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DEVELOPMENT OF THE SCALE-TEACHER FORM TO EVALUATE THE ATTITUDES OF MIDDLE SCHOOL STUDENTS WITH AUTISM SPECTRUM DISORDER TOWARDS PHYSICAL EDUCATION

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ABSTRACT

The aim of this study is to develop an attitude scale (PEAS) towards physical education lesson of secondary school students with Autism Spectrum disorder and to reveal students' attitudes in line with this developed scale. The scale, which was prepared during the scale development phase, was applied to 186 secondary school students with Autism Spectrum disorder, and EFA was performed with it. Afterwards, it was applied to 226 secondary school students again for the CFA for the remaining items. Explanatory Factor Analysis (EFA) revealed that the scale consisted of 22 items and these items were collected under a single factor. It was seen that the construct obtained as a result of the EFA was confirmed by the Confirmatory Factor Analysis (CFA). The single factor was found to explain 60.288% of the total variance. The item factor loadings were found to range from .730 to .835. These analyses revealed that all the items in the scale could discriminate. In addition, as a result of ANOVA, the attitudes of the students were found to vary significantly depending on the extent to which they are affected by the ASD and whether they do sports or not. The Cronbach alpha reliability coefficient of the unidimensional scale was found to be .96. Validity and reliability analyses revealed that the Physical Education Attitude Scale is a valid and reliable measurement tool for students with Autism Spectrum Disorder.

Keywords: Autism spectrum disorder, physical education, attitude, middle school students.

INTRODUCTION

Autism Spectrum Disorder (ASD), which has been researched by experts in many different disciplines in recent years, is defined as a neurodevelopmental disorder that begins in early childhood and manifests itself with deficiencies in social interaction and communication, limited attention and repetitive behaviours (American Psychiatric Association [APA], 2013). The International Classification of Diseases (ICD) defines ASD as a disorder characterized by inadequacies in social interaction and communication skills and a series of limited and repetitive behaviours according to the individual's current performance. ASD manifests itself with different characteristics from person to person and generally affects people negatively in areas such as interaction, communication and repetitive behaviour patterns (Boyd et al., 2011).

It is stated in many different studies in the related literature that the prevalence of ASD has increased rapidly in recent years (Chakrabarti & Fombonne, 2005). Centres for Disease Control and Prevention (CDC) stated in the report published in 2014 on the prevalence of ASD that the prevalence of ASD is 1.47% (Baio, 2014). Although there is no research revealing the prevalence of ASD in Turkey, in the National Action Plan of the Ministry of Family, Labour and Social Services (2016-2019), it is stated that there are a total of 16.837 children diagnosed with ASD in the compulsory education period and that 53.2% of all the children educated in special education and rehabilitation centres are children with ASD (Susuz & Güçiz Doğan,2020).

Although many studies have been carried out by a wide group of experts in different disciplines on ASD, it is still not known exactly what causes ASD. There are still many questions to be answered on ASD (Korkmaz, 2021). Leo Kanner, a psychiatrist in the 1940s, was one of the first to do research to identify and treat ASD. Kanner suggested that ASD was caused by parents spending less time with their children and displaying formal behaviours (Kanner, 1943). In the 1960s, Bettelheim proposed the idea of the refrigerator mother and argued that the children of indifferent mothers were withdrawn into their own world and this situation caused ASD. In the following years, with the developments in medicine, it has been suggested that ASD may be genetic and that the ideas such as indifferent parents, refrigerator mothers are invalid (Feinstein, 2011). Recent studies have focused on environmental, genetic and neurological factors as the causes of ASD (Kana et al., 2009).

When the diagnostic processes in ASD are examined, it can be said that this process started in 1943 when the psychiatrist Kanner reported the conditions of his patients. Kanner (1943) stated in this report that his patients like to be alone, have trouble speaking compared to their peers and exhibit excessive anger or timid behaviours. Today, the diagnostic criteria of ASD include the features of ASD expressed by Kanner. On the other hand, existing diagnostic principles have been made more specific in the DSM-5 and ICD-11. People diagnosed with ASD in the DSM-5 are graded based on the level of support they need (Özdemir, 2021). ASD diagnostic criteria in the DSM-5 are as follows (Kaymak, 2016): a) Presence of clinically significant, persistent disability in social communication and interaction, b) Presence of limited, repetitive behaviours, interests and activities c) Symptoms seen in early childhood d) Clinically significant impairment is caused in social,

occupational or other important activities of daily life and e) Intellectual disability (impaired mental development) or general developmental delay cannot better explain these disabilities.

