

Determining Validity and Reliability of Athletic Identity Measurement Scale (AIMS-Plus) among Iranian Sample

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Abstract

The present paper aims at considering the AIMS' validity and reliability among Iranian sample. In this regard, English and Farsi scripts conformity and Cieslak's (2004) AIMS-Plus context were assessed through translation and back-translation in a pilot study. At the second phase, statistical sample comprising 384 physical education course students (184 male and 200 female) was applied to verify internal stability and construction validity of the scale through exploratory and confirmatory factor analysis. The original AIMS-Plus version revealed lack of proper construction validity and necessity of deleting some items. That is why the scale was revised and the second factor analysis showed more proper construction validity relative to the original version; moreover it extracted a three-factor construction. Also the results revealed that revision of the scale's validity and internal stability (Cronbach's $\alpha=0.88$) are at acceptable level. According to the research findings the new revised version of AIMS with 17 items has more appropriate psychometrical characteristics for measuring athletic identity among Iranian sample population.

Keywords: Athletic Identity, Validity, Reliability, Iranian Students

1. Introduction

Human has attempted to recognize identity. This attempt has a long history which involved human mind. In fact, concentrating on identity means to answer the question of "who am I?" (Woodward, 2000). Responsible parents, a bosom friend, a member of religious center, an efficient student, a kind wife, a loyal husband and a successful athlete are among possible selves or individual identities which may be developed or denied during one's life. These possible selves are some items of hopes, fears, aims and threats (Markus & Nurius, 1986), recognition of which provides the required background for interpreting and measuring the present self (Shajie, Sohrabi, & Fooladian, 2010).

One who recognizes his or her identity with being an athlete defines the athletic identity as a strength or power with an effective role in individual's daily decisions. It also plays the role of exclusivity, or it may be defined as one's special attention to sport relative to other activities in his or her life. This identity affects other aspects of people's sport participation; and even provides reasons for lack of participation in other activities including education and social interactions. That is why, athletic identity has been referred as "Achilles' Heel" for athletes (B. W. Brewer, Van Raalte, & Linder, 1993) and some have attempted to develop a precise and standard instrument for its measurement. Such an instrument may facilitate athletic

identity measurement and provide the practitioners with valuable information about the efficient role of athletic identity in realization of the athletes' goals (Li, 2006).

Brewer et al. (1993) achieved an instrument to determine strength and exclusivity through athletic role; this was called Athletic Identity Measurement Scale (AIMS). At first, AIMS comprised 10 choices including social, cognitive and affectivity of the athletic identity components. Participants in sport activities assessed each choice to determine their understanding of daily experiences using a seven-value scale. Brewer et al. (1993) reported the instrument's internal stability as 0.93 and its test-retest validity 0.89 (Shajie, et al., 2010). The then problem was the situation of the AIMS validity and the way of comparing the athletic identity, self-esteem and physical self-perception. Therefore, Brewer et al. (1993) considered correlation of AIMS and Rosenberg's self-esteem scale (Rosenberg, 1965) and all five sub-scales of physical perception-self profile (Kenneth. R. Fox & Corbin, 1989) and found a significant correlation. Moreover, they found that just one sub-scale among the four perceived importance profile scales has a significant correlation with AIMS. Accordingly, the researchers concluded that athletic identity differs to self-esteem, perceived importance of self and physical self-perception (K. R. Fox, 2002; Kenneth. R. Fox & Corbin, 1989; Rosenberg, 1965). Then Brewer et al. (1993) provided the three-factor model of athletic identity comprising social, exclusivity and negative affectivity. Based on their model, social identity shows a situation in which individual tries to recognition the society through sport; exclusivity represents the situation in which individual's value is revealed just in his or her athletic activities and lastly the negative affectivity presents the individual's negative effects experienced out of unwelcome and possible consequences of his or her athletic participation (B. Brewer & Cornelius, 2001).

Martin et al. (1997) studied AIMS in disabled athletes and provided a four-factor model with nine choices (Martin, Eklund, & Adams-Mushett, 1997). Martin et al. (1994, 1997) also discovered another factor i.e. self-identity which was controller of cognitive constructs related to self (Martin, Adams-Mushett, & Eklund, 1994; Martin, et al., 1997). Researchers pointed that appearance of self-identity probably depends on the under study sample's characteristic. Such identical experiences in various statistical populations could affect AIMS construction and lead to separation of social identity and self-identity (Martin, et al., 1994). Accordingly, researchers began to study the structure of AIMS components and compare all previous models through confirmatory analysis. Hale et al. (1999) conducted a cross-cultural research among 1160 subjects from UK, USA and Russia and compared psychometric characteristics of the main single-dimensional model (B. Brewer, Boin, Petitpas, Van Raalte, & Mahar, 1993), three-factor model (B. W. Brewer, et al., 1993) and the four-factor model presented by Martin et al. (Martin, et al., 1994; Martin, et al., 1997). They found out that the three-factor model is superior over other models. However, a three-factor amended model which permits two choices enter inside the two components increases the conformity level considerably. Moreover, this model has been more appropriate for those subjects selected exclusively from UK and USA; they did not offer any reason but difficulties in translating the question into Russian and that is why the Russian version was not efficient enough (Hale, James, & Stambulova, 1999).

Brewer and Cornelius (2001) attempted in a Ten-year study to consider appropriateness of various AIMS in developing norms among men, women, athletes and non-athletes (B. Brewer & Cornelius, 2001). They suggested a new seven-choice model with internal stability of 0.81 containing primary components (social identity, exclusivity and negative affectivity). Alfermann (2004) developed the AIMS' Five-choice version. It was translated in German, Lithuanian and Russian, although their research was psychometric-centred and no copy was published, they did not mention its psychometric characteristics and its selection reasons (Alfermann, Stambulova, & Zemaityte, 2004). Cieslak (2004) developed the advanced AIMS-Plus model using previous models. It contained five sub-scales (social identity, exclusivity, self-identity, negative affectivity and positive affectