

# Turkish Adaptation of Leisure Motivation Scale: A Sample of Turkish Adolescents Participating in Regularly Physical Activity

## Rekreasyonel Amaçlı Fiziksel Aktiviteye Katılan Ergenler için Motivasyon Ölçeği: Türkçe Adaptasyon Çalışması

İsmail AYDIN<sup>1</sup> 

Bartın University, Sport Science Faculty,  
Department of Recreation, Bartın, Türkiye

Fatih YAŞARTÜRK<sup>2</sup> 

Bartın University, Sport Science Faculty,  
Department of Recreation, Bartın, Türkiye

Serdar SOLMAZ<sup>3</sup> 

Batman University, Sport Science Faculty,  
Department of Sport Management, Batman,  
Türkiye

Buğra AKAY<sup>4</sup> 

Kırıkkale University, Sport Science Faculty,  
Department of Physical Education and Sport,  
Kırıkkale, Türkiye

Mehmet CEYLAN<sup>5</sup> 

Kırıkkale University, Sport Science Faculty,  
Department of Physical Education and Sport,  
Kırıkkale, Türkiye

### ABSTRACT

In the study, we aimed to evaluate the Turkish adaptation of the leisure motivation scale (LMS-A) for adolescents participating in recreational physical activities. We collected data from 331 people determined by the convenience sampling method, and conducted its Turkish adaptation with three different test phases after we performed Turkish language co-validation of the scale. Firstly, we determined the univariate and multivariate normality levels of the data. In the second stage we used confirmatory factor analysis (CFA) to assess the contextuality of the scale and in the third stage we utilized two types of construct validity, convergent and discriminant to evaluate the validity of the scale. The results revealed that the original structure of the scale fits well in the correlated factors model and best fit the data collected from the Turkish population. These results suggest that the leisure motivation scale could be a valid and reliable measurement tool for adolescents participating in recreational physical activities in Türkiye.

**Keywords:** Adolescent, leisure, motivation, physical activity, validity and reliability

### Öz

Bu çalışmanın amacı, rekreasyonel amaçlı fiziksel aktiviteye katılan ergenler için serbest zaman motivasyon ölçeğinin (SZMÖ-E) Türkçe adaptasyonunu test etmektir. Araştırmada veriler kolayda örneklem yöntemiyle belirlenen 331 kişiden toplanmıştır. Türkçe dil eş geçerliliği yapılan ölçeğin Türkçe adaptasyon üç farklı test aşaması ile yürütülmüştür. İlk olarak verilerin tek değişkenli normallik düzeyi ile çok değişkenli normallik düzeyleri belirlenmiştir. İkinci aşamada, ilgili ölçeğin kavramsallığını test etmek için Doğrulamalı Faktör Analizi (DFA) analizi test edilmiştir ve üçüncü aşamada, ölçeğin geçerliliğini test etmek adına yakınsak ve ayırt edici olmak üzere iki tür yapı geçerliliği kullanılmıştır. Analiz sonuçları, ölçeğin orijinal yapısının ilişkili faktörler modelinde iyi uyum gösterdiği ve Türk popülasyonundan toplanan verilere en iyi şekilde uyduğunu ortaya koymuştur. Elde edilen bu sonuçlar, Türkiye'deki rekreasyonel amaçlı fiziksel aktiviteye katılan ergenler popülasyonu için geçerli ve güvenilir bir ölçüm aracı olarak serbest zaman motivasyon ölçeğinin kullanılabilir olduğunu göstermektedir.

**Anahtar Kelimeler:** Ergen, fiziksel aktivite, geçerlilik ve güvenilirlik, serbest zaman, motivasyon

GelişTarihi/Received 27.03.2024  
Kabul Tarihi/Accepted 28.05.2024  
Yayın Tarihi/Publication Date 20.06.2024

Sorumlu Yazar/Corresponding author:

İsmail AYDIN

E-mail : ismail.aydin2013@gmail.com

Cite this article: Aydın, İ., Yaşartürk, F., Solmaz, S., Akay, B., & Ceylan, M. (2024).

Turkish adaptation of leisure motivation scale: A sample of turkish adolescents participating in regularly physical activity  
Makale başlığı. *Research in Sport Education and Sciences*, 26(2), 51-65.



Content of this journal is licensed under a  
Creative Commons Attribution-Noncommercial  
4.0 International License.

## Introduction

Adolescents almost all over the world have specific time as leisure during the day that they can liberally and voluntarily utilize (Irby & Tolman, 2002). Leisure has been defined as crucial determinant on adolescents' lives and recognized the concept as a substantial context for their self-development by authors (Belošević & Ferić, 2022; Bosacki et al., 2022). Numerous studies demonstrated that adolescents have become so sedentary in their lives that researchers have focused on what they do in this extended period of leisure, which activities they participate in and how they evaluate such periods (Larson & Verma, 1999). For instance, U.S. Bureau of Labor Statistics (2007) reported American adolescents had 4.85 hours of leisure on weekdays and 6.68 hours of leisure on weekends/holidays. Pääkkönen (2002) found in another study that Finlander students aged 7-15 had 5.95 hours of leisure on weekdays and 9.85 hours on weekends/holidays. Additionally, recent studies in various cultures have reported that adolescents' use of electronic devices and screen time increased during the Covid-19 pandemic and its aftermath (Cosma et al., 2021; Schmidt et al., 2020). These studies strikingly reveal that adolescents tend to prefer sedentary behaviors such as watching television and using smartphones instead of engaging in physical activities in their leisure.

The World Health Organization (2022) have recommended 60 minutes of moderate-intensity physical activity every day or at least 3 days of vigorous-intensity physical activity. However, research has proved that has not reached the levels recommended despite the physical, mental, emotional, and social benefits of physical activity for adolescents (Dimitri et al., 2020; Eime et al., 2013; Lubans et al., 2012). According to Guthold et al. (2020), physical inactivity is particularly prevalent among adolescents. Research indicated that 80 percent of adolescents and 31 percent of adults are not active enough (Guthold et al., 2018; Hallal et al., 2012). The authors have recognized adolescence as a precursor to adulthood and consider that physical activity behaviors during this period are also likely to carry over into adulthood (Kandola et al., 2020; Telama et al., 2005). McDavid et al. (2012) stated that the adolescence-adulthood connection is evident in health-related behaviors such as physical activity participation. Therefore, many authors have focused on adolescents' level of physical activity in their leisure and the factors affecting this period (Collings et al., 2014; Cooper et al., 2015; Jose et al., 2011). Motivation has been accepted to influence the direction, intensity, and persistence of behavior by determining why, with what force, and for how long people perform certain activities by Iso-Ahola & Clair (2000), so Molanorouzi et al. (2014) addressed motivation as the most important reason for being physically active in leisure.

According to Deci and Ryan (1985), self-determination theory (SDT) provides a theoretical framework for understanding various forms of motivation in physical activity settings, explains the motivation that regulates behavior as well as the environmental conditions that facilitate motivational development and the theory classifies motivation into three categories as intrinsic motivation, extrinsic motivation and amotivation. Intrinsic motivation has been related to the individual's participation in a leisure activity (e.g. physical activity) because of the pleasure and satisfaction a person derives from the activity (Vallerand, 2007). Extrinsic motivation, on the other hand, involves engaging in a behavior or activity to achieve outcomes that are separable from the activity itself, such as obtaining rewards, avoiding punishment, and gaining recognition and approval in the social environment (Ryan et al., 2009), while amotivation refers to situations in which a person does not feel a connection between individual's action and its consequences and occurs when a person is not intrinsically and extrinsically motivated (Ntoumanis, 2001; Wang, 2017).

The motivation in SDT has been detailed in two sub-theories named as organismic integration theory (OIT) and cognitive evaluation theory (CET) (Ryan & Deci, 2000). OIT addresses environmental factors related to amotivation and different self-regulation processes in the forms of extrinsic motivation, while CET explains the change in intrinsic motivation (Deci & Ryan, 1985). Deci and Ryan (1991) explained intrinsic and extrinsic motivation in SDT as two opposite poles in the continuity of self-determined behavior and divided extrinsic motivation into four behavioral regulation such as external regulation, introjected regulation, identified regulation, integrated regulation. External regulation refers to the control of an individual's behavior by external means, such as reward and punishment. Introjected regulation represents the individual taking an action motivated to avoid feelings of internal pressure, guilt, and shame, or to be approved. Identified regulations clarify that behaviors are in accordance with one's own choices and the consequences of the behavior are valuable for the person. Identified regulation reveals that behaviors are in accordance with one's own choices and that the consequences of the behavior are valuable for the person. Integrated regulation implies the integration of one's behavior with one's own lifestyle (Deci & Ryan, 1991). Although Deci and Ryan (1985) consider integrated regulation as a type of extrinsic motivation, previous data reveal that

integrated regulation does not constitute a reason for participation in the sport context. Besides, adolescents do not yet have this cognitive and developmental regulation of motivation (Vallerand, 1997).