Another guideline taken into consideration in the diagnosis processes of ASD is the ICD published by the World Health Organization (WHO). The diagnostic criteria according to its latest version; ICD-11, include a) Persistent deficits in initiating and maintaining social communication and mutual social interactions that fall outside the expected normal range of functioning, considering the individual's age and level of mental development, b) persistent, restricted, repetitive and inflexible behaviours, interests or activity patterns that are clearly abnormal or extreme, c) Symptoms of ASD begin to appear within the individual's developmental period, but symptoms may not become obvious until social demands exceed limited capacities and d) Disabilities are severe enough to result in impairment in personal, family, social, educational, occupational, or other important areas of functioning, and are often a common feature of an individual's functioning and can generally be observed in all settings, although they may vary depending on social, educational or other context (ICD-11, 2022).

Restricted and repetitive behaviours, which are emphasized in the DSM-5 and ICD-11 for ASD, refer to a broad term used to describe rigid, unchanging, repetitive body movements or the movements of the body with objects (Matson et al., 2009). These behaviours indicate rigid and repetitive motor and verbal expressions that can be easily observed by other people (Lam et al., 2007). These behaviours are seen as repetitive body movements without serving a specific purpose (Richler et al., 2007). Behaviours can be seen in different ways; they differ from each other in terms of their occurrence, severity and frequency (Prosperi et al., 2021).

It is necessary to eliminate these behaviours seen in people with ASD and to prevent people with ASD from being isolated by the society. In order to reduce or eliminate the effects of lack of social interaction and social communication and restricted and repetitive behaviours, which are stated to be seen in people with ASD by the DSM-5 and ICD-11, it is necessary to ensure their social integration with the society. Today, different applications are made for the social integration of people with ASD. It is seen that many different applications, especially special education, are conducted for these people. For these applications to be successful, they need to make people feel comfortable, to be liked by the people targeted, to make people feel relaxed and to be functional. Physical education classes provide serious positive support to the psycho-motor, emotional and cognitive development areas of people and plays an important role in people's living a healthy life (Ada et al., 2020).

There are many studies in the literature (Derer, 2018, Durmuş, et al., 2021, Gökgöz, 2019, Orhan, 2020, Öz, 2021) that reveal the effectiveness of physical activities in students with ASD. Physical education classes contribute to psycho-motor, emotional and cognitive development areas in students with ASD as well as in students with normal development. In addition, it is thought that physical education classes are important in social interaction, effective communication, coordination and treatment of limited attention and repetitive

behaviours of students with ASD. Therefore, it has become important to determine the attitudes of students diagnosed with ASD towards the physical education course, which has such an impact on people. In the literature research conducted, many different studies were found on physical education in special education. However, no study was found on the attitudes of students diagnosed with ASD towards physical education lesson. Therefore, this study was conducted to reveal the attitudes of students diagnosed with ASD towards physical education lesson.

METHOD

In this section, the research model, participants, data collection tool and data analysis are included.

Research Model

The study was designed on the basis of the survey model, which is one of the quantitative research methods. The survey model is used in studies in which the interests, skills, abilities, attitudes or opinions of the participants about a topic or an event are determined on a larger sample. The purpose of the survey design is to take a picture of the current situation and make a description (Fraenkel et al., 2012).

Participants

The study group consists of students with ASD who take physical education lessons in secondary schools residing in Van. Data were collected by selecting two different sample groups for the study. The first sample group consists of 186 students with ASD, and the second sample group consists of 226 students with ASD. EFA was applied to the first sample group and CFA to the second sample group. The scale was given to physical education teachers in a paper form and online, and students with ASD were asked to be evaluated through this form. Descriptive information of students with ASD who participated in the research are given in Table 1 and Table 2.

Tablo 1. Descriptive Information of the Participants

Variables	Category	N	%
Gender	Male	141	75.8
	Female	45	24.2
Grade Level	5th Grade	53	28.5
	6th Grade	57	30.7
	7th Grade	46	24.7
	8th Grade	30	16.1
Socio-Economic Status	Low	70	37.6
	Medium	96	51.6
	High	20	10.8
Level of ASD	Low	87	46.8
	Medium	65	34.9
	High	34	18.3
Can the student do sport?	Yes	152	81.7
	No	34	18.3
Total		186	100

When Table 1 is examined, it is seen that while 75.8% (n=141) of the participants in the first group of the study were male, 24.2% (n=45) were female students. Looking at the class level of the participants in the study, it is seen that they mostly attend the 6th grade. In addition, when the socio-economic status of the research participants is examined, it is seen that the participants mostly have middle income. The demographic characteristics of the second participant group of the study are presented in Table 2.

