to observe and evaluate students' success, and to be equipped with the essential knowledge and qualifications for measuring and evaluating (Uçar, 2001). In addition, teaching quality (Darling-Hammond, 2014), teacher effectiveness, and student learning (Darling-Hammond & Snyder, 2000; Goldhaber, 2015; Popham, 2013) should continuously be improved as much as possible.

Measurement and evaluation performance criteria have been determined as necessary for the general efficiency of the teaching profession (Avşar, 2012; Nartgün, 2008; Smith, 2005). Various studies have addressed the measurement and evaluation efficiency of teachers. The results have shown that teachers often consider themselves to be insufficient in these areas, that they need in-service training, and that they utilize those measurement techniques with which they feel most comfortable, such as written examinations and observing student performance and student interest in the lesson (Bıçak & Çakan, 2004; Gelbal & Kelecioğlu, 2007). Specifically, PE teachers have so far experienced a shortage of time during the application of alternative assessment and evaluation methods (Özkoparan & İnan, 2018) and possess insufficient information and equipment in terms of the implementation of both traditional and alternative measurement and evaluation tools (Özgül & Kangalgil, 2018). In some studies, it is seen that teachers have problems, particularly in the application of such techniques, and are influenced by generally accepted practices (Çalık, 2007; Gömleksiz & Bulut, 2007). Zhang and Burry-Stock (2003) show that the perception of measurement and evaluation efficiency levels among primary and secondary school teachers is that they need improving, with the hypothesis that achieving higher education levels would correlate with feeling more qualified. A practical, comprehensive assessment is recommended by Salimin et al. (2015); that are, assessing the cognitive, affective, and psychomotor domains of learning. Daniel and King (1998) indicate that primary and secondary school teachers do not have extensive knowledge about measurement and evaluation and lack even a basic understanding of statistics.

Teachers may consider themselves sufficient in terms of the desired qualification skills in the field of measurement and evaluation in general, but they show differences based on their years of experience, subjects studied, the number of students in their classes (Özbaşı &

Çıkrıkçı-Demirtaşlı, 2013) as well as a general absence of a valid and reliable way of measuring student achievement (Rink, 2013). In Turkey, studies have shown that PE teachers do not find themselves sufficiently versed in utilizing information to measure and evaluate the performance of their students efficiently, have sufficient time to apply alternative assessment tools (Özkoparan & İnan, 2018), and they do not consider themselves skilled in using the measurement and evaluation tools available in the literature (Özgül & Kangalgil, 2018; Şirin et al., 2009; Yaykın, 2015). Baş and Beyhan (2016) reported that teachers had a low level of self-efficacy in educational measurement and evaluation, both in knowledge and skill sub-dimensions. Historically, teachers have found themselves insufficient and faced many problems in the field of measurement and assessment (Ulutaş & Erman, 2011). Therefore, it is crucial to assess PE teachers' measurement and evaluation levels and to improve their efficacy levels through experimental designs. The present study provides a new scale to measure what constructs need to be developed in terms of measurement and evaluation.

In Turkey, the standards and performance indicators related to the general efficiency of teachers have been determined by the Ministry of National Education and the Council of Higher Education (YÖK, 2008). Three key areas have been established; Professional Knowledge, Professional Skills, and Attitudes and Values. In the professional skills category, Assessment and evaluation are categorized. Specifically, this aims that the teacher "uses the methods, techniques, and tools of assessment and evaluation that fit the purpose." In a study on the general efficiency of teachers, the perception of available measurement and evaluation efficiency is divided into various sub-dimensions and performance indicators (MoNE, 2002). The Measurement and Evaluation of Common Competency Perception (MECCP) Scale, developed by Nartgün (2008), have been proven to be effective in measuring the general efficiency perception of preservice teachers. This scale comprises three sub-dimensions, and the desired coefficients were established for the internal consistency and reliability of all items. Similar findings were evident for preservice PE teachers (Arslan, İlker & Demirhan, 2013).

Research has shown that PE teachers do not feel confident in measuring and evaluating; they prefer more practical applications and oral examinations in measuring student outcomes, and while they utilize measurement and evaluation applications in compliance with the defined standards, their performance in this regard is not at the desired level (Avşar, 2012; Şirin et al., 2009; Şirinkan & Erciş, 2009; Şirinkan & Gündoğdu, 2011; Tagele & Bedilu, 2015; Yaykın, 2015). The research objective of the present study is to test the validation and reliability of the MECCP Scale for in-service physical education teachers in Turkey.