Extrinsic regulation and introjected regulation (controlled forms of motivation) are not expected to be effective in maintaining behaviors for a long time, although such regulations can motivate behaviors for a short time (Ryan & Deci, 2000). Individuals who act with identified regulation, integrated regulation (autonomous motivation) are more likely to maintain behaviors over the long term than those who act only with controlled forms of motivation to participate in physical activity (Markland & Ingledew, 2007; Teixeira et al., 2012). SDT has been adopted as a useful framework for studying motivated human behavior and has been used in a variety of domains including education (Ntoumanis, 2001), leisure (Wang, 2017), sport (Markland & Ingledew, 2007), and business life (Howard et al., 2016). In SDT-based studies, motivation has been specifically linked to sport and leisure activities. For example, Teixeira et al. (2012) presented that different types of motivation predict both short- and long-term commitment to physical activity. McDavid et al. (2012) found that adolescents' self-determined motivation strongly influenced their leisure physical activity behavior. Similarly, Lonsdale (2009) found, in a study of high school students, that students with autonomous motivation engaged in more physical activity in class. Moreover, such students have been reported to show more effort, concentration, and enjoyment in different studies (Ntoumanis, 2001; Standage et al., 2005). Outside of school, individuals with autonomous motivation were found to have higher physical activity participation and intention (Hagger et al., 2005).

Various studies suggests that adolescents often spend their free time in a sedentary manner (Pääkkönen, 2002; U.S. Bureau of Labor Statistics, 2007; WHO, 2022). This may lead to a decrease in physical activity levels and consequently an increase in health problems. Therefore, it is extremely important to understand and measure adolescents' physical activity motivation in leisure. Numerous studies have been conducted in this context from the past to present. For example, Beard and Ragheb (1983) evaluated leisure motivation scale with 48 items with "intellectual", "stimulus-avoidance", "social" and "competence-mastery" sub-dimensions. Rogers and Morris (2003) developed and experimentally validated the recreational exercise motivation scale (REMM), which addresses the motivation of individuals participating in recreational exercises in eight sub-dimensions. Subsequently, Morris and Rogers (2004) developed the 40-item physical activity and leisure motivation scale by selecting the five strongest items from each of the eight sub-factors to shorten the scale. Roychowdhury (2018) stated that when measurement tools with a high number of items are applied in sports and exercise environments, participants are likely to get bored and tired. This could limit the application of the relevant measurement tools in sports settings (Beard & Ragheb, 1983; Morris & Rogers, 2004; Rogers & Morris, 2003).

Based on SDT, Baldwin and Caldwell (2003) measured adolescents' leisure motivation in a five-factor (amotivation, extrinsic, introjected, identified, and intrinsic motivation) structure with a total of 20 items. This scale has been tested for validity and reliability by a researcher in Turkish before (Üstün, 2016). Üstün (2016) adapted this scale, which assesses adolescents' leisure motivation, to Turkish culture. The study has revealed that researchers have evaluated individual's motivation using a general term with leisure activities, and tested the scale on sample groups with wide range ages whereas our study was conducted to measure the motivation of adolescents aged 10-19 who enjoy their leisure participating in physical activity. This approach stands out as a key methodological difference from previous uses of our testing. Accordingly, we aimed to test the Turkish adaptation of the leisure motivation scale developed by Baldwin and Caldwell (2003) to the physical activity context on adolescents who regularly participate in physical activity.

## Methods

### Participants

We studied with adolescents aged 10-19 who participated in regular physical activity programs at a sports school and identified 331 participants whom they are 148 female ( $M_{age}= 14.20$ ) and 183 male ( $M_{age}= 13.78$ ) according to convenience sampling method. We considered some criteria such as (I) that these schools offer a variety of physical activity programs (II) physical activity services such as football, volleyball, basketball, gymnastics, swimming, and horse riding to adolescents and (III) that these schools can be preferred by parents for their children to spend their leisure both in summer and winter in the determining of sports schools.

These sports schools provide recreational physical activity services for adolescents, designing comprehensive and balanced programs that take into account the biological, psychological and social needs of adolescents. These programs aim to improve adolescents' physical strength, flexibility, endurance and coordination skills by offering activities involving various sports such as basketball, football, volleyball, swimming, athletics and gymnastics. In addition, such physical activity programs provided through sports schools are aimed to increase the levels of fun and motivation while contributing to adolescents' adoption of a healthy and active lifestyle, gaining self-confidence and developing social skills.

### Demographic Profile of the Responds

In Table 1, we achieved that the adolescents participating in the study are predominantly male (Total= 55.3%) and have an average age of thirteen years ( $M_{\text{age}} = 13.96\%$ ), also we determined that the participants attended the sports school on average three days a week ( $M_{\text{day}} = 2.98$ ) and had an average of twenty-six months ( $M_{\text{month}} = 25.51$ ) of experience in which the activity they participate. We specified that the special feature of the sports school were also effective (Total = 78.5%) in the preference process, that responds largely enjoyed this activity (Total = 97.3%), the responds planned to continue participating in this activity in the future (Total= 93.7%) and that responds thought of becoming a professional athlete in branch of sports (Total= 90.3%), that responds also participated in this activity with their family (Total= 68.0%), and that responds also participated in another activity in addition to this activity (Total= 66.2%) as the reasons why the majority of participants prefer this activity. Additionally, we found out responds preferred to participate in this physical activity program mostly because of their own personal curiosity (Total= 62.5%), and as physical activity, they preferred football (Total= 21.5%), basketball (Total= 11.2%), volleyball (Total= 6.3%), handball (Total= 8.2%), swimming (Total= 10.3%), athletics (Total= 6.9%), table tennis (Total= 7.9%) and gymnastics (Total= 27.8%).

**Table 1.**  
**Demographic characteristics of the responds (n= 331)**

Continuous variables	M	SD.	Min.	Max.
Age <sub>(year)</sub>	13.96	2.38	10	19
How many days a week do you come to the sports school? <sub>(daily)</sub>	2.98	1.06	1	6
How long have you been engaged in this type of activity? <sub>(monthly)</sub>	25.51	16.0	1	60
Categorical variables			%a	%b
Gender (a=female; b=male)			55.3	44.7
Do you have a plan to become a professional athlete in this physical activity? (a=yes; b=no)			90.3	9.7
Do you enjoy this activity? (a=yes; b=no)			97.0	3.0
Do you have a plan to continue this activity? (a=yes; b=no)			93.7	6.3
Do you also participate in another physical activity program? (a=yes; b=no)			66.2	33.8
Did this sports school's characteristics influence your choice of this activity? (a=yes; b=no)			78.5	21.5
Do you also participate in this activity with your family? (a=yes; b=no)			68.0	32.0

Notes: M= Mean, SD= Standard Deviation, Min.= Minimum, Max.= Maximum

### Data Collection Tools

Baldwin and Caldwell (2003) developed the free time motivation scale for adolescents (FTMS-A). The scale consists of a total of 5 sub-dimensions and 20 items, and the sub-dimensions of the scale are (a) amotivation, (b) external motivation, (c) introjected motivation, (d) identified motivation, and (e) intrinsic motivation and are answered in a 5-point Likert scale. We also determined the demographic characteristics of adolescents (e.g., gender, age, type of physical activity, physical activity experience, and weekly physical activity participation time) with a personal information form with questions in the study.

"Free time" is a more general concept and refers to any free time left over from work or other duties. "Leisure", however,

aims to enjoy this free time and is usually filled with various activities. In our research, we preferred to use the word "leisure" instead of "free time", as participants prefer to fill their free time with physical activities for health, relaxation, and enjoyment. We named the scale leisure motivation scale for adolescents (LMS-A).

