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## Developing an Orienteering Attitudes Scale: A Validity and Reliability Study

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### ABSTRACT

Orienteering is an increasingly popular sport activity. Because orienteering is believed to improve cognitive, affective, and behavioural skills, it is used in many classes such as social studies, geography, and physical education. It is, thus, of critical importance to know attitudes towards orienteering, especially among middle school students to use orienteering more effectively and efficiently. This study aimed to develop a reliable and valid scale to measure middle school students' attitudes towards orienteering. To this end, the study sampled 600 students who were attending fifth, sixth, seventh, and eighth grades during the fall term of the 2019-2020 academic year. Expert opinion (EFA) conducted for the construct validity indicated a three-factor structure consisting of sixteen items, which accounted for 65.06% of the total variance. The factor loadings of the scale items ranged from 0.61 and 0.94. According to the results of the confirmatory factor analysis (CFA), the goodness of fit indices (GFI) were as follows:  $\chi^2/df = 2.37$ , RMSEA = 0.07, GFI = 0.91, AGFI = 0.88, SRMR = 0.05, RFI = 0.95, CFI = 0.97, IFI = 0.97, NFI = 0.96, and NNFI = 0.97. The reliability of the scale was tested using the Cronbach's alpha coefficient, the test-retest reliability coefficient, the significance of the correlation coefficients for the scale and subscales, and the upper and lower 27%. The Cronbach's alpha coefficient was found to be .92 for the total scale, .89 for the affective subscale, .89 for the behavioural subscale, and .72 for the cognitive subscale. Based on the findings, the Orienteering Attitudes Scale is a valid and reliable measure and can be used to measure middle school students' attitudes towards orienteering.

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#### Keywords:

Orienteering, middle school students, scale development, validity, reliability

### 1. Introduction

Orienteering was first used in military training in Sweden in 1886 and is a sport where people run around an unknown or little-known area to find a number of control points marked on a map in the fastest time with the aid of a map and compass (International Orienteering Federation [IOF], 2018a, 2018b). Orienteering has been done within various institutions in Turkey since the 1970s; efforts for the official organization were initiated in 2001 and the Orienteering Federation was established in 2006 (Türkiye Oryantiring Federasyonu [Turkish Orienteering Federation], 2020). Orienteering requires athletes to combine excellent map reading and total

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concentration skills to choose the optimal route through the start, control points and finish in mountainous, steep and sandy terrain, woods, or parks (Güler, 2009, p. 4). There are four types of orienteering depending on the way it is done. They are foot orienteering, ski orienteering, mountain bike (MTB) orienteering, and trail orienteering (Karaca, 2008, p. 91). Orienteering is not only a game or sport but also an interdisciplinary activity and mental training that can serve to establish a better relationship between human and the environment (Notarnicola et al., 2012). It is a lifelong skill that can be taught to people of all ages in both natural and urban settings. There are many reasons for using orienteering in education: It is fun and safe, requires minimal equipment, provides measurable results, informs students about their abilities and strengths, and encourages group interaction (Hammes, 2007).

Arikan and Aladağ (2019) reported that orienteering education has a moderate effect on improving the map reading skills of undergraduates. Tanrikulu (2011) emphasised that orienteering can be used at all levels of education to transform the use of maps and compasses into skills. Atakurt et al. (2017) demonstrated that orienteering education has a positive effect on children's attention and memory level. Tuna and Balcı (2013) found that orienteering increased preservice geography teachers' perceived self-efficacy in map skills by 56%, in fieldwork skills by 66%, and in questioning, interpreting and evaluating skills by 57%. Özcan (2007) concluded that orienteering made a positive contribution to the development of students' social, individual and mathematical-logical intelligence. Avcı (2013) indicated that student views on the practice of orienteering in geography classes were positive. İmamoğlu and İmamoğlu (2018) examined the secondary education curriculum of geography and physical education and sports and suggested that it would be beneficial to prefer orienteering as a classroom activity to help students achieve learning outcomes. Di Tore et al. (2015) suggested that orienteering is a powerful learning resource in the development of spatial skills. Deniz et al. (2011) noted that orienteering develops independent thinking and problem-solving under pressure and stress. Ferguson and Turbyfill (2013) also argued that orienteering promotes better health and fosters critical thinking, problem-solving, and environmental sensitivity. According to Eccles and Arsal (2014), orienteering helps develop quick decision-making skills.