Table 2. Descriptive Information of the Participants

Variables	Category	N	%
Gender	Male	143	63.3
	Female	83	36.7
Grade Level	5th Grade	72	31.9
	6th Grade	65	28.8
	7th Grade	37	16.4
	8th Grade	52	23
Socio-Economic Status	Low	83	36.7
	Medium	113	50.0
	High	30	13.3
Level of ASD	Low	72	31.9
	Medium	101	44.7
	High	53	23.5
Can the student do sport?	Yes	162	71.7
	No	64	28.3
Total		226	100

According to the information obtained in Table 2, 63.3% (n=143) of the students with ASD participating in the research were male, while 36.7% (n=83) were female students. It can be said that the highest number of 5th grade students in the research is. Considering the socio-economic status of the students participating in the research, it can be said that the number of students participating in the research has a medium level of income. Also, when the level of exposure of the students participating in the research is examined, the highest number of students with ASD is medium. Finally, when we look at the status of the students doing sports, it is seen that a serious part of the students do sports. As a result of the field study carried out to obtain the data of the study, the following situation was determined: As a result of the interviews and observations made with the guidance research centre, it was seen that the number of the students diagnosed with ASD is higher in the 1st level and that the number of the students diagnosed with ASD in the 2nd level is lower than the number of the students in the 1st level.

Data Collection Tool

The aim of this study is to develop an attitude scale (PEAS) towards physical education lesson of secondary school students with Autism Spectrum disorder and to reveal students' attitudes in line with this developed scale. First, the relevant literature was reviewed to create scale items. As a result of the literature review, 48 items were obtained. The item pool consisting of 48 items was converted into a draft form, and the items in this form were submitted to the review of experts (n=5) (one assessment and evaluation expert, one physical education expert, one primary education expert and two special education experts). The experts evaluated the

items by marking one of the following options for each item: “appropriate”, “should be removed” or “should be corrected”.

In light of the feedbacks from the experts, necessary corrections were made and a form consisting of 36 items was created. From the prepared form, it was categorized as "never" (1), "rarely" (2), "moderately" (3), "often" (4) and "always" (5). Accordingly, it can be said that students with ASD have a high attitude towards physical education lesson with high scores from the scale. If the score is low, it can be said that the attitude towards Physical Education is low. A maximum of 110 points can be obtained on the scale, and a minimum of 22 points can be obtained. In addition, there are no reverse items in the scale. Certain assumptions were checked for the suitability of the data collected in the study for factor analysis. These assumptions are sample size, missing data, normality, linearity, outliers and the structure of the R matrix and the adequacy of the R matrix. The sample size must be large enough to perform factor analysis. There is no consensus among researchers about the sample size required for factor analysis (İlhan & Çetin, 2014). In this connection, some researchers argue that 200 participants may be sufficient yet 500 participants are quite good, and some argue that the number of participants should be 3 to 6 times more than the number of items (Cattell, 1978). The higher number of participants makes the factor structure more apparent, but it is argued that administering the scale to the number of participants 5 times more than the number of items in the scale is acceptable (Stevens, 2002; Gorsuch, 1983). 186 students with ASD participated in the study for EFA and 226 students with ASD for CFA, and when the data set obtained from the data collected from students with ASD was examined, no missing data were found.

It was checked whether the total scores were normally distributed to test the normality and linearity of the data set. Skewness and kurtosis coefficients were evaluated and normality tests were performed [-ʐ=-1.95 ≤ ʐ (skewness =.35; kurtosis =-.15; skewness =.27; kurtosis =-.16) ≤ +ʐ=+1.95].. The z-scores of each variable were examined to determine whether there were outliers in the data set. It was observed that the z-scores of the variables were in the range of ±3.00. Then, Mahalanobis distances were calculated to check whether all the variables were outliers in multiple variables and the values of each variable were examined. It was observed that there were no outliers in the data set. In order to check the factorability of R, the KMO (Kaiser-Meyer-Olkin) value and Bartlett Test results were examined. KMO value was found to be .96 and Bartlett test result was found to be (χ^2 = 3281.399, p =. 00). The assumption testing multivariate normality was also found to be significant. Thus, it can be said that the data were suitable for factor analysis.

Data analysis

In order to determine the content validity of the scale in the study, interviews were conducted with 5 different experts and the content validity ratios and indices were calculated accordingly. At this stage, the content validity ratios (CVR) for all the items were calculated based on the opinions of 5 different experts and the form was created. When half of the experts state that the item is “suitable”, then CVR = 0 when more than half of the experts state that the item is “suitable”, then CVR > 0 and when more than half of

the experts do not state that the item is "suitable", then CVR < 0. According to Veneziano & Hooper (1997), the minimum content validity criterion for 5 experts should be .99. The content validity index (CVI) is obtained from the mean of the total CVR of the items that are significant at the $\propto$ = .05 level (Yurdugül, 2005).