METHODS

This research is a cross-sectional study based on the survey model (Büyüköztürk et al., 2012), which is one of the quantitative research methods.

Study Groups

The study population was comprised of in-service PE teachers (n=878). PE teachers who agreed to participate in the research and lived in the seven different geographic regions of Turkey were contacted. Next, ethical permission was obtained for the questionnaire to be used from the Ethics Committee for Clinical Research of Çanakkale Onsekiz Mart University. The PE teachers gave consent to participate in personal meetings or via the Internet. The purposive sampling method was used (Büyükoztürk et al., 2012).

Inclusion criteria for participation was that the teachers be currently employed in service at public or private schools and had graduated from physical education teaching and sports departments. Participants were mainly from different cities in one of the seven geographical regions in Turkey (Adana=53, Ankara=102, Aydın=30, Bursa=37, Çanakkale=83, Çorum=74, Diyarbakır=20, Edirne=6, Elazığ=24, Gaziantep=64, Mersin=27, İstanbul=159, İzmir=65, Konya=35, Trabzon=50, Van=49).

Data Collection Tools

Data were collected with questionnaire forms. The data collection tool, the MECCP Scale, was developed by Nartgün (2008) for preservice teachers and originally consisted of 24 items. The questionnaire was validated for Turkish preservice students, and the scale is a five-point Likert-type scale, where “5” represents "sufficient", and “1” illustrates "insufficient." There are three sub-dimensions of the scale: basic concepts (6 items), measurement techniques (9 items), and statistical analysis and reporting (9 items). Higher points from the full scale and each sub-dimension show that the preservice teachers find themselves sufficient for general efficiency in measurement and evaluation. In comparison, lower points are obtained by those who feel insufficient (Çelik & Arslan, 2012). The correlation values of the MECCP Scale for PE teachers were determined and were found to be high (Cronbach's α=0.94).

Data Collection Procedure

The questionnaires (n=1107) were administered in all seven geographic regions; cities were selected based on their population. The purposive sampling method was followed. Forms were excluded if they were incompletely filled out or not returned. Those filled out in cities with insufficient responses were also excluded, yielding the final total of acceptable questionnaires to be (n=878). Consent to participate was given by the PE teachers in personal

meetings or via the Internet. Official permission from schools to carry out the survey was sent, and the questionnaires were filled out online. In addition, some PE teachers were found to apply the questionnaire in person.

From the results of the test-retest questionnaire, Cronbach alpha values for each sub-dimension were over 0.70 (basic concepts: 0.88, measuring techniques: 0.89, statistical analysis and reporting: 0.92).

Data Analysis

To adapt this questionnaire for the PE teachers, Exploratory Factor Analysis (EFA) (n=438) and Confirmatory Factor Analysis (CFA) (n=440) were implemented with LISREL (Schumacker & Lomax, 2010) having an alpha level ($p<0.05$).

RESULTS

Exploratory Factor Analysis (EFA)

In relation to the EFA (SPSS), the stated variance was 62.49%. The original scale, consisting of three sub-dimensions and 24 items, was therefore reduced in accordance with the EFA results to three sub-dimensions and 23 items (in the sub-dimension of measuring techniques, item 14 was deleted as being less than <0.50). Examining the sub-dimensions in which these 23 items are found, the sub-dimension of basic concepts contains six items (nos. 1, 2, 3, 4, 5, 6), that of measurement techniques includes eight items (nos. 7, 8, 9, 10, 11, 12, 13, 15), and that of statistical analysis and reporting contains nine items (nos. 16, 17, 18, 19, 20, 21, 22, 23, 24) (see Table 1).

The data collected in this study were utilized after being processed with the assumptions from EFA. The questionnaire factor weights that are part of the three-dimensional structure of the scale are summarized in Table 1.

Confirmatory Factor Analysis (CFA)

With regard to the CFA, LISREL analysis (Schumacker & Lomax, 2010) showed that the three sub-dimensions consisted of 23 items in total (basic concepts = 6 items, measurement techniques = 8 items, statistical analysis and reporting = 9 items) (Figure 1).

Reviewing the fit indices, all values are seen to be good: $\chi 2/sd.=4.83$, RMSEA=0.092, CFI=0.96, IFI=0.96, and GFI=0.94. It is stated in the literature that the admissible values of these parameters are RMSEA<0.06-0.08, CFI>0.95-0.90, GFI>0.95-0.90 and IFI>0.95-0.90 (Byrne, 2001; Hu & Bentler, 1999) (see Table 2). Thus, the results of the present study are consistent with the ranges presented in the literature (Kline, 1994). In conclusion, good values strengthened the CFA results.