Orienteering activities have become increasingly popular (Gasser, 2018). Orientation is frequently used in out-of-school learning activities. In today's world marked by the increasing importance of distance education due to the ongoing COVID 19 pandemic since 2019, there are many online applications and platforms where orienteering can be played in either single-player or multiplayer mode. Thus, orienteering is also used effectively in distance education. As highlighted in the relevant literature, individuals have fun and learn thanks to orienteering. Additionally, orienteering is believed to improve mental and social skills, it is frequently used in many classes such as social studies, geography, and physical education. However, the existing body of literature has no instrument that measures middle school students' attitudes towards orienteering. Middle school students are in adolescence during which attitudes begin to develop and take shape (Güllü & Güçlü, 2009). It is, thus, of critical importance to know attitudes towards orienteering, especially among middle school students to use orienteering more effectively and efficiently. Against this background, the purpose of this study was to develop a scale to identify middle school students' attitudes towards orienteering. It is hoped that this study will fill the gap in the literature. This measure can determine students' positive and negative attitudes towards orienteering. It can provide managers with a basis for steps to be taken for orienteering policies. The measure will also be instrumental for researchers who wish to measure attitudes towards orienteering in middle schools.

## **2. Methodology**

### **2.1. Research Design**

The study used an exploratory sequential mixed methods design. According to Creswell (2018), the use of the exploratory sequential mixed design offers many advantages to scale development research and, in this design, the researcher first collects and analyses qualitative data on the research problem and then collects, analyses and interprets quantitative data by building on the findings from the qualitative data. Accordingly, orienteering instructors and officials of the Turkish Orienteering Federation were interviewed. The existing literature was examined, and the scale items were formulated.

## 2.2. Research Steps

This study aimed to develop a valid and reliable measure to determine middle school students' attitudes towards orienteering. To this end, interviews were held with an administrator who had served at the Turkish Orienteering Federation in Ankara and two orienteering instructors. The literature on orienteering and existing attitude scales for different types of sports were examined.

Based on the interviews and literature search, the researchers created a 35-item item pool including 24 positive items and 11 negative items rated on a 5-point Likert scale ranging from (1) Strongly disagree to (5) Strongly agree. Great care was taken to ensure that the scale items are clear, understandable and suitable for students' level. The items were evaluated by three subject matter experts, a measurement expert, and a Turkish language expert to ensure the content and face validity of the scale. The experts recommended discarding five items and revise two items. Accordingly, five items were discarded, and two items were revised by the researchers. The initial version of the Orienteering Attitudes Scale (OAS) consisted of 30 items.

The OAS was administered to 635 middle school students. Among 635 forms, twenty-three forms were excluded from the dataset because they were not suitable for the data analysis (missing or double-marked items). Additionally, to ensure the normality of the data, twelve outliers were removed from the data set and the normal distribution of the data was achieved. Therefore, the data set consisted of the data of 600 students. Table 1 shows the distribution of the respondents across grade-levels and gender.

**Table 1.** *Grade Level and Gender of the Respondents*

Grade Level	Gender	f	%
5	Female	61	10.2
	Male	37	6.2
6	Female	41	6.8
	Male	32	5.3
7	Female	95	15.8
	Male	92	15.3
8	Female	134	22.3
	Male	108	18
Total		600	100

The construct validity of the scale was tested using exploratory factor analysis (EFA) followed by confirmatory factor analysis (CFA).. Looking at the previous studies that used both EFA and DFA, some studies conducted EFA and CFA on the same sample, some studies conducted EFA and CFA on two different samples by dividing the sample randomly into two sets, and other studies conducted EFA and CFA on different samples randomly selected from the same population for each analysis. Document analysis studies indicated that the literature mostly include studies that conducted EFA and CFA on two different samples by randomly dividing the sample into two sets (Kılıç & Koyuncu, 2017). Fabrigar et al. (1999) suggested splitting the data into two sets and subject one data set to CFA and the other set to EFA when the sample is large enough. In this study, the data were split into two sets and one half was subjected to EFA and the other half to CFA due to temporal and economic reasons. The reliability of the scale was tested using the Cronbach's alpha coefficient, the test-retest reliability coefficient, the significance of the correlation coefficients for the scale and subscales, and the upper and lower 27%. SPSS statistical software version 23.0 was used for EFA, Cronbach's alpha, correlation test, independent samples t-test, and descriptive statistics. Lisrel statistical software version 8.80 was used for CFA.