In line with the opinions of the experts, 12 items out of 48 were thought to have too low content validity to measure the attitudes of students with ASD towards the course of physical education and these items were excluded from the form. These items were removed from the form and the CVI was calculated again and it was seen that the calculated value was sufficient. After these changes, a comprehensibility study was conducted on a small group to test the comprehensibility of the scale items. Opinions were received from the physical education teachers who teach the students with ASD about the comprehensibility of each item in the scale. Finally, before the scale was finalized, it was turned into a paper form and handed over to physical education teachers to be administered face-to-face to students on a volunteer basis. The preliminary administration of the scale was completed with the collected data. After the preliminary administration studies were completed, the pilot implementation was started.

After the scale was administered to the participating students, statistical analyses were conducted. EFA and CFA were performed to determine the construct validity and item factor structure of the scale. EFA and CFA are frequently used in the scale development process. In this study, EFA was first performed with 186 of the collected data. Then, new data were collected from 226 people and CFA was performed. Physical education teachers were reached to apply these 36 items to students with ASD. Since the scale is unidimensional, direct oblimin rotation technique was applied during the EFA. In factor analysis, it is recommended to use the varimax method for the sub-dimensions with a low correlation with each other or independent of each other (Tabachnick & Fidell, 2007). While conducting exploratory factor analysis, "principal components analysis" was used as the factoring method and "varimax" method, which is one of the vertical rotation methods, was used as the factor rotation method. For the reliability of the scale, Cronbach's Alpha internal consistency coefficient and item-total correlations were calculated for the whole scale. By using the difference between the 27% upper group and 27% lower group scores of the students and the independent samples t-test were used to establish the criterion validity of the scale. ANOVA was conducted to determine the attitude levels of the students with ASD towards the Physical Education lesson. it was examined whether the total scores of the participants, who were homogeneously distributed among the classes, varied significantly depending on gender, grade level, socio-economic status, level of ASD and whether the student does sports or not. It was examined whether the data were normally distributed or not and found to be normally distributed (p> .05). Therefore, ANOVA, one of the parametric methods used for unrelated groups, was used to test the significance of the difference between the total scores of the participants according to the variables. The data were collected in writing using and online the data collection tool. Data were analyzed using SPSS 21 and LISREL 8.7 programs.

FINDINGS

In this section, the validity and reliability information about the scale is given.

Construct Validity

The construct validity of the attitude scale developed to determine the attitudes of the students with ASD towards the course of physical education was determined with EFA and CFA.

Explanatory Factor Analysis (EFA)

Exploratory factor analysis was conducted to determine the construct validity of the Physical Education Attitude Scale and to determine the item factor loadings. In EFA analysis, eigenvalue greater than 1, the ratio of the total variance explained and a scree plot are used to determine the number of factors (Field, 2009). By taking all these criteria into consideration, the items were found to be gathered under 4 factors, explaining 72.315% of the total variance. However, it was observed that the ratio of the total variance explained for the items in 3 factors was below 5%. In the literature, it is recommended that factor loadings be above .30 in EFA analysis findings (Floyd & Widaman, 1995; Tabachnick & Fidell, 2007). Accordingly, 8 items with a factor loading of .30 and lower were excluded from the analysis. In addition, 6 items were not included in the analysis because their item-total correlations was lower than 0.30. It can be said that items with an item-total correlation of 0.30 and higher can distinguish individuals well, items with values between 0.20 and 0.30 can be included in the analysis when necessary, and items with values smaller than 0.20 should not be included in the analysis (Büyüköztürk, 2017). The result of the scree plot is shown in Figure 1.

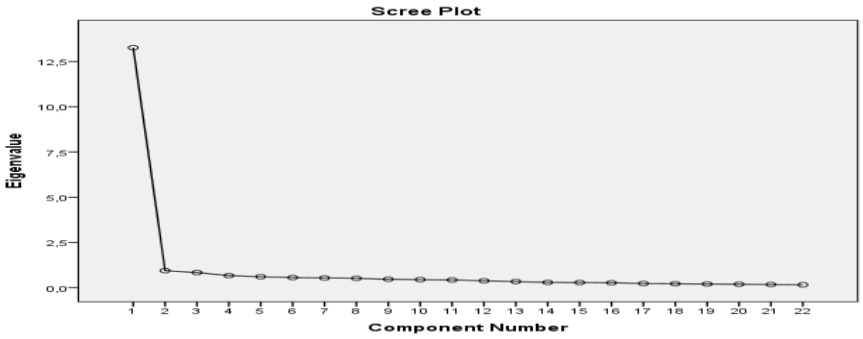

Figure 1. Scree Plot

Considering the purpose of the study and the results of the EFA, it was decided to collect the items in a single factor. The eigenvalue obtained as a result of the EFA analysis was found to be 13.263 and to explain 60.288% of the total variance. Items and factor loadings are given in Table 3.