### Language Co-validation Process of LMS-A

According to Brislin (1970), cross-cultural research is difficult to translate. However, most cross-cultural projects involve questionnaires, which need to be translated from the researcher's language into another culture's language. The translation and back translation procedure involves the process of translating texts or sentences from one language into another, and then retranslating these translations back into the original language. Campbell et al. (1970) pointed out that a researcher might use one or more of the following techniques in back-translation for cross-cultural research. Firstly, we translated the items of the relevant scale from the original language (English) to the target language (Turkish) to ensure linguistic equivalence for the Turkish version of the LMS-A. We followed up this process with translating the scale items into Turkish by a bilingual researcher, and then translating the relevant items back into the original language by another researcher who is both fluent in English and a native speaker of Turkish. Finally, we asked a native speaker researcher to compare the pre-translation and post-translation forms and to indicate the differences. Later, translator reported that the two scale forms reflected the existing structure in the same way after this comparison. We presented the English and Turkish items of the LMS-A after language co-validation process in Table 2.

**Table 2.**  
**English and Turkish versions of the LMS-A**

Factor and item in English		Factor and item In Turkish	
<i>I do what I do in my free time because...</i>		<i>Boş zamanımda bu fiziksel aktiviteyi yapıyorum çünkü...</i>	
Amotivation (AMT)		Motivasyonsuzluk (MTS)	
*AMT <sub>1</sub>	...I don't know why I do my free time activities, and I don't really care	*MTS <sub>1</sub>	...neden yaptığımı bilmiyorum ve gerçekten umurumda da değil
*AMT <sub>2</sub>	...I don't know, nothing much interests me	*MTS <sub>2</sub>	...bilmiyorum, ilgimi çeken pek bir şey de yok
*AMT <sub>3</sub>	...I don't know, I have never really thought about it.	*MTS <sub>3</sub>	...bilmiyorum, bunu hiç düşünmedim
*AMT <sub>4</sub>	...I don't know, but it doesn't matter because I don't do much of anything	*MTS <sub>4</sub>	...bilmiyorum ama bunun bir önemi yok çünkü pek bir şey yapmıyorum zaten
External Motivation (EXT)		Dış Motivasyon (DM)	
EXT <sub>1</sub>	...I would get in trouble if I don't	DM <sub>1</sub>	...eğer yapmazsam problem yaşarım
EXT <sub>2</sub>	...I am supported to	DM <sub>2</sub>	...yapmam gerekiyor
EXT <sub>3</sub>	...That is the rule in my house	DM <sub>3</sub>	...evimdeki kural bu
EXT <sub>4</sub>	...So others won't get mad at me	DM <sub>4</sub>	...böylece başkaları bana kızmaz
EXT <sub>5</sub>	...My parent expect me to	DM <sub>5</sub>	...ailem yapmamı bekliyor
Introjected Motivation (IJ)		İçselleştirilen Motivasyon (İÇM)	
IJ <sub>1</sub>	...I will feel badly about myself if I don't	İÇM <sub>1</sub>	...eğer yapmazsam kendimi kötü hissedeceğim
IJ <sub>2</sub>	...I want to impress my friends	İÇM <sub>2</sub>	...arkadaşlarımı etkilemek istiyorum
IJ <sub>3</sub>	...I want people to like me	İÇM <sub>3</sub>	...insanlar beni sevsin istiyorum
Identified Motivation (ID)		Kişiselleştirilen Motivasyon (KM)	
ID <sub>1</sub>	...I want to understand how things work	KM <sub>1</sub>	...işlerin nasıl yürüdüğünü anlamak istiyorum
ID <sub>2</sub>	...What I do is important to me	KM <sub>2</sub>	...bu benim için önemli
ID <sub>3</sub>	...I develop skills that I can use later in life	KM <sub>3</sub>	...hayatımın ilerleyen dönemlerinde kullanabileceğim becerileri geliştiriyorum
ID <sub>4</sub>	...The activities help me develop into the person I want to become	KM <sub>4</sub>	...olmak istediğim kişiye dönüşmemi yardımcı oluyor
Intrinsic Motivation (INT)		İçsel Motivasyon (İM)	
INT <sub>1</sub>	...I want to have fun	İM <sub>1</sub>	...eğlenmek istiyorum.
INT <sub>2</sub>	...I enjoy what I do	İM <sub>2</sub>	...yaptığım şeyden zevk alıyorum.
INT <sub>3</sub>	...I like what I do	İM <sub>3</sub>	...yaptığım şeyi seviyorum.
INT <sub>4</sub>	...I want to	İM <sub>4</sub>	...bunu istiyorum

Notes: Items were measured on a 5-point scale, where 1= strongly disagree and 5= strongly agree, \*Calculated as reverse items in the analysis.

### Data Collection

We applied to Bartın University Social and Human Sciences Ethics Committee, be approved with protocol number 2023-SBB-0451 after The Scientific and Technological Research Council Türkiye (TUBITAK) has decided to support our project with number 123K830 and titled as “*The relationship between perceived parental influence, motivation and intention to participate again in adolescents who engage in regular physical activity.*” Afterwards, we requested the documents “special legal permission” signed by the administrators of the sports schools where we would collect the data to prove that they have declared their support for our project. We signed with the TUBITAK the contract for the project after submitting all documents to the council and began collecting data of the project. A researcher from the project team visited 15 different sports schools on different dates to communicate with adolescents aged 10-19 years participating in regular physical activity programs, which (I) provide services only to adolescents, (II) have at least 50 or more members, (III) have been established for five years or more, (IV) could offer at least one physical activity program. The researcher explained that responds could fill in the scale items on paper or online after presenting the relevant consent form to them. An online link was sent to the participants who wanted to fill out the online scale form with the social media groups of their parents or children with the support of the sports school administration so that they could access easily to the scale form. Participants took approximately 4 minutes to complete the paper or online forms. We took approximately 4 weeks to collect all data for the project. We determined the appropriate number of responds for the study, based on the Green (1991) formula ( $n \geq 50 + 8 \times \text{Number}$ ) recommended in the literature. According to the formula, we predicted that 234 or more participants would be sufficient for this study. We excluded 89 data due to missing information and continued analyses with 331 complete data.

### Statistical Analysis

We realized three stages for the testing of the data. Firstly, we determined the level of univariate normality and multivariate normality for data. Secondly, we conducted confirmatory factor analysis (CFA) to evaluate the scale’s contextuality and tested just the correlated factors model in this stage. We used the root mean square error of approximation (RMSEA), The normed fit index (NFI), The comparative fit index (CFI) and standardized root mean square residual (SRMR) to evaluate how well the model fits the data. Thirdly, we used the convergent and discriminant as construct validity to test the scale’s validity. Byrne (2009) referred convergent validity to the agreement of independent measures in evaluating the same construct, whereas reflected discriminant validity as the difference between independent measures in assessing these constructs. We utilized the power of factor loadings, the significance of t-values and average variance extracted (AVE) values for convergent validity tests, respectively while we calculated whether the AVE was greater than the squared correlation between latent constructs to assess discriminant validity in the study. Besides, we evaluated item-total correlation values to examine the correlations of each item of the measurement tool with the total factor. Mariani et al. (2023) explained item-total correlation values as the correlations of each item of a measurement tool with the total factor.

We also tested the scale’s reliability coefficient by examining the internal consistency coefficient (Cronbach's alpha), the construct reliability of the dimensions (composite reliability: CR) and McDonald's omega ( $\omega$ ) coefficient, which has been shown to be one of the best alternative methods for estimating reliability in different studies. All these steps to ensure validity and reliability were conducted using R Studio and SPSS 26 software (IBM Corp., 2019; Team, 2021). We used ‘lavaan’ (Rosseel, 2012) for CFA analysis, ‘semTools’ (Jak et al., 2021) for confidence intervals, and ‘semPlot’ (Epskamp, 2015) for visualizations.