## 3. Findings

The data were checked for suitability to perform EFA on the OAS developed within the scope of the study. For this purpose, outliers, missing data, the normality of the dataset, and the suitability of the sample were taken into account (Büyüköztürk, 2007; Tabachnick & Fidell, 2013). Frequency analysis was carried out and no missing data was found. The negative items 2, 5, 7, 10, 16, 17, 22, 29 and 30 were reversed. The normality of the data was tested using the Kolmogorov-Smirnov test ( $p > .05$ ); histograms, mode, median, and arithmetic mean were examined; skewness and kurtosis coefficients (-1.5 to +1.5) were taken into account (Tabachnick &

Fidell, 2013). The data found to be outliers based on the analysis results were deleted from the dataset and the normal distribution was achieved.

### 3.1. Findings on Validity of the Scale

Exploratory and confirmatory factor analyses were performed consecutively to test the validity of the OAS.

### 3.2. Exploratory Factor Analysis

After the data were made suitable for factor analysis, the suitability of the data for EFA was tested using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. The KMO value was found to be .93 and the results of Bartlett's test of sphericity were significant ( $\chi^2 = 4396.466$  df = 435,  $p < .00$ ). A KMO value should be greater than .60 and Bartlett's test of sphericity should be significant to conduct a factor analysis (Field, 2013). The results showed that the data were suitable for factor analysis.

Promax rotation was used because there were intercorrelations above .30 (Brown, 2009). According to the results of the initial factor analysis, 30 items were subsumed under a single factor. Factor loadings should be above .40 (Tabachnick & Fidell, 2013). Thus, the condition that factor loadings should be above .40 and differences between the factor loadings should be .20 and above was considered during the analysis. Items that fail to meet the condition were deleted from the scale. As a result, a three-factor structure emerged. In the scree plot for the number of factors that stemmed from the scale, the inflexion point also indicated three factors.

The total variance explained by the three-factor scale was found to be 65.06%. The percentage of the explained variance is indicative of the strength of the factor structure. Tavşancıl (2010) noted that a total variance between 40% and 60% is sufficient for social sciences. Table 2 demonstrates the results of the factor analysis of the scale.

**Table 2.** Factor Analysis Results for the Orienteering Attitudes Scale

		Factors			Anti-image Correlation Coefficient	X	SD
EN	NN	Affective	Behavioural	Cognitive			
12	1	.85			0.91	4.07	1.13
13	2	.84			0.91	3.67	1.24
9	3	.73			0.91	4.06	1.02
14	4	.70			0.95	3.82	1.16
8	5	.70			0.89	4.07	1.03
15	6	.68			0.94	4.10	1.09
6	7	.66			0.92	3.39	1.20
24	8		.87		0.91	3.63	1.31
26	9		.89		0.92	3.37	1.34
28	10		.76		0.94	3.79	1.23
27	11		.72		0.92	3.14	1.36
23	12		.71		0.95	3.59	1.25
25	13		.61		0.94	3.88	1.22
30	14			.94	0.84	4.68	0.90
3	15			.65	0.90	4.42	1.00
5	16			.63	0.88	4.38	1.02
Eigenvalues		7.37	1.85	1.18			
% of Variance		46.09	11.57	7.35			
% of Total Variance		46.09	57.66	65.01			
KMO		.92					
$\chi^2$		2666.937					
p		.000					

As seen in the table above, seven items (items 6, 8, 9, 12, 13, 14, and 15) were subsumed under the affective subscale, six items (items 23, 24, 25, 26, 27, and 28) were subsumed under the behavioural subscale, and three items (items 3, 5, and 30) were subsumed under the cognitive subscale. The factor loadings of the scale items ranged from 0.61 and 0.94. These results showed that the scale has a satisfactory level of construct validity.