Table 3. Factors and Factor Loadings Resulting from the EFA

	Factor 1 (Attitude) Cronbach Alfa=0.968 Explained variance =60.288%	
		Factor Loading
1.	Does the student participate in group activities in physical education exercises?	.730
2.	Does the student communicate with other students during physical education exercises?	.774
3.	Does the student have the ability to easily perform movements that require patterns during physical education exercises?	.793
4.	Does the student know how to use the material in physical education classes?	.817
5.	Does the student have the ability to put away the course materials at the end of the physical education exercises?	.767
6.	Does the student have the awareness of his/her own physical characteristics during physical education exercises?	.744
7.	Does the student participate in the activities independently without receiving any hints in the physical education classes?	.775
8.	Does the student have the ability to perform movements that require fine motor skills independently as expected?	.709
9.	Does the student perform movements that require gross motor skills independently?	.758
10.	Does the student participate in repetitive activities?	.767
11.	Does the student have the ability to independently construct a game in physical education classes?	.778
12.	Does the student perform movements that require power and strength independently during physical education exercises?	.777
13.	Does the student perform direction activities correctly during physical education exercises?	.773
14.	Does the student have the ability to follow the instructions given in the lesson during physical education exercises?	.835
15.	Does the student wait for his or her turn in physical education exercises?	.808
16.	Does the student distinguish the sports equipments used during physical education exercises in terms of their features?	.796
17.	Does the student perform sports activities in the designated area (football, basketball, etc.) during physical education exercises?	.807
18.	Does the student perform movements that require object control during physical education exercises?	.762
19.	Does the student perform the movements given piece by piece in the form of a pattern during physical education exercises?	.782
20.	Does the student obey the commands during physical education exercises?	.764
21.	Does the student follow the teacher's instructions in physical education exercises?	.794
22.	Can the student express the problem correctly when faced with a problem during physical education exercises?	.761
	Total Variance Explained	**60.288%**

Considering the content and theoretical structures of the items revealed as a result of the EFA analysis in Table 3, the factor was named "Attitude". The factor explains 60.288% of the total variance and has 22 items. The factor loadings of the items are between .730 and .835. In this study, items with factor loading values of .30 and above were taken into consideration (Büyüköztürk, 2017). When the scale items are evaluated together, it is seen that the scale is unidimensional and the items in the scale explain 60.288% of the total variance. Since the scale was found to be unidimensional, vertical rotation was considered appropriate in the factor analysis study. For this reason, Varimax, one of the vertical rotation methods, was used.

Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis was applied to test the accuracy of the structure consisting of 22 items and one dimension obtained as a result of factor analysis. The fit index values for the scale are given in Table 4. The chi-

square, chi-square/degree of freedom and goodness-of-fit indices calculated when this construct was tested are given in Table 4.

Table 4. Results of the CFA Conducted to Confirm the Construct Established with the EFA

Model	÷²	÷²/df	NNFI	NFI	CFI	RMSEA
Factor Construct	485.40	2.35	0.98	0.98	0.99	0.07
Criteria		3.0	≥0.95	≥0.95	≥0.95	≤0.08

Table 4 includes the evaluation criteria for accepted indexes according to Schermelleh-Engel, Moosbrugger and Müller (2003). It can be said that the values obtained as a result of the CFA for the unidimensional structure have a good fit. Goodness-of-fit values (t-test) of the single-factor construct are given in Table 5.

Table 5. T-test Values Obtained from the CFA for the Scale

Item No	t	Item No	t	Item No	t	Item No	t
Attitude1	12.24*	Attitude7	12.84*	Attitude13	12.86*	Attitude19	12.57*
Attitude2	15.43*	Attitude8	11.91*	Attitude14	13.64*	Attitude20	12.59*
Attitude3	13.02*	Attitude9	12.18*	Attitude15	13.37*	Attitude21	12.74*
Attitude4	13.48*	Attitude10	12.65*	Attitude16	12.91*	Attitude22	12.48*
Attitude5	12.39*	Attitude11	12.86*	Attitude17	13.03*		
Attitude6	12.34*	Attitude12	12.63*	Attitude18	12.25*		

*p<.01

In Table 5, it is seen that the t-test values of the items of the scale are between 11.91 and 15.43. If the t value found is greater than 2.58, it is significant at the level of .01, if it is greater than 1.96, it is significant at the level of .05 (Jöreskog & Sörbom, 2000; Kline 2011). According to the results of the t-test values calculated in the CFA, the t values of all the items were found to be significant at the level of .01. Therefore, it was decided that there were no items to be excluded from the model. It was seen that the single-factor construct obtained as a result of the EFA was confirmed by the CFA. According to the literature, the established construct was statistically confirmed. The model constructed as a result of the CFA is given in Figure 2.