In addition to the fit indices of the CFA, it is also important that the results of the t-test are significant for all items ($p<0.05$), as listed in Figure 2. Modifications between items "1 and 2", "20 and 21", and "21 and 22" were made due to better model fit indices.

The findings showed that there are three sub-dimensions in the questionnaire (Basic concepts, Measurement techniques, Statistical analysis, and reporting) with 23 items were acceptable. The survey asked the physical education teachers to rate all the 23 items on a five-point scale.

Table 1. Item loads resulting from Exploratory Factor Analysis (EFA) (n=438)

Subscales in the original scale	Item loads		
Item 1	0.64		
Item 2	0.70		
Item 3	0.76		
Item 4	0.63		
Item 5	0.73		
Item 6	0.63		
Item 7		0.74	
Item 8		0.70	
Item 9		0.69	
Item 10		0.77	
Item 11		0.68	
Item 12		0.67	
Item 13		0.50	
Item 14		0.53	
Item 15			0.73
Item 16			0.60
Item 17			0.64
Item 18			0.72
Item 19			0.76
Item 20			0.76
Item 21			0.71
Item 22			0.75
Item 23			0.75

(After deleting item number 14, total variance explained = 62,49 %)

Table 2. Measurements of investigation model

Compliance Measures	Good Compliance	Acceptable Compliance	Measurement Model
χ^2/sd.	$0 \leq \chi^2/sd \leq 2$	$2 < \chi^2/sd \leq 5$	4.83
GFI	$0.95 \leq GFI \leq 1$	$0.90 \leq GFI < 0.95$	0.94
CFI	$0.97 \leq CFI \leq 1$	$0.95 \leq CFI < 0.97$	0.96
IFI	$0.97 \leq IFI \leq 1$	$0.90 \leq IFI < 0.97$	0.96
RMSEA	$0 \leq RMSEA \leq 0.05$	$0.05 < RMSEA \leq 0.08$	0.92