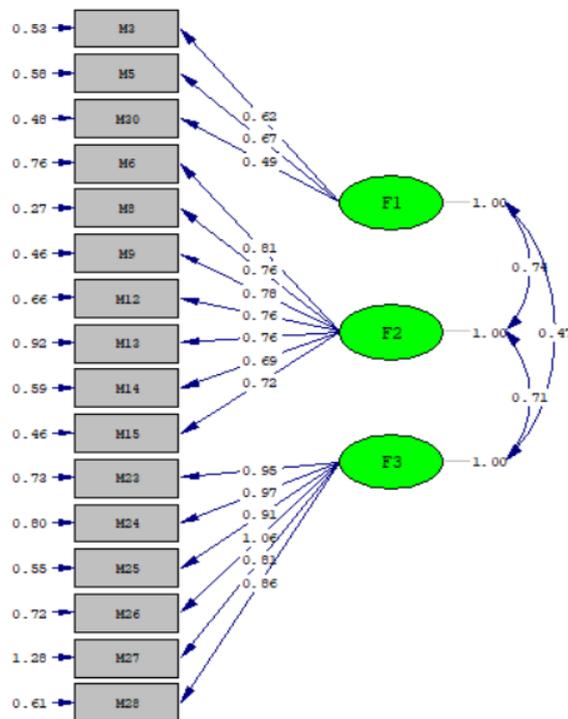
### 3.3. Confirmatory Factor Analysis

The goodness of fit of the emerging structure was analysed using CFA and the value of  $\chi^2/df$  and the goodness of fit indices were computed. Table 3 displays the standard goodness of fit criteria and the goodness of fit indices for the model.

As it is clear from the goodness of fit indices in the table above, the model has “perfect fit” or “acceptable fit” values. Given the reference values, the model has an acceptable fit. (Schermelleh-Engel & Moosbrugger, 2003; Schumacker & Lomax, 2004; Kline, 2005; Seer, 2015).

**Table 3.** Standard Goodness of Fit Criteria and Goodness of Fit Indices

Tested Goodness of Fit Indices	Perfect Fit Range	Acceptable Fit Range	Computed Fit Values	Conclusion
$\chi^2$	-	-	238.95	-
Df	-	-	101	-
$\chi^2/df$	$0 \leq \chi^2/df \leq 2$	$2 \leq \chi^2/df \leq 3$	2.37	Acceptable Fit
RMSEA	$.00 \leq RMSEA \leq .05$	$.05 \leq RMSEA \leq .08$	.07	Acceptable Fit
GFI	$.95 \leq GFI \leq 1.00$	$.90 \leq GFI \leq .95$	.91	Acceptable Fit
AGFI	$.90 \leq AGFI \leq 1.00$	$.85 \leq AGFI \leq .90$	.88	Acceptable Fit
RMR	$.00 \leq RMR \leq .05$	$.05 \leq RMR \leq .08$	.06	Acceptable Fit
SRMR	$.00 \leq SRMR \leq .05$	$.05 \leq SRMR \leq .10$	.05	Acceptable Fit
RFI	$.90 \leq RFI \leq 1.00$	$.85 \leq RFI \leq .90$	.95	Perfect Fit
CFI	$.97 \leq CFI \leq 1.00$	$.95 \leq CFI \leq .97$	.97	Perfect Fit
IFI	$.95 \leq IFI \leq 1.00$	$.90 \leq IFI \leq .95$	.97	Perfect Fit
NFI	$.95 \leq NFI \leq 1.00$	$.90 \leq NFI \leq .95$	.96	Perfect Fit
NNFI	$.97 \leq NNFI \leq 1.00$	$.95 \leq NNFI \leq .97$	.97	Acceptable Fit
PNFI	$.95 \leq PNFI \leq 1.00$	$.50 \leq PNFI \leq .95$	.81	Acceptable Fit
PGFI	$.95 \leq PGFI \leq 1.00$	$.50 \leq PGFI \leq .95$	.81	Acceptable Fit



F1: cognitive subscale, F2: affective subscale, and F3: behavioural subscale

**Figure 1.** Path diagram obtained from the CFA

As shown in Figure 1, the item factor loadings ranged from 0.49 to 1.06. The t values of the items were examined to determine whether the standardized values are significant. The t values of the scale items ranged from 9.34 to 16.97. According to okluk et al. (2016), a t value above 2.56 indicates that it is significant at .01.