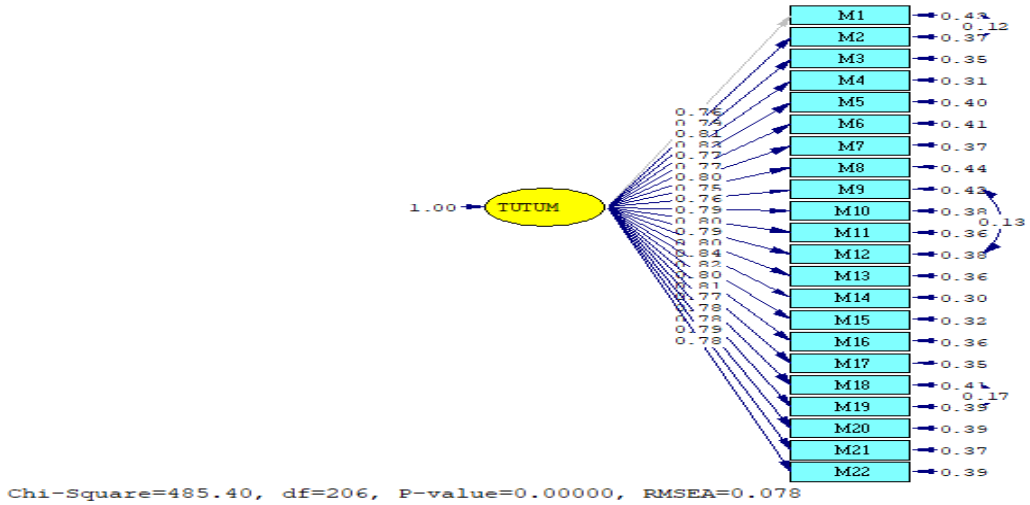

Figure 2. Measurement Model for the Scale

Reliability

The alpha coefficient for all the items in the scale was calculated to be 0.96. Thus, the scale has a high reliability.

Item analysis

For the determination of the predictive power of the total score and item discrimination, corrected total correlation was calculated. In addition, the scores of the students found in the 27% upper and lower groups were compared. Findings related to item analysis are given in Table 6.

Table 6. Item Analysis Results for the Scale

Item No	Scale Alpha When the Item is Removed	Corrected Item Total Correlation	Mean	Standard Deviation	Skewness
Attitude1	.970	.732	2.51	1.22	.63
Attitude2	.970	.773	2.32	1.21	.63
Attitude3	.970	.785	2.18	1.02	.85
Attitude4	.970	.807	2.35	1.06	.64
Attitude5	.970	.752	2.46	1.19	.50
Attitude6	.970	.743	2.15	1.16	.70
Attitude7	.970	.775	2.23	1.14	.62
Attitude8	.971	.716	2.26	1.13	.62
Attitude9	.970	.749	2.67	1.15	.14
Attitude10	.970	.762	2.46	1.07	.43
Attitude11	.970	.771	1.88	.99	1.04
Attitude12	.970	.772	2.25	1.07	.70
Attitude13	.970	.771	2.05	1.05	.85
Attitude14	.970	.819	2.35	1.05	.65
Attitude15	.970	.801	2.41	1.17	.49
Attitude16	.970	.784	2.36	1.12	.60
Attitude17	.970	.791	2.34	1.12	.61
Attitude18	.970	.752	2.45	1.08	.57
Attitude19	.970	.770	2.14	1.04	.74
Attitude20	.970	.760	2.30	1.08	.73
Attitude21	.970	.775	2.56	1.01	.61
Attitude22	.970	.756	2.10	1.09	.92

In Table 6, the item total correlation results range from .71 to .81. It is accepted that a total item correlation of .30 and above is sufficient for the interpretation of the items to be used to distinguish the measured features (Büyüköztürk, 2017; Erkuş, 2012). An independent samples t-test was used to come up with additional evidence for the construct validity of the scores of the 27% upper and lower groups of the participants and to determine the difference between their total scores.

For this purpose, 27% of the data obtained from 226 students with ASD were divided into two groups as lower and upper groups. The t-test results of each item according to the group statistics and the scores of each group from the scale are given in Table 7.