## Results

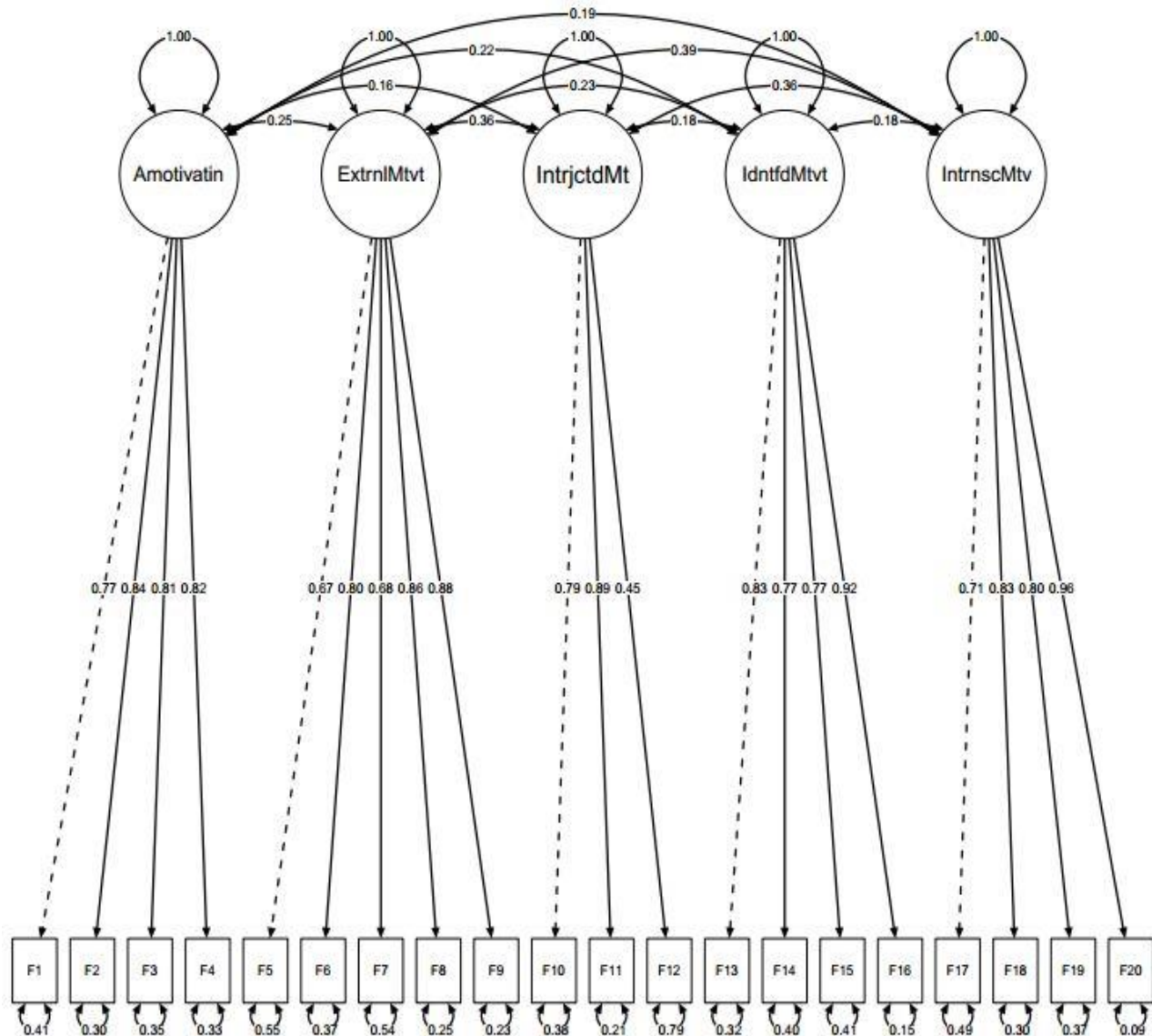
### Normality Test of Data

We determined that the data were within the range of  $\pm 2.00$  in the univariate normality assumption and had a univariate normal distribution (George & Mallery, 2019). Additionally, we calculated mardia skewness ( $b1d = .035$ ,  $p = 0.16 > 0.05$ ) and mardia kurtosis ( $b2d = 2.49$ ,  $p = .06 > 0.05$ ) to determine whether the multiple normality assumption is met. All these values proved that the data also met the assumption of multiple normality (Cain et al., 2017; Gana & Broc, 2019). Researchers have preferred maximum likelihood (ML), which is a parametric estimation method, in CFA testing in such cases (Amorim et al., 2010; Papadakis et al., 2022; Ryan, 2000).

## Confirmatory Factor Analysis: Testing of Validity and Reliability

### Testing of Convergent Validity

We achieved a particularly good fit to the data [ $\chi^2(160) = 350.294$ ;  $p < .0001$ , RMSEA = .056 (90% CI: 0.051, 0.068), CFI = 0.95, TLI = 0.94, SRMR = 0.56] for the correlated factors model in the CFA results. The result demonstrated that the model fits the data set in a way that confirms the proposed theoretical structure, and the model is reliable.



**Figure 1.** Correlated factors model of the LMS-A

We used the strength of factor loadings, significance of t-values and AVE for convergent validity tests. Table 3 demonstrated that most of the factor loadings of the CFA factor loadings are above 0.70, and only the factor loadings of EXT1, EXT3 and IJ3 items are below 0.70. Table 3 also presented that all item factor loadings of the LMS-A are statistically significant (t-values  $\geq \pm 1.96$ ). This suggests that these results support convergent validity. In the study, we calculated AVE values to test the internal consistency and validity of the LMS-A evaluated with the correlated factors model (see Figure 1). Table 3 displayed that the AVE values calculated for the factors are  $< 0.50$ .

**Table 3.**  
*The results of CFA, AVE, CR and Cronbach Alpha*

	$\lambda$	t-value	SE	R <sup>2</sup>	M	SD
Amotivation (AMT) (CR=0.88; AVE=0.65; $\alpha$ = 0.88)					4.23	0.47
AMT <sub>1</sub>	0.77	27.80	0.028	0.59	4.29	0.55
AMT <sub>2</sub>	0.84	37.02	0.023	0.70	4.25	0.58
AMT <sub>3</sub>	0.81	32.66	0.025	0.65	4.17	0.51
AMT <sub>4</sub>	0.82	34.41	0.024	0.67	4.22	0.57
External Motivation (EXT) (CR=0.88; AVE=0.61; $\alpha$ = 0.88)					4.30	0.45
EXT <sub>1</sub>	0.67	20.35	0.033	0.44	4.27	0.46
EXT <sub>2</sub>	0.80	32.65	0.024	0.64	4.26	0.61
EXT <sub>3</sub>	0.68	20.05	0.034	0.46	4.35	0.57
EXT <sub>4</sub>	0.86	44.57	0.019	0.73	4.32	0.56
EXT <sub>5</sub>	0.88	48.62	0.018	0.77	4.26	0.58
Introjected Motivation (IJ) (CR=0.76; AVE=0.54; $\alpha$ = 0.72)					4.22	0.35
IJ <sub>1</sub>	0.79	23.50	0.034	0.62	4.29	0.45
IJ <sub>2</sub>	0.89	26.76	0.033	0.79	4.17	0.40
IJ <sub>3</sub>	0.45	9.09	0.050	0.20	4.20	0.46
Identified Motivation (ID) (CR=0.89; AVE=0.68; $\alpha$ = 0.88)					4.18	0.52
ID <sub>1</sub>	0.83	37.37	0.022	0.68	4.23	0.53
ID <sub>2</sub>	0.77	30.59	0.025	0.59	4.19	0.65
ID <sub>3</sub>	0.77	29.95	0.026	0.59	4.10	0.67
ID <sub>4</sub>	0.92	59.72	0.015	0.84	4.20	0.57
Intrinsic Motivation (INT) (CR=0.89; AVE=0.68; $\alpha$ = 0.89)					4.29	0.49
INT <sub>1</sub>	0.71	24.04	0.030	0.50	4.32	0.52
INT <sub>2</sub>	0.83	42.63	0.020	0.68	4.22	0.59
INT <sub>3</sub>	0.80	35.70	0.022	0.64	4.33	0.58
INT <sub>4</sub>	0.96	79.57	0.012	0.92	4.30	0.58

### Discriminant Validity Test

We conducted discriminant validity tests for the construct evaluation of the LMS-A after the convergent validity tests. Firstly, we assessed the correlation values between the factors to support the construct validity of the scale and to reveal whether the measurement tool works in accordance with its purpose in this stage. Table 4 demonstrated that the relationship between the factors of the LMS-A is low and positive ( $r= 0.17-0.39$ ,  $p<.00$ ). This degree of relationship between the sub-dimensions released consistent or significant in the adaptation process of the scale, which we could interpreted it as the structural validity of the scale is ensured. Besides, researchers often have tried to ensure the construct discriminant validity of the scale they assess by utilizing  $\sqrt{AVE}$  values.