For all items, t values were significant at  $p < .01$ . These results indicate the three-factor OAS consisting of sixteen items has an acceptable fit and is applicable.

### 3.4. Findings on the Reliability of the Scale

After EFA and CFA, the reliability of the scale was tested using the Cronbach’s alpha coefficient, the test-retest reliability coefficient, the significance of the correlation coefficients for the scale and subscales, and the upper and lower 27%. To determine the internal consistency of the scale items, the Cronbach’s alpha coefficients were computed for the total scale and subscales. Table 4 shows the results.

**Table 4.** Internal Consistency Coefficients of the Scale

Item No	Subscales	Items	Cronbach’s Alpha
12	Affective	I would like to take an orienteering course.	.89
13		I would like to go to orienteering activities wherever they are.	
9		I enjoy orienteering.	
14		I am interested in orienteering equipment.	
8		I like orienteering.	
15		Orienteering activities attract my attention.	
6		Orienteering is indispensable to me.	
24	Behavioural	I introduce orienteering to people around me.	.89
26		I read about orienteering.	
28		I listen to orienteering issues eagerly.	
27		I spend on orienteering equipment.	
23		I watch orienteering competitions attentively.	
25		I recommend orienteering to my friends.	
30	Cognitive	I would ban orienteering if I could.	.72
3		Orienteering needs to be popularized.	
5		I think orienteering is a boring activity.	
		Total	.92

The Cronbach’s alpha coefficient was found to be .92 for the total scale, .89 for the affective subscale, .89 for the behavioural subscale, and .72 for the cognitive subscale. Table 5 presents the independent samples t-test results for the upper and lower groups.

**Table 5.** Independent Samples t-Test Results for the Upper and Lower Groups

ItemNo	Groups	N	X	SD	df	t	p
12	Upper	81	4.91	0.32	91.48	14.41	0.00
	Lower	81	2.91	1.21			0.00
13	Upper	81	4.74	0.57	116.36	14.63	0.00
	Lower	81	2.65	1.15			0.00
9	Upper	81	4.84	0.40	105.23	14.97	0.00
	Lower	81	3.05	1.00			0.00
14	Upper	81	4.72	0.55	114.61	13.84	0.00
	Lower	81	2.74	1.16			0.00
8	Upper	81	4.88	0.40	102.74	15.25	0.00
	Lower	81	2.98	1.05			0.00
15	Upper	81	4.88	0.51	111.65	14.16	0.00
	Lower	81	2.94	1.12			0.00
6	Upper	81	4.52	0.78	141.87	12.82	0.00
	Lower	81	2.57	1.13			0.00
24	Upper	81	4.64	0.62	119.52	13.79	0.00
	Lower	81	2.57	1.20			0.00
26	Upper	81	4.33	0.96	154.67	11.43	0.00
	Lower	81	2.42	1.16			0.00
28	Upper	81	4.81	0.45	103.50	15.52	0.00
	Lower	81	2.67	1.16			0.00
27	Upper	81	4.33	0.96	160	13.25	0.00
	Lower	81	2.15	1.13			0.00
23	Upper	81	4.67	0.69	139.36	15.02	0.00

	Lower	81	2.59	1.03			0.00
25	Upper	81	4.80	0.51	113.71	16.11	0.00
	Lower	81	2.65	1.09			0.00
30	Upper	81	4.99	0.11	81.28	5.88	0.00
	Lower	81	4.17	1.24			0.00
3	Upper	81	4.94	0.24	85.95	9.65	0.00
	Lower	81	3.57	1.25			0.00
5	Upper	81	4.90	0.49	110.20	9.18	0.00
	Lower	81	3.67	1.11			0.00

Another method for determining the internal consistency of the items is examining the significance of the difference between the mean scores of the upper and lower 27% of the sample. According to the results of the independent samples t-test for the upper and lower 27%, there was a significant difference between the groups for all scale items. To prove the internal consistency of the scale, the significance of the intercorrelations among the subscales and correlations between the total scale and subscales was also analysed. Table 6 shows the correlation values for the total OAS and subscales.