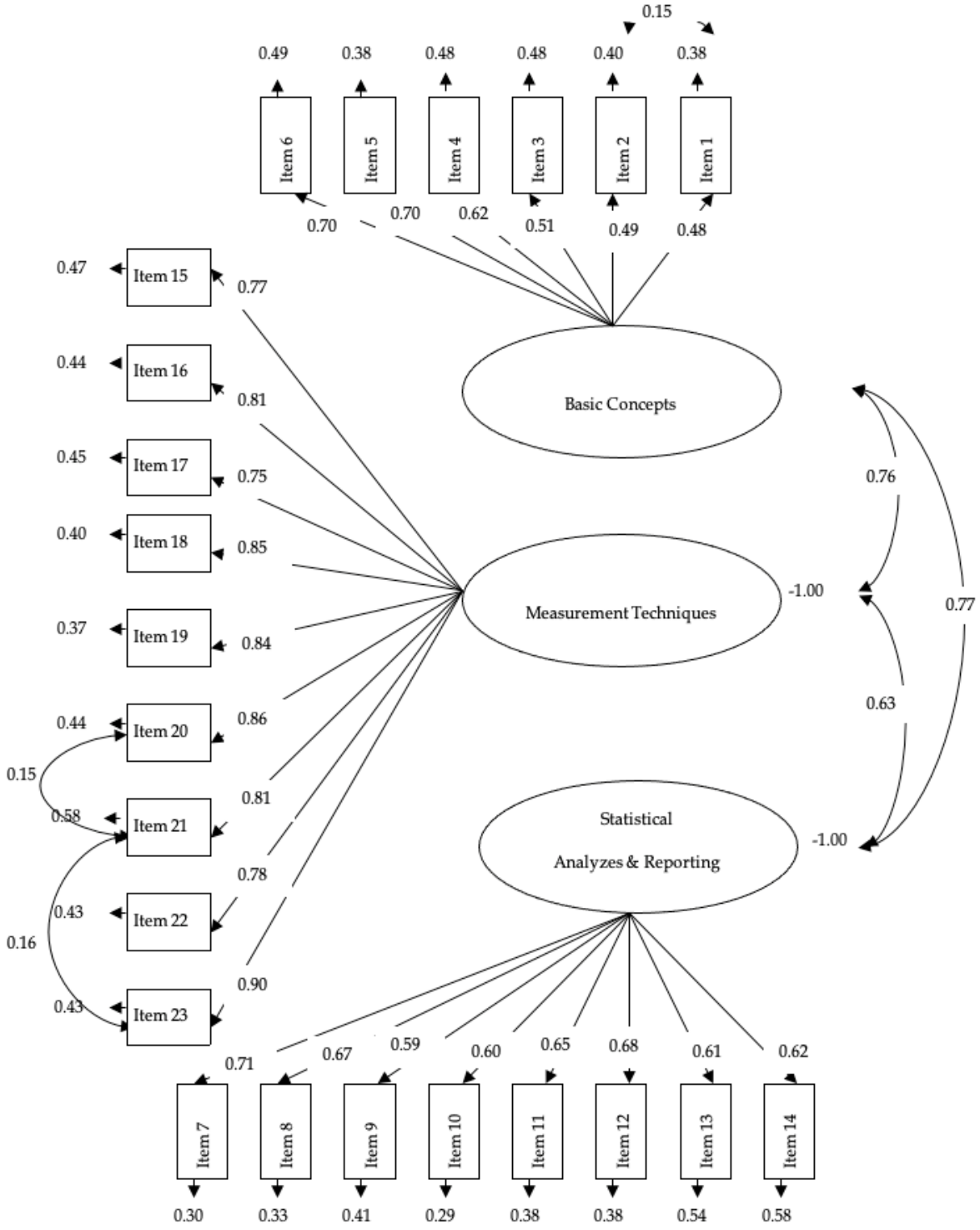

Figure 1. The results of Confirmatory Factor Analysis (CFA) (n=440)