**Table 4.**  
*Discriminant validity of the LMS-A*

Factor	1	2	3	4	5
1. Amotivation	<b>(0.80)</b>				
2. External Motivation	0.23**	<b>(0.77)</b>			
3. Introjected Motivation	0.13*	0.37**	<b>(0.72)</b>		
4. Identified Motivation	0.19**	0.22**	0.21**	<b>(0.81)</b>	
5. Intrinsic Motivation	0.17**	0.39**	0.38**	0.17**	<b>(0.82)</b>

Notes: \*\*=  $p<0.001$ , \*=  $p<0.05$

We checked Heterotrait monotrait ratio (HTMT) values to check whether the discriminant validity was achieved. Table 5 presented that HTMT values were below the upper threshold of 0.90. We also calculated the item-total correlation value in the last stage of the discriminant validity of the LMS-A. Table 6 exhibited that the corrected item-total correlation values ( $r_{jx} =$



0.33 to 0.54) ranged between low and medium level. Item-total correlation values measure the relationship between an item and the total factor. If an item has a high correlation with the expected factor, this indicates that the item behaves in a manner consistent with the factor it measures.

**Table 5.**  
*The result of heterotrait monotrait ratio*

Factor	1	2	3	4	5
1. Amotivation	-				
2. External Motivation	0.25	-			
3. Introjected Motivation	0.16	0.47	-		
4. Identified Motivation	0.21	0.24	0.26	-	
5. Intrinsic Motivation	0.19	0.44	0.46	0.19	-

**Table 6.**  
*Corrected item-total correlation ( $r_{jx}$ ) of the LMS-A*

	Item No				
	1	2	3	4	5
1. Amotivation	0.40 $r_{jx}$	0.38 $r_{jx}$	0.44 $r_{jx}$	0.39 $r_{jx}$	
2. External Motivation	0.45 $r_{jx}$	0.48 $r_{jx}$	0.49 $r_{jx}$	0.53 $r_{jx}$	0.54 $r_{jx}$
3. Introjected Motivation	0.34 $r_{jx}$	0.38 $r_{jx}$	0.44 $r_{jx}$		
4. Identified Motivation	0.40 $r_{jx}$	0.33 $r_{jx}$	0.41 $r_{jx}$	0.41 $r_{jx}$	
5. Intrinsic Motivation	0.48 $r_{jx}$	0.48 $r_{jx}$	0.48 $r_{jx}$	0.54 $r_{jx}$	

Notes:  $r_{jx}$  = Item discrimination power

### Testing of Reliability

We examined the reliability of the LMS-A after convergent and discriminant validity. Table 3 presented that Cronbach alpha values are above 0.70, CR values are above 0.76. Researchers interpreted reliability coefficients equal to or higher than 0.70 as an acceptable good value (Nunnally & Bernstein, 1994). Additionally, some authors have calculated the reliability of measurement instruments containing multiple variables, mostly with CR value (Fornell & Larcker, 1981; Li et al., 1996). There are opinions that the CR value obtained should meet at least  $<0.60$  in the literature (Bagozzi & Yi, 1988).

### Discussion

Leisure has been stated as a useful context for understanding motivational processes and its structure allows for a wide variety of motivation types (most intrinsically and extrinsically motivated behaviors) to occur by Baldwin and Caldwell (2003). Thus, research suggest that motivating factors need to be identified to develop effective strategies to promote adolescents' leisure physical activity in leisure (Wang, 2017). The SDT has qualitatively examined the relationship between several types of motivation and behavioral engagement in various fields such as education (Ntoumanis, 2001), sports (Markland & Ingledew, 2007), business life (Howard et al., 2016). Accordingly, we aimed to test the Turkish adaptation of LMS-A developed by Baldwin and Caldwell (2003) based on self-determination theory.

Firstly, we conducted the CFA to determine if the factor structure of the LMS-A could be confirmed. The CFA results proved that the five-factor structure of the LMS-A is preserved in the correlated factors model for Turkish population, as well. According to some authors, RMSEA and SRMR values less than 0.05 indicate a good fit, while values between 0.05-0.08 indicate an acceptable fit (Byrne, 2009; Hu & Bentler, 1999). CFI and TLI values vary between 0 and 1, and values greater than 0.90 indicate an acceptable fit; values close to 1 can be interpreted as a better fit of the model (Hu & Bentler, 1998; Schermelleh-Engel et al., 2003; Şimşek, 2020). Schermelleh-Engel et al. (2003) considered  $\chi^2/sd$  value less than 3; Wheaton et al. (1977) and Tabachnick and Fidell (2013) consider this value less than 5 sufficient for model fit, although there are different opinions about the  $\chi^2/sd$  value. This could indicate that the model fits the data set and is reliable.

In the study, we obtained appropriate value ranges in convergent validity tests with actor loadings, significance of t-values and AVE. According to the researchers (Bollen & Hoyle, 2012), factor loadings represent a portion of the variance captured

by the latent factor. Researchers have argued that low factor loadings should be accepted as standardized factor loadings ( $>0.70$ ) because they consider that the latent factor captures less than 50% of the variation in the indicator (Kyle et al., 2020). However, Anderson and Gerbing (1988) stated that convergent validity could also be assessed by determining whether the estimated model coefficient of each indicator (item) on the hypothesized underlying construct factor is significant. Eventually, Fornell and Larcker (1981) explained AVE values as a critical statistical measurement in structural equation modeling analyses within the framework of standards to assess the suitability of the model to the data, to ensure the reliability of the measurement tools and to evaluate the internal consistency of the measurement tool, and it is suggested that an AVE value below 0.50 may cast doubt on the validity of the measured construct. Additionally,

We figured out appropriate results with discriminant validity tests such as the relationship of the factors,  $\sqrt{\text{AVE}}$  values, HTMT and the item-total correlation value for the construct evaluation of the LMS-A. The authors have reported that these all values are within a reasonable score. For example, Terwee et al. (2007) reported that the relationship between an item and the total factor should be greater than 0.85. Henseler et al. (2015) implied the discriminant validity could be ensured, since both the squares of AVE values are higher than the correlation values between variables and the HMT value is below 0.90. Fornell and Larcker (1981) stated that the AVE calculated for each latent construct should be greater than the squared correlations between each construct. Indeed, each factor correlation value of LMS-A is below  $\sqrt{\text{AVE}}$  values. This released basic evidence for the convergent validity of the LMS-A

We evaluated the scale's reliability and discovered that the LMS-A could be used as a reliable measurement tool. DeVellis & Thorpe (2021) states that Cronbach's alpha coefficient is often used to assess whether a measurement tool is relevant and whether it measures the same topic. Most researchers have considered values of 0.60 and above in Cronbach's alpha coefficient to be sufficient for the reliability of the measurement tool (DeVellis & Thorpe, 2021; Ercan & Kan, 2004; George & Mallery, 2019; Nunnally & Bernstein, 1994). Since Cronbach's alpha tends to be high when there are many variables, the CR value is used as an alternative to assess reliability. Some authors have mentioned that CR values above 0.70 are considered good reliability (Hair et al., 2010; Raykov, 1998). According to the researchers, the CR value should be higher than the AVE value and the AVE value is expected to be above 0.50 (Fornell & Larcker, 1981; Hair et al., 2017). Finally, we determined that the item-total correlation values ranged between 0.33 and 0.54 in the discriminant validity process. Büyüköztürk (2020) stated that the discrimination of items with a value of 0.30 and above is at a good level, while items with a value lower than 0.20 should be removed from the test.

In the literature, many authors conducted the adaptation of motivational measurement instruments by conducting a similar validation and reliability process as that conducted as in LMS-A, and developed with theoretical approaches to measure motivation to participate in physical activity. For example, researchers have used the exercise motivation inventory (Markland and Hardy, 1993) for individuals who exercise regularly, the sports motivation scale (Pelletier et al., 1995) for students with athletic background, and the exercise motivation scale (Li, 1999) for university students to assess motivation to participate in sport contexts. Unlike the study of Baldwin and Caldwell (2003), these scales addressed intrinsic motivation in three sub-factors. In recent studies examining adolescent motivation from an SDT perspective (Estevan et al., 2021; Kalajas-Tilga et al., 2020; Kerner et al., 2019), motivation has been evaluated in accordance with the factor structure of Baldwin and Caldwell's study.