**Table 6.** Correlation Values for the Total Scale and Subscales

	Total Scale	Affective	Behavioural
Affective	.92	-	
Behavioural	.88	.66	-
Cognitive	.61	.53	.34

As seen in Table 6 is examined, the correlation values ranged from 0.34 to 0.92, indicating a positive correlation at the significance level of  $p < 0.05$ .

The stability of the scale was tested using the test-retest reliability method. To this end, the scale was administered to 52 students at three-week intervals. Table 7 presents the test-retest reliability coefficients.

**Table 7.** Test-Retest Reliability Coefficients for the Total Scale and Subscales

OAS		Affective	Behavioural	Cognitive	Total
Affective	r	.653			
	p	0.00			
	n	52			
Behavioural	r		.767		
	p		0.00		
	n		52		
Cognitive	r			.644	
	p			0.00	
	n			52	
Total	r				.989
	p				0.00
	n				52

As seen in Table 7, the test-retest reliability coefficient was found to be 0.65 for the affective subscale, 0.77 for the behavioural subscale, 0.64 for the cognitive subscale, and 0.99 for the total scale. A measure with reliability coefficients .70 and higher is considered reliable (Fraenkel et al., 2012).

Given the significance of the t values for the between-group differences, the Cronbach's alpha coefficients, the intercorrelations of the factors, and the test-retest coefficients, it is safe to say that the items are discriminating, and the OAS is reliable (Büyüköztürk, 2007; Erkuş, 2012).

Considering the results of the validity and reliability analysis together, the OAS is a valid and reliable measure to determine middle school students' attitudes towards orienteering. The highest score attainable on the OAS is 80 and the lowest score is 16. The highest score attainable on the affective subscale is 35 and the lowest is 7. The highest score attainable on the behavioural subscale is 30 and the lowest is 6. The highest score attainable

on the cognitive subscale is 15 and the lowest it 3. An individual's overall attitude towards orienteering can be determined by looking at the total score on the scale or each subscale can be evaluated separately.

#### **4. Conclusion and Discussion**

This study set out to develop a valid and reliable scale to measure attitudes towards orienteering. While developing the Orienteering Attitudes Scale (OAS), the three-factor structure including affective, behavioural, and cognitive was taken into consideration in keeping with the nature of attitude. Based on the literature search and the interviews with an orienteering administrator and two orienteering instructors, a 35-item item pool was created including 24 positive items and 11 negative items rated on a 5-point Likert scale ranging from (1) Strongly disagree to (5) Strongly agree. The scale items were evaluated by three subject matter experts, a measurement expert, and a Turkish language expert to ensure the content and face validity of the scale. The experts recommended discarding five items and revise two items. Accordingly, five items were discarded, and two items were revised by the researchers. The initial version of the Orienteering Attitudes Scale (OAS) consisted of 30 items.

The OAS was administered to 635 middle school students. Among 635 forms, twenty-three forms were excluded from the dataset because they were not suitable for the data analysis (missing or double-marked items). Additionally, to ensure the normality of the data, twelve outliers were removed from the data set and the normal distribution of the data was achieved. The final dataset contained the data of 600 students. EFA and CFA were used to test the construct validity of the OAS. The data collected from 600 respondents were split into two sets. One half was subjected to EFA and the other half to CFA. The results of the EFA indicated a three-factor structure consisting of sixteen items, which accounted for 65.06% of the total variance. The factors were named affective, behavioural, and cognitive. Then, a CFA was performed to see whether the model is verified. The results of the CFA showed that the three-factor structure of the OAS had adequate goodness of fit indices.

The percentage of the explained variance is indicative of the strength of the factor structure. Tavşancıl (2010) noted that a total variance between 40% and 60% is sufficient for social sciences. The factor loadings of the scale items ranged from 0.61 and 0.94. Considering that the goodness of fit indices computed through the CFA were within the range of perfect and acceptable fit, the construct validity of the OAS was established.