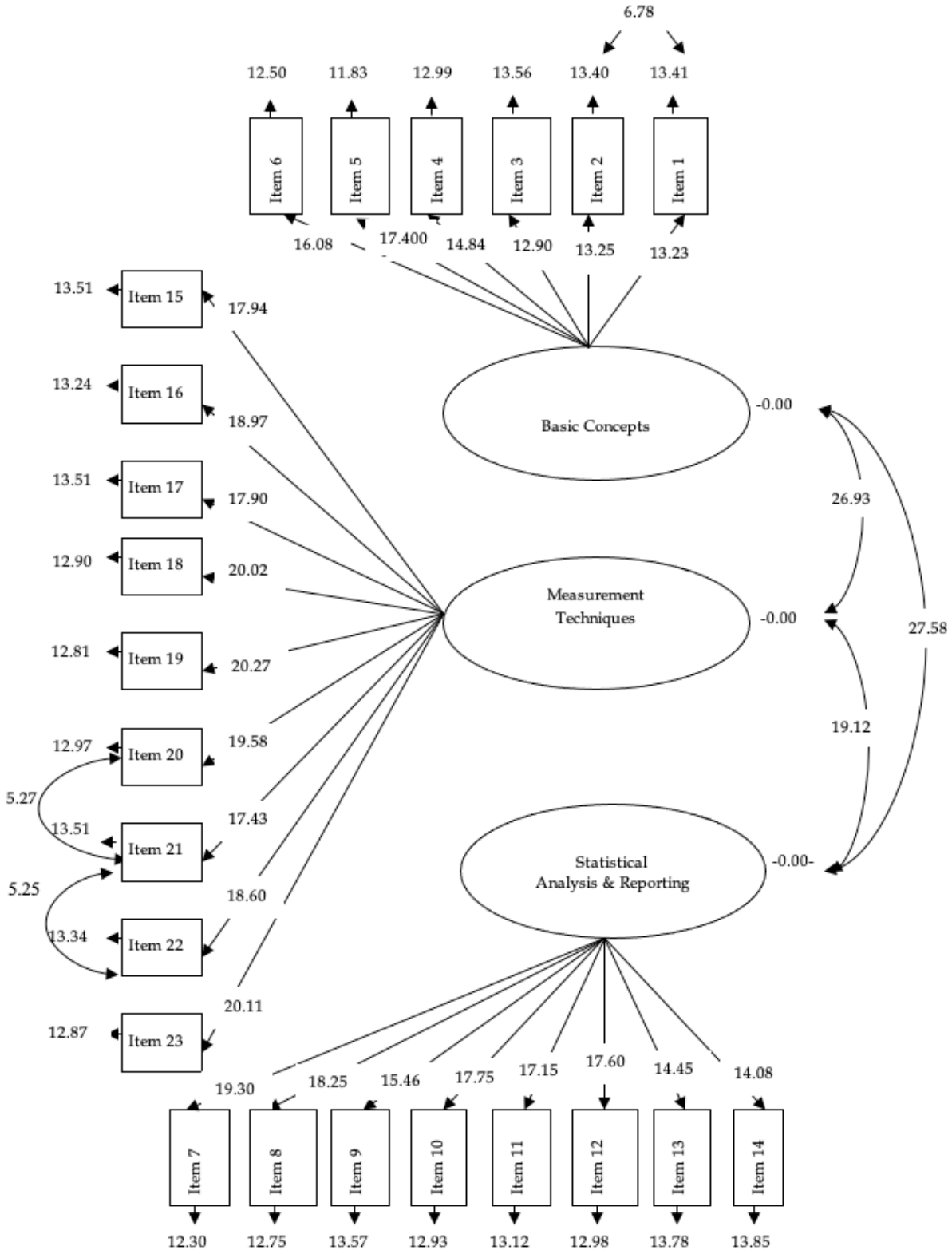

Figure 2. T-Test results of CFA (n=440)

DISCUSSION

With respect to the obtained findings, it was determined that the MECCP Scale for PE teachers in service is utilizable with its three sub-dimensions and 23 items. High scores obtained from the scale and all sub-dimensions show that in-service PE teachers perceive their general skills in measuring and evaluation efficiency to be sufficient, while on the contrary, low scores can be interpreted as a sign that they find their skills insufficient. Based on the analysis results, it was found that one item present in the original scale of Nartgün (2008) was not being utilized by PE teachers in service. This item was therefore removed, and the relevant performance indicators were determined within the three sub-dimensions. Studies in the literature regarding the measuring and evaluation efficiency of PE teachers in service, in terms of efficiency levels in the educational sciences, were said to be limited in number and problematic (Lacy & Hastad, 2006; Wise et al., 1991).

In the study of Nartgün (2008) regarding preservice teachers, the original MECCP Scale contained six items in the first sub-dimension, nine items in the second sub-dimension, and nine items in the third sub-dimension. On the other hand, Karaca (2004) had developed a 4-dimensional scale for assessing the perceptions of measuring and evaluation efficiency of preservice teachers. Different from preservice teachers' perceptions of measurement and evaluations, teacher efficiencies as a whole are shown in one dimension in general, while in studies regarding available efficiencies of the teaching profession, measurement, and evaluation efficiencies are divided into sub-dimensions, and performance indicators are determined. In the present study, the utilized performance indicators (basic concepts, measurement techniques, statistical analysis and reporting) for the evaluation of PE lessons by in-service PE teachers in terms of perceptions of measurement and evaluation efficiency were divided into three sub-dimensions and applied on a scale. The adapted scale would help researchers and stakeholders to understand PE teachers' basic concepts, measurement techniques, statistical analysis, and reporting knowledge related to measurement and evaluation. In addition, both the quality of students' learning and being able to measure the knowledge of PE teachers would be possible through the scale.

Another study on the validity and reliability of the self-efficacy of PE teachers was conducted by Ünlü et al. (2008). It stated that the reliability coefficient of their scale was high for all sub-dimensions, with six sub-dimensions related to general teacher efficacy. In particular, the reliability coefficient for ten items in the monitoring and evaluation of educational development dimensions was high. In the present study, however, the scale

consists of three sub-dimensions and the reliability coefficient is high for all sub-dimensions of the scale. Items are more specific to general skills in measurement and evaluation, and therefore the scale has the potential to determine and develop those constructs.

The data collection tool that was utilized during this research was limited to the cities and in-service PE teachers that participated. One item in measurement techniques (item 14) was removed, concerning portfolios. The reason may be that other items were written similarly in their sentence structure. This shows that PE teachers' basic knowledge about measurement and evaluation is insufficient (Daniel and King, 1998). Different cities with a random sampling procedure are recommended for future research. The three sub-dimensional adapted version for in-service PE teachers in this study was found to be a valid and reliable measuring tool. Further research to determine the level of in-service teachers' perceptions of general efficiency in measurement and evaluation is strongly suggested.

CONCLUSIONS

It is concluded that the scale can be utilized to determine the necessary efficiency perception levels and to assess perceptions of general efficiency in measurement and evaluation among in-service PE teachers. It is assumed that further national and international studies on the range of measurement and evaluation efficiency perceptions of PE teachers would have a significant impact on the relevant persons and institutions; as such studies remain limited in number to date. It is recommended to establish new experimental designs to support the development of the general efficiency levels of measurement and evaluation of PE teachers, to review the educational processes of PE teachers in their courses regarding the obtained perceptions of their levels of efficiency, and to include other topics concerning measurement and evaluation in teachers' ongoing vocational training and tutorials (Richards & Templin, 2011). It is also important to compare the level of PE teachers in different countries that are implementing the constructivist theory in their curriculum, and their general efficiency related to measurement and evaluation levels.