### Conclusions

Consequently, these results revealed that the Turkish version of the LMS-A could be used as a valid and reliable measurement tool to assess the motivation of adolescents participating in recreational physical activity. This study provides a more comprehensive and concise assessment of motivation in terms of the factors used, compared to other measurement tools (Akbulut & Öncü, 2023; Güngörmüş, 2012; Tekkurşun Demir & Cicioğlu, 2022). For example, Güngörmüş (2012) addressed the motivational factors that are effective in the participation of university students and staff in recreational activities with a total of 28 items in 7 sub-dimensions. Tekkurşun Demir and Cicioğlu (2022) evaluated students' motivation towards physical education class with intrinsic, extrinsic and amotivation sub-dimensions in a study group consisting of students between the ages of 12-18, while Akbulut and Öncü (2023) in a study group consisting of middle and high school students. Baldwin and Caldwell (2003) measured adolescents' leisure motivation with a 5-factor structure named as amotivation, extrinsic, extrinsic, introjected, identified, and intrinsic motivation, based on self-determination theory. Üstün (2016) adapted this measurement tool, which assesses adolescents' general leisure motivation, to Turkish culture. However,

since our study tested the leisure motivation of adolescents participating in just recreational physical activity, it differs from other studies in terms of the characteristics of the sample group. All these efforts may contribute about expanding the existing leisure motivation measurement tools in Türkiye.

### **Limitations and Recommendations**

The current scale differs significantly from other measurement studies previously conducted in Turkish, with various limitations determined by considering its scope and methodology. A sample group in the study, which includes only adolescents who engage in regular physical activity and live in large cities, has limited the generalizability of the study results, and reduced the applicability of such a sample group to a broad segment of the population it represents. Additionally, the results obtained from this sample group may have various limitations in representing and generalizing the universe, although we determined the sample size with a meticulous approach in our current research. All these reveal the limitations of the LMS-A with the sample group. Therefore, we suggested using larger and more diverse sample groups and including participants from different regions in future studies to increase the general validity of the results. This ensures that the results of the research are applicable to a wider researcher.

In language co-validation, the LMS-A has been addressed in terms of language and cultural differences, which it revealed had a significant effect on the validity and reliability of the scale. We conducted preliminary research to test the suitability of the scale for Turkish culture and considered Turkish adolescents' perceptions of leisure activities and motivations in Turkish adaptation of LMS-A. The word "*free time*" in the scale's original version preferred by the authors has no clear Turkish equivalent and has different meanings in Turkish. Such confusion of meaning is more likely in the adolescent age group. Thus, we preferred "*leisure*" the more commonly known to "*free time*" to eliminate these differences and to make the scale more suitable for Turkish culture and to ensure better understanding of Turkish adolescents in the scale items. Additionally, we used the sentence "*I do this physical activity in my leisure because .....*" to instead of "*I do what I do in my free time because ...*" when considering the diversity of activities that Turkish adolescents frequently in the scale items for the purpose of the study. In this stage, an expert translation team examined the scale's Turkish version and made necessary corrections. Then we pre-evaluated the scale's Turkish form on a small pilot group to test its comprehensibility and consistency. We accept all these periods crucial for the validity and reliability of the scale, since expert researchers conducted sensitively this whole adaptation process and assessed the Turkish form with the properly methods. These methods, which were made during the adaptation of the scale to the Turkish language, reveal its limitations in terms of the validity and reliability of the measurement tools.

We approved that the design is one of limitations because we used a cross-sectional design in the study. A cross-sectional design is a method in which data are collected at a specific point in time and the relationships between variables are assessed with a single point-in-time observation. This design may make it difficult to identify causal relationships. It may also not allow us to observe changes over time. In addition, another limitation of the cross-sectional design is that there is no opportunity to observe changes over time. We collected data only at a specific time to determine adolescents' leisure motivations in our study. Therefore, we do not have an opportunity to observe changes in adolescents' leisure motivations over time or to evaluate these changes in the long term within the scope of the study. This may hinder our understanding of how the results of the research have changed or developed over time. For this reason, research designs such as longitudinal, comparative studies, mixed method approach, and controlled experiments will help researchers to better understand complex issues such as leisure motivation and to develop more effective interventions to overcome the limitations of cross-sectional design for future research and to obtain more comprehensive results.

**Etik Komite Onayı:** Bu çalışma için etik komite onayı Bartın Üniversitesi'nden (Tarih: 17 Temmuz 2023, Karar No: 17, Protokol No: 2023-SBB-0451) alınmıştır.

**Katılımcı Onamı:** Çalışmaya katılan tüm katılımcılardan sözlü onam alınmıştır.

**Hakem Değerlendirmesi:** Dış bağımsız.

**Yazar Katkıları:** Fikir- İ.A.; Tasarım- İ.A.; Denetleme-İ.A.; Kaynaklar- İ.A., F.Y., S.S., B.A., M.C.; Veri Toplanması ve/veya İşlemesi- İ.A., B.A., M.C.; Analiz ve/ veya Yorum- İ.A., S.S.; Literatür Taraması- İ.A., F.Y., B.A., M.C.; Yazıyı Yazan- İ.A., F.Y., S.S., B.A., M.C.; Eleştirel İnceleme- İ.A., F.Y.

**Çıkar Çatışması:** Yazarlar, çıkar çatışması olmadığını beyan etmiştir.

**Finansal Destek:** Yazarlar, bu çalışma için TÜBİTAK tarafından finansal destek aldığını beyan etmiştir. Bu çalışma, Türkiye Bilimsel ve Teknolojik Araştırma Kurumu (TÜBİTAK) tarafından 123K830 Numaralı proje ile desteklenmiştir. Projeye verdiği destekten ötürü TÜBİTAK'a teşekkürlerimizi sunarız.

**Ethics Committee Approval:** The ethics committee approval was received for this study from the ethics committee of Bartın University (Date: July 19, 2023, Decision Number: 15, Protocol No: 2023-SBB-0451).

**Informed Consent:** Verbal consent was obtained from all the participants.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept- İ.A.; Design-İ.A.; Supervision- İ.A.; Resources- İ.A., F.Y., S.S., B.A., M.C.; Data Collection and/or Processing- İ.A., B.A., M.C.; Analysis and/or Interpretation- İ.A., S.S.; Literature Search- İ.A., F.Y., B.A., M.C.; Writing Manuscript- İ.A., F.Y., S.S., B.A., M.C.; Critical Review- İ.A., F.Y.

**Conflict of Interest:** The authors have no conflicts of interest to declare.

**Financial Disclosure:** The authors declare that they have received financial support from TUBITAK for this study. This study was supported by the Scientific and Technological Research Council of Turkey (TUBITAK) under Project No. 123K830. We would like to thank TUBITAK for its support to the project.