The reliability of the scale was tested using the Cronbach's alpha coefficient, the test-retest reliability coefficient, the significance of the correlation coefficients for the scale and subscales, and the upper and lower 27%. The Cronbach's alpha coefficient was found to be .92 for the total scale, .89 for the affective subscale, .89 for the behavioural subscale, and .72 for the cognitive subscale. The results of the independent samples t-test for the upper and lower 27% showed a significant difference between the groups for all scale items. These findings indicate that all items of the OAS are highly discriminating. Concerning the intercorrelations among the subscales and the correlations between the total scale and subscales, the correlation values ranged from 0.34 to 0.92, indicating a positive correlation at the significance level of  $p < 0.05$ . The test-retest results showed a high correlation for the subscales and a very high correlation for the total scale. Given the significance of the t values for the between-group differences, the Cronbach's alpha coefficients, and the intercorrelations of the factors, it is safe to say that the items are discriminating, and the OAS is reliable (Büyüköztürk, 2007; Erkuş, 2012).

Attitudes have three components. The central component is the affective component generated by relatively continuous positive or negative feelings related to an object. The cognitive component forms beliefs about an attitude object. The behavioural component involves acting in a manner consistent with feelings and beliefs (Morgan, 2011). As a result of the analysis, the OAS emerged as having three factors including affective, behavioural, and cognitive. The literature includes studies on the effects of orienteering on individuals' cognitive, affective and behavioural development. Looking at the studies investigating the effect of orienteering on cognitive development, Arıkan and Aladağ (2019) stated that orienteering has a moderate effect on improving the map reading skills of undergraduates. Atakurt et al. (2017) showed that orienteering education has a positive effect on children's attention and memory level. Özcan (2007) found that orienteering positively contributes to the development of students' social, individual and mathematical-logical intelligence. İmamoğlu and İmamoğlu (2018) investigated the secondary education curriculum of geography and physical education and sports and recommended that it would be beneficial to use orienteering as a classroom activity

to help students achieve learning outcomes. Peke (2020) reported that orienteering increases individuals' levels of mental endurance. Tuna and Balcı (2013) concluded that orienteering promotes preservice geography teachers' self-efficacy perceptions. Yılmaz and Dellal (2020) reported that students paid more attention to artefacts and learned how to use maps during the orienteering activities held at a museum. Kobayashi (2019) argued that orienteering is important for geography education. Cataldi et al. (2021) reported that orientation improves visual-spatial working memory. Notarnicola et al. (2012) noted that orienteering strengthens memory. Zagorodnikova and Guseva (2020) argued that orienteering improves especially attention control and memorisation skills.

Looking at the studies investigating the effect of orienteering on affective development, Peke (2020) reported that orienteering fosters individuals' commitment to sports. Additionally, Yılmaz and Dellal (2020) concluded that students enjoyed the orienteering activities held at the museum. Avcı (2013) also indicated that student had positive views on the practice of orienteering in geography classes. Looking at the studies investigating the effect of orienteering on behavioural development, Aksın (2008) noted that orienteering has positive effects on mental and physical development. Likewise, Deniz et al. (2011) stated that orienteering helps players have high coordination and stay healthy. Karaca and Gündüz (2021) also argued that systematic and purposeful mental training can positively contribute to the performances of orienteers. Additionally, Pouya et al. (2017) asserted that orienteering can provide cognitive, affective and behavioural contributions.

Taken together, the results of the validity and reliability analysis demonstrate that the OAS can be used as a valid and reliable measure to identify middle school students' attitudes towards orienteering.

As a result of the search for the literature, no scale has been found to measure attitudes towards orienteering. This study makes a major contribution to the current literature by filling this gap and promoting the more effective and efficient use of orienteering. The scale developed in this study was subjected to multiple validity and reliability analyses and evidence was presented. In this regard, the construct validity was tested through EFA and CFA, and the reliability was tested using the Cronbach's alpha coefficient, correlation coefficients, and the upper and lower 27%. The test-retest reliability method was also used.

## 5. Limitations and Recommendations

The major limitation of this study is the fact that it sampled only fifth-to-eighth-grade students. Thus, it would be useful to repeat validity and reliability analyses using data from different sample groups. Further research may carry out a correlational survey to investigate the relationship between orienteering and some variables such as self-efficacy perceptions, academic achievement, school attitudes, and motivation.

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