Table 7. Item Analysis Results Based on 27% Upper-Lower Groups of the Scale

Item	Group	$\bar{X}$	t	p	Item	Group	$\bar{X}$	t	p
1	Lower	1.30			12	Lower	1.17		
	Upper	3.69	-22.283	.00		Upper	3.33	-21.442	.00
2	Lower	1.17			13	Lower	1.05		
	Upper	3.53	-22.190	.00		Upper	3.19	-22.245	.00
3	Lower	1.24			14	Lower	1.38		
	Upper	3.17	-19.176	.00		Upper	3.59	-24.517	.00
4	Lower	1.41			15	Lower	1.27		
	Upper	3.50	-21.345	.00		Upper	3.68	-24.694	.00
5	Lower	1.37			16	Lower	1.37		
	Upper	3.67	-21.811	.00		Upper	3.61	-20.628	.00
6	Lower	1.08			17	Lower	1.30		
	Upper	3.30	-20.518	.00		Upper	3.56	-20.899	.00
7	Lower	1.12			18	Lower	1.50		
	Upper	3.35	-22.536	.00		Upper	3.56	-19.466	.00
8	Lower	1.12			19	Lower	1.21		
	Upper	3.40	-23.062	.00		Upper	3.26	-20.831	.00
9	Lower	1.51			20	Lower	1.30		
	Upper	3.76	-20.911	.00		Upper	3.43	-21.261	.00
10	Lower	1.43			21	Lower	1.75		
	Upper	3.53	-21.231	.00		Upper	3.69	-18.841	.00
11	Lower	1.02			22	Lower	1.11		
	Upper	2.98	-21.288	.00		Upper	3.25	-21.325	.00

Table 7 According to the findings obtained, the t values of the item scores of the students in the upper group of 27% and the lower group of 27% are between -18.84 and 24.69 (sd=120, p <.05). it is seen that there is a significant difference between the groups (p <.05). It is seen that the averages of the items in the upper group of 27% distinctive are higher than the averages of the items in the lower group of 27%. Therefore, it was concluded that there was a significant difference between the students in the upper group and the students in the lower group, and the items were distinctive.

Table 8 shows the results of one-factor analysis of variance (One-Way Anova) in an unrelated sample to examine how the attitudes of secondary school students diagnosed with ASD change according to gender, class level, socio-economic status, ASD degree, and whether the student does sports or not.

Table 8. Results Of The ANOVA Conducted To Determine Whether The Scores Taken From The Scale Vary Significantly Depending On Gender, Grade Level, Socio-Economic Status, Level Of ADS And Whether The Student Does Sports

Variables	Group	N	$\bar{X}$	SS	F	P
	Male	143	57.47	18.42		
Gender	Female	83	59.10	16.01	0.361	0.548
	5^{th} Grade	72	53.87	15.49		
	6^{th} Grade	65	57.26	19.28		
	7^{th} Grade	37	52.72	18.65		
Grade Level	8^{th} Grade	52	52.71	14.58	1.720	0.103
	Low	83	54.16	19.13		
	Medium	113	53.84	16.86		
Socio-economic Status	High	30	50.93	22.14	0.705	0.495

	Low	72	67.38	17.09		
	Medium	101	53.40	13.05		
Level of ASD	High	53	41.74	18.11	77.007	0.000
	Yes	162	57.79	17.14		
Can the student do sports?	No	64	43.42	17.92	58.692	0.000

According to the findings in Table 8, it can be said that there is no significant difference between the attitudes of students with ASD towards physical education and their genders (F(1, 224) = 0.361, p >.05). It is seen that there is no significant difference between ASD students' attitudes towards physical education and their class (F(3, 222)= 1.720, p>.05).Moreover, there is no significant differance between the attitudes of the students with ASD and their socio-economic status (F(2. 223)= 0.705. p>.05).

There is a significant differance between the attitudes of the students with ASD towards physical education and their level of ASD (F(2. 223)= 77.007. p<.05). According to the Tukey test, it can be said that the students with a low level of ASD ($\overline{X}$=67.38) have higher attitudes towards physical education than the students with medium ($\overline{X}$=53.40) and high levels of ASD ($\overline{X}$=41.74). It can be said that the students with a medium level of ASD ($\overline{X}$=53.40) have higher attitudes towards physical education than the students with a high level of ASD ($\overline{X}$=41.74). It is recommended to use the eta-square (η 2) correlation coefficient to determine the effect size (Büyüköztürk, 2017). The effect size takes values between 0.00 and 1.00. Values between 0.00 and 0.06 are interpreted as small effect, values between 0.06 and 0.14 are interpreted as medium effect and values of 0.14 and above are interpreted as large effect (Büyüköztürk, 2017; Cohen, 1988). In the current study, the effect size regarding the attitudes of the students with ASD towards physical education was found to be 0.27. Thus, it can be said that the effect size obtained in this study has a large effect. There is a significant correlation between the attitudes of the students with ASD towards physical education and the ability of the student to do sports (F(1. 224)= 58.692. p<.05). It can be said that the students who can do sports ($\overline{X}$=57.79) have higher attitudes towards physical education than the students who cannot do sports ($\overline{X}$=43.42). The effect size was found to be 0.12, indicating a medium effect size.According to Gülen & Ayaz (2019), attitudes are between 1-1.79 “very bad”, 1.80-2.59 “bad”, 2.61-3.39 “moderate”, 3.40-4.19 “good” and 4.20-5.00 “very good”. . Accordingly, it can be said that the attitudes of students with ASD towards physical education lesson ($\overline{x}$=2.22) are low.