## References

- Akbulut, V., & Öncü, E. (2023). The adaptation of physical education motivation scale into Turkish: A validity and reliability study. *Sportive*, 6(2), 139-152. <https://doi.org/10.53025/sportive.1311231>
- Amorim, L. D. A. F., Fiaccone, R. L., Santos, C. A. S. T., Santos, T. N. dos, Moraes, L. T. L. P. de, Oliveira, N. F., Barbosa, S. O., Santos, D. N. dos, Santos, L. M. dos, & Matos, S. M. A. (2010). Structural equation modeling in epidemiology. *Cadernos de Saúde Pública*, 26(12), 2251-2262.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411-423. <https://doi.org/10.1037/0033-2909.103.3.411>
- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74-94. <https://doi.org/10.1007/BF02723327>
- Baldwin, C. K., & Caldwell, L. L. (2003). Development of the free time motivation scale for adolescents. *Journal of Leisure Research*, 35(2), 129-151. <https://doi.org/10.1080/00222216.2003.11949987>
- Beard, J. G., & Ragheb, M. G. (1983). Measuring leisure motivation. *Journal of Leisure Research*, 15(3), 219-228. <https://doi.org/10.1080/00222216.1983.11969557>
- Belošević, M., & Ferić, M. (2022). Contribution of leisure context, motivation and experience to the frequency of participation in structured leisure activities among adolescents. *International Journal of Environmental Research and Public Health*, 19(2), 877. <https://doi.org/10.3390/ijerph19020877>
- Bollen, K. A., & Hoyle, R. H. (2012). Latent variables in structural equation modeling. *Handbook of Structural Equation Modeling*, 56-67.
- Bosacki, S., Sitnik, V., Pissoto Moreira, F., & Talwar, V. (2022). Emotion recognition, self-knowledge, and perceptions of leisure time activities in emerging adolescents: A longitudinal study. *European Journal of Developmental Psychology*, 19(5), 654-678. <https://doi.org/10.1080/17405629.2021.1937993>
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-cultural Psychology*, 1(3), 185-216. <https://doi.org/10.1177/135910457000100301>
- Büyükoztürk, Ş., Çakmak, E. K., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2020). Bilimsel araştırma yöntemleri (31. Baskı). Pegem Akademi Yayınları.
- Byrne, B. M. (2009). Structural equation modeling with Mplus: Basic concepts, applications, and programming. Routledge.
- Cain, M. K., Zhang, Z., & Yuan, K.-H. (2017). Univariate and multivariate skewness and kurtosis for measuring nonnormality: Prevalence, influence and estimation. *Behavior Research Methods*, 49(5), 1716-1735. <https://doi.org/10.3758/s13428-016-0814-1>
- Campbell, D., Brislin, R., Stewart, V., & Werner, O. (1970). Back-translation and other translation techniques in cross-cultural research. *International Journal of Psychology*, 30, 681-692.
- Collings, P. J., Wijndaele, K., Corder, K., Westgate, K., Ridgway, C. L., Dunn, V., Goodyer, I., Ekelund, U., & Brage, S. (2014). Levels and patterns of objectively-measured physical activity volume and intensity distribution in UK adolescents: The ROOTS study. *International Journal of Behavioral Nutrition and Physical Activity*, 11(1), 23. <https://doi.org/10.1186/1479-5868-11-23>
- Cooper, A. R., Goodman, A., Page, A. S., Sherar, L. B., Esliger, D. W., van Sluijs, E. M., Andersen, L. B., Anderssen, S., Cardon, G., Davey, R., Froberg, K., Hallal, P., Janz, K. F., Kordas, K., Kreimler, S., Pate, R. R., Puder, J. J., Reilly, J. J., Salmon, J., ... Ekelund, U. (2015). Objectively measured physical activity and sedentary time in youth: the International children's accelerometry database (ICAD). *International Journal of Behavioral Nutrition and Physical Activity*, 12(1), 113. <https://doi.org/10.1186/s12966-015-0274-5>
- Cosma, A., Pavelka, J., & Badura, P. (2021). Leisure time use and adolescent mental well-being: Insights from the COVID-19 Czech spring lockdown. *International Journal of Environmental Research and Public Health*, 18(23), 12812. <https://doi.org/10.3390/ijerph182312812>
- Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. Springer Science & Business Media.
- Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. *Nebraska Symposium on Motivation*, 38(1), 237-288.
- DeVellis, R. F., & Thorpe, C. T. (2021). Scale development: Theory and applications. Sage publications.
- Dimitri, P., Joshi, K., & Jones, N. (2020). Moving more: physical activity and its positive effects on long term conditions in children and young people.

- Archives of Disease in Childhood*, 105(11), 1035-1040. <https://doi.org/10.1136/archdischild-2019-318017>
- Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2013). A systematic review of the psychological and social benefits of participation in sport for children and adolescents: Informing development of a conceptual model of health through sport. *International Journal of Behavioral Nutrition and Physical Activity*, 10(98), 1-21. <http://www.ijbnpa.org/content/10/1/98>
- Epskamp, S. (2015). semPlot: Unified visualizations of structural equation models. *Structural Equation Modeling: A Multidisciplinary Journal*, 22(3), 474–483. <https://doi.org/10.1080/10705511.2014.937847>
- Ercan, İ., & Kan, İ. (2004). Ölçeklerde güvenilirlik ve geçerlik. *Journal of Uludağ University Medical Faculty*, 30(3), 211–216.
- Estevan, I., Bardid, F., Utesch, T., Menescardi, C., Barnett, L. M., & Castillo, I. (2021). Examining early adolescents' motivation for physical education: Associations with actual and perceived motor competence. *Physical Education and Sport Pedagogy*, 26(4), 359-374. <https://doi.org/10.1080/17408989.2020.1806995>
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50. <https://doi.org/10.1177/002224378101800104>
- Gana, K., & Broc, G. (2019). Structural equation modeling with lavaan. Wiley. <https://doi.org/10.1002/9781119579038>
- George, D., & Mallery, P. (2019). IBM SPSS statistics 26 step by step. Routledge. <https://doi.org/10.4324/9780429056765>
- Güngörmüş, H. A. (2012). The study of validity and reliability of Turkish version of leisure motivation scale. *Energy Education Science and Technology Part B: Social and Educational Studies*, 4(3), 1209–1216.
- Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2018). Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1.9 million participants. *The Lancet Global Health*, 6(10), e1077–e1086. [https://doi.org/10.1016/S2214-109X\(18\)30357-7](https://doi.org/10.1016/S2214-109X(18)30357-7)
- Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2020). Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1.6 million participants. *The Lancet Child & Adolescent Health*, 4(1), 23–35. [https://doi.org/10.1016/S2352-4642\(19\)30323-2](https://doi.org/10.1016/S2352-4642(19)30323-2)
- Hagger, M. S., Chatzisarantis, N. L., Barkoukis, V., Wang, C. K., & Baranowski, J. (2005). Perceived autonomy support in physical education and leisure-time physical activity: a cross-cultural evaluation of the trans-contextual model. *Journal of Educational Psychology*, 97(3), 376-390. <https://doi.org/10.1037/0022-0663.97.3.376>
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate data analysis: A global perspective (7th ed.). Pearson Education.
- Hair, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: updated guidelines on which method to use. *International Journal of Multivariate Data Analysis*, 1(2), 107. <https://doi.org/10.1504/IJMDA.2017.087624>
- Hallal, P. C., Andersen, L. B., Bull, F. C., Guthold, R., Haskell, W., & Ekelund, U. (2012). Global physical activity levels: surveillance progress, pitfalls, and prospects. *The Lancet*, 380(9838), 247–257. [https://doi.org/10.1016/S0140-6736\(12\)60646-1](https://doi.org/10.1016/S0140-6736(12)60646-1)
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of The Academy of Marketing Science*, 43, 115-135. <https://doi.org/10.1007/s11747-014-0403-8>
- Howard, J., Gagné, M., Morin, A. J. S., & Van den Broeck, A. (2016). Motivation profiles at work: A self-determination theory approach. *Journal of Vocational Behavior*, 95(1), 74–89. <https://doi.org/10.1016/j.jvb.2016.07.004>
- Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, 3(4), 424. <https://doi.org/10.1037/1082-989X.3.4.424>
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55. <https://doi.org/10.1080/10705519909540118>
- Irby, M., & Tolman, J. (2002). Rethinking leisure time: Expanding opportunities for young people and communities. Washington, DC: The Forum for Youth Investment.
- Iso-Ahola, S. E., & Clair, B. St. (2000). Toward a theory of exercise motivation. *Quest*, 52(2), 131–147. <https://doi.org/10.1080/00336297.2000.10491706>
- Jak, S., Jorgensen, T. D., & Rosseel, Y. (2021). Evaluating cluster-level factor models with lavaan and mplus. *Psych*, 3(2), 134–152. <https://doi.org/10.3390/psych3020012>
- Jose, K. A., Blizzard, L., Dwyer, T., McKercher, C., & Venn, A. J. (2011). Childhood and adolescent predictors of leisure time physical activity during the transition from adolescence to adulthood: A population based cohort study. *International Journal of Behavioral Nutrition and Physical Activity*, 8, 1-9. <https://doi.org/10.1186/1479-5868-8-54>
- Kalajas-Tilga, H., Koka, A., Hein, V., Tilga, H., & Raudsepp, L. (2020). Motivational processes in physical education and objectively measured physical activity among adolescents. *Journal of Sport and Health Science*, 9(5), 462-471. <https://doi.org/10.1016/j.jshs.2019.06.001>
- Kandola, A., Lewis, G., Osborn, D. P. J., Stubbs, B., & Hayes, J. F. (2020). Depressive symptoms and objectively measured physical activity and sedentary behaviour throughout adolescence: a prospective cohort study. *The Lancet Psychiatry*, 7(3), 262–271. [https://doi.org/10.1016/S2215-0366\(20\)30034-1](https://doi.org/10.1016/S2215-0366(20)30034-1)
- Kerner, C., Burrows, A., & McGrane, B. (2019). Health wearables in adolescents: implications for body satisfaction, motivation and physical activity. *International Journal of Health Promotion and Education*, 57(4), 191-202. <https://doi.org/10.1080/14635240.2019.1581641>
- Kyle, G., Landon, A., Vaske, J., & Wallen, K. (2020). Tools for assessing the psychometric adequacy of latent variables in conservation research. *Conservation Biology*, 34(6), 1353–1363. <https://doi.org/10.1111/cobi.13625>
- Larson, R. W., & Verma, S. (1999). How children and adolescents spend time across the world: Work, play, and developmental opportunities. *Psychological Bulletin*, 125(6), 701–736. <https://doi.org/10.1037/0033-2909.125.6.701>
- Li, F. (1999). The exercise motivation scale: Its multifaceted structure and construct validity. *Journal of Applied Sport Psychology*, 11(1), 97-115. <https://doi.org/10.1080/10413209908402953>
- Li, F., Harmer, P., & Acock, A. (1996). The task and ego orientation in sport questionnaire: construct equivalence and mean differences across gender. *Research Quarterly for Exercise and Sport*, 67(2), 228–238. <https://doi.org/10.1080/02701367.1996.10607949>
- Lonsdale, C., Sabiston, C. M., Raedeke, T. D., Ha, A. S., & Sum, R. K. (2009). Self-determined motivation and students' physical activity during structured