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Authors' contributions

The authors confirm sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

Declaration of conflict interest

The authors declare there is no conflict of interest.

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Appendices

Beden Eğitimi Öğretmenleri için Ölçme ve Değerlendirme Genel Yeterlik Algısı Ölçeği (In Turkish)

Bu ölçek görev yapmakta olan beden eğitimi öğretmenlerin ölçme ve değerlendirme genel yeterlik algılarını tespit etmek amacıyla hazırlanmıştır. Üç boyuttan oluşan ölçekte toplam 23 genel yeterlik ifadesi bulunmaktadır. Her bir ifade kapsamıyla birlikte verilmiştir.

ÇokYeterliyim (5) Yeterliyim (4) Orta Düzeyde Yeterliyim (3) Yetersizim (2) Çok Yetersizim (1)

İfadeler Kapsam		**Genel Yeterlikler**				
		[5]	**[4]**	**[3]**	**[2]**	**[1]**
1	Doğrudan, dolaylı ve türetilmiş ölçme yapabilirim.	5	4	3	2	1
2	Tanılayıcı, biçimlendirici ve değer biçmeye dönük değerlendirme yapabilirim.	5	4	3	2	1
3	Nitel/nicel, sürekli/süreksiz, bağımlı/bağımsız/kontrol değişkenleri belirleyebilirim.	5	4	3	2	1
4	Adlandırma/sınıflama, sıralama, eşit aralıklı, oranlı ölçekler hazırlayabilirim.	5	4	3	2	1
5	Görünüş, kapsam, yapı, benzer ölçekler, yordama geçerliği yapabilirim.	5	4	3	2	1
6	Ölçme hatası, güvenirlik, güvenirlik türleri: test-tekrar test, paralel formlar, eşit yarılar, iç tutarlılık, puanlayıcılar arası uyum yapabilirim.	5	4	3	2	1
7	Kazanımın yapısına uygun çoktan seçmeli soru tipini belirleme, yazma, uygulama ve puanlama yapabilirim.	5	4	3	2	1
8	Kazanımın yapısına uygun kısa cevaplı soru yazma, uygulama ve puanlama yapabilirim.	5	4	3	2	1
9	Kazanımın yapısına uygun eşleştirme tipi soru yazma, uygulama ve puanlama yapabilirim.	5	4	3	2	1
10	Kazanımın yapısına uygun Doğru/yanlış tipi soru yazma, uygulama ve puanlama yapabilirim.	5	4	3	2	1
11	Kazanımın yapısına uygun açık uçlu soru yazma, uygulama ve puanlama yapabilirim.	5	4	3	2	1
12	Kazanımın yapısına uygun performans görevi belirleme, uygulama ve puanlama yapabilirim.	5	4	3	2	1
13	Öğrenci ürün dosyasına dayalı ölçme sürecini uygulayabilirim.	5	4	3	2	1
14	Duyuşsal ve psikomotor nitelikleri ölçebilirim.	5	4	3	2	1
15	Madde güçlük indeksi ve madde ayırıcılık gücü hesaplayıp yorumlayabilirim.	5	4	3	2	1
16	Frekans dağılımları ve grafiksel gösterimler hazırlayabilirim.	5	4	3	2	1
17	Ortalama, ortanca, mod vb. hesaplayıp yorumlayabilirim.	5	4	3	2	1
18	Ranj, standart sapma, varyans vb. hesaplayıp yorumlayabilirim.	5	4	3	2	1
19	Normal dağılım, çarpıklık, basıklık vb. hesaplayıp yorumlayabilirim.	5	4	3	2	1
20	Verilerin yapısına uygun korelasyon tekniğinin belirlenmesi, hesaplayıp yorumlayabilirim.	5	4	3	2	1
21	T-testi, F testi vb. istatistikleri hesaplayıp yorumlayabilirim.	5	4	3	2	1
22	Mutlak değerlendirme, bağıl değerlendirme vb. yapabilirim.	5	4	3	2	1
23	Madde güçlük indeksi ve madde ayırıcılık gücü hesaplayıp yorumlayabilirim.	5	4	3	2	1