CONCLUSION and DISCUSSION

This study was conducted to develop a valid and reliable measurement tool for the Evaluation of the Attitudes of the students with ASD towards Physical Education. An item pool consisted of 48 items was prepared while developing the scale. Opinions of five experts were taken for the content validity of the scale. In line with these opinions, a draft measurement tool consisting of 36 items was constructed. This five-point Likert scale was administered to middle school students diagnosed with ASD. The construct validity of the scale was tested with EFA and CFA. As a result of the EFA, a single-factor construct consisted of 22 items and explaining 60.288% of the total variance was elicited. In order to confirm the unidimensional construct obtained as a result of the EFA, CFA was conducted. As a result of the CFA, the fit indices of the single-factor construct were found to be good.

The criterion for the rate of variance explained in the EFA was taken as 30% and above. It is understood that the CFA fit indices for values of 0.30 and above are appropriate. Therefore, when the results of the EFA and CFA were taken into account, it was seen that the construct validity was achieved. The internal consistency reliability of the measurement results obtained from the scale was tested with the Cronbach's Alpha reliability coefficient method and the item-total correlations were examined. For the criterion validity of the data obtained from the scale, the difference between the scale scores of the 27% upper and lower groups was examined using the independent samples t-test.

The Cronbach Alpha reliability of the measurements was calculated to be 0.96 for the whole scale. For the reliability of the measurements, the reliability coefficient should be .70 and above (Fornell & Larcker, 1981; Tezbaşaran, 1997; Nunnaly & Bernstein, 1994). Item analysis was performed to reveal the predictive power of the items in the scale and to determine the discrimination levels of the items. While performing the item analysis, the corrected total item correlation was checked by comparing the 27% lower and upper groups. The item analysis revealed that the corrected item-total correlation results were in the appropriate range. In addition, the t value for the difference between the 27% lower and upper groups was found to be significant for all the items in the scale. Therefore, it can be said that all the items of the scale are discriminative. As a result of the analyses, it was revealed that the scale would make valid and reliable measurements of the attitudes of the students with ASD towards physical education. In addition, the scale can be used for students with ASD who are studying at different levels and taking the course of physical education.

It was concluded that there was no significant difference between the attitudes of students with autism towards physical education and their gender, grade levels and Socio-economic Status. It has been concluded that there is a significant difference between the attitudes of the students with autism towards physical education and the ASD Degree and Student sports status. Derer (2018) aimed to reveal the relationship between motor competence and social skill rating system scores of individuals with ASD and the effect of participation in physical activities, motor competence and inappropriate behaviors on social skills. As a result of the research, it was seen that there was a positive and moderately significant relationship between social skills and motor competence scores. Durmus et al. (2021), in their study, aimed to reveal the relationship between ASD and physical activities. As a result of the research, they stated that physical activities, which are considered important for all people, have positive effects on the motor skills of individuals with ASD and contribute significantly to their social, psychological and all other areas of their lives. They stated that these effects have a significant importance on the lives of individuals with ASD. Gökgöz (2019) aimed to reveal the effects of the adapted physical activity program of young people with ASD on the elimination of stereotypical behaviors, motor development, physical posture and social adaptation skills. Gökgöz (2019) stated that as a result of the research, there was a serious decrease in stereotypical behaviors, and there were positive improvements in physical posture and social adaptation skills. Orhan (2020), in his research, aimed to examine the changes in the inappropriate behavior of an individual who participated in an adapted physical activity program. As a result of the research, he stated that the physical activity program had a positive effect on the inappropriate

behaviors of the individual with ASD. In his research, Öz (2021) aimed to reveal the level of effect of gamified physical activities on ASD symptoms and basic motor skills of individuals with ASD. A gamified physical activity program was applied to the participants for 5 hours a day. According to the data obtained as a result of the research, Öz (2021) stated that the gamified physical activity program has positive effects on the ASD levels, limited and repetitive behaviors and basic motor skills of individuals with ASD. In addition, the scale can be used for students with ASD who are studying at different levels and taking physical training.

ETHICAL TEXT

In this article, journal writing rules, publication principles, research and publication ethics rules, journal ethics rules were followed. Responsibilities for any violations that may arise regarding the article, belong to the author(s). Ethical approval was obtained for the study with the decision of Van Yüzüncü Yıl University Social and Human Sciences Publication Ethics Committee dated 13.05.2022 and numbered 2022/11-04.

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