- physical education lessons and free choice periods. *Preventive Medicine*, 48(1), 69-73. <https://doi.org/10.1016/j.ypmed.2008.09.013>
- Lubans, D. R., Plotnikoff, R. C., & Lubans, N. J. (2012). A systematic review of the impact of physical activity programmes on social and emotional well-being in at-risk youth. *Child and Adolescent Mental Health*, 17(1), 2-13. <https://doi.org/10.1111/j.1475-3588.2011.00623.x>
- Marianti, S., Ruffaida, A., Hasanah, N., & Nuryanti, S. (2023). Comparing item-total correlation and item-theta correlation in test item selection: A simulation and empirical study. *Jurnal Penelitian Dan Evaluasi Pendidikan*, 27(2), 133-145. <https://doi.org/https://doi.org/10.21831/pep.v27i2.61477>
- Markland, D., & Hardy, L. (1993). The Exercise Motivations Inventory: Preliminary development and validity of a measure of individuals' reasons for participation in regular physical exercise. *Personality and Individual Differences*, 15(3), 289-296. [https://doi.org/10.1016/0191-8869\(93\)90219-5](https://doi.org/10.1016/0191-8869(93)90219-5)
- Markland, D., & Ingledew, D. K. (2007). Exercise participation motives: A self-determination theory perspective. In H. MS & C. NL (Eds.), *Intrinsic Motivation and Self-determination in Exercise and Sport*. Human Kinetics.
- McDavid, L., Cox, A. E., & Amorose, A. J. (2012). The relative roles of physical education teachers and parents in adolescents' leisure-time physical activity motivation and behavior. *Psychology of Sport and Exercise*, 13(2), 99-107. <https://doi.org/10.1016/j.psychsport.2011.10.003>
- Molanorouzi, K., Khoo, S., & Morris, T. (2014). Validating the physical activity and leisure motivation scale (PALMS). *BMC Public Health*, 14(1), 909. <https://doi.org/10.1186/1471-2458-14-909>
- Morris, T., & Rogers, H. (2004). Measuring motives for physical activity. Sport and Chance of Life: Proceedings of 2004 International Sport Science Congress, 242-250.
- Ntoumanis, N. (2001). A self-determination approach to the understanding of motivation in physical education. *British Journal of Educational Psychology*, 71(2), 225-242. <https://doi.org/10.1348/000709901158497>
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory* New York, NY: McGraw-Hill.
- Pääkkönen, H. (2002). Mihin koululaisten aika kuluu. *Hyvinvointikatsaus*, 4, 2-9.
- Papadakis, S., Gözümlü, A. İ. C., Kalogiannakis, M., & Kandir, A. (2022). A comparison of Turkish and Greek parental mediation strategies for digital games for children during the COVID-19 pandemic. In *STEM, Robotics, Mobile Apps in Early Childhood and Primary Education: Technology to Promote Teaching and Learning* (pp. 555-588). Springer.
- Pelletier, L. G., Tuson, K. M., Fortier, M. S., Vallerand, R. J., Briere, N. M., & Blais, M. R. (1995). Toward a new measure of intrinsic motivation, extrinsic motivation, and amotivation in sports: The Sport Motivation Scale (SMS). *Journal of Sport and Exercise Psychology*, 17(1), 35-53. <https://doi.org/10.1123/jsep.17.1.35>
- Raykov, T. (1998). Coefficient alpha and composite reliability with interrelated nonhomogeneous items. *Applied Psychological Measurement*, 22(4), 375-385. <https://doi.org/10.1177/014662169802200407>
- Rogers, H., & Morris, T. (2003). An overview of the development and validation of the Recreational Exercise Motivation Measure (REMM). In *New approaches to exercise and sport psychology: Theories, methods and applications*. XIth European Congress of Sport Psychology (22-27 July), Book of Abstracts. Copenhagen (Vol. 144).
- Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(2), 1-36. <https://doi.org/10.18637/jss.v048.i02>
- Roychowdhury, D. (2018). A comprehensive measure of participation motivation: Examining and validating the Physical Activity and Leisure Motivation Scale (PALMS). *Journal of Human Sport and Exercise*, 13(1), 1-17. <https://doi.org/10.14198/jhse.2018.131.20>
- Ryan, J. A.-M. (2000). Predicting positive youth development outcomes using the social development model. University of Washington.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Ryan, R. M., Williams, G. C., Patrick, H., & Deci, E. L. (2009). Self-determination theory and physical activity: The dynamics of motivation in development and wellness. *Hellenic Journal of Psychology*, 6(2), 107-124.
- Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, 8(2), 23-74.
- Schmidt, S. C., Anedda, B., Burchartz, A., Eichsteller, A., Kolb, S., Nigg, C., Niessner, C., Oriwol, D., Worth, A., & Woll, A. (2020). Physical activity and screen time of children and adolescents before and during the COVID-19 lockdown in Germany: A natural experiment. *Scientific Reports*, 10(1), 21780. <https://doi.org/10.1038/s41598-020-78438-4>
- Şimşek, Ö. F. (2020). Yapısal eşitlik modellemesine giriş: Temel ilkeler ve LISREL uygulamaları.
- Standage, M., Duda, J. L., & Ntoumanis, N. (2005). A test of self-determination theory in school physical education. *British Journal of Educational Psychology*, 75(3), 411-433. <https://doi.org/10.1348/000709904X22359>
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics*. Pearson Boston, MA.
- Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 9(1), 1-30.
- Tekkurşun Demir, G., & Cicioğlu, H. İ. (2022). Developing the motivation for participation in physical education lesson scale (MFPELS): Validity and reliability study. *Balikesir Health Sciences Journal*, 12(1), 134-141. <https://doi.org/10.53424/balikesirsbd.1078077>
- Telama, R., Yang, X., Viikari, J., Välimäki, I., Wanne, O., & Raitakari, O. (2005). Physical activity from childhood to adulthood. *American Journal of Preventive Medicine*, 28(3), 267-273. <https://doi.org/10.1016/j.amepre.2004.12.003>
- Terwee, C. B., Bot, S. D. M., de Boer, M. R., van der Windt, D. A. W. M., Knol, D. L., Dekker, J., Bouter, L. M., & de Vet, H. C. W. (2007). Quality criteria were proposed for measurement properties of health status questionnaires. *Journal of Clinical Epidemiology*, 60(1), 34-42. <https://doi.org/10.1016/j.jclinepi.2006.03.012>
- U.S. Bureau of Labor Statistics. (2007). American time use survey summary. [https://doi.org/https://www.bls.gov/news.release/archives/atus\\_06252008.pdf](https://doi.org/https://www.bls.gov/news.release/archives/atus_06252008.pdf)
- Üstün, Ü. D. (2016). Investigating the motivational factors that motivate adolescents to recreation activities in the extent of serious leisure perspective [Doctoral thesis] Dumlupınar University, Turkey.
- Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In *Experimental Social Psychology* (pp. 271-360).

[https://doi.org/10.1016/S0065-2601\(08\)60019-2](https://doi.org/10.1016/S0065-2601(08)60019-2)

- Vallerand, R. J. (2007). Intrinsic and extrinsic motivation in sport and physical activity: A review and a look at the future. *Handbook of Sport Psychology*, 59-83.
- Wang, L. (2017). Using the self-determination theory to understand Chinese adolescent leisure-time physical activity. *European Journal of Sport Science*, 17(4), 453-461. <https://doi.org/10.1080/17461391.2016.1276968>
- Wheaton, B., Muthen, B., Alwin, D. F., & Summers, G. F. (1977). Assessing reliability and stability in panel models. *Sociological Methodology*, 8(1), 84-136.
- World Health Organization. (2022). Physical activity. World Health Organization. <https://www.who.int/news-room/fact-sheets/detail/physical-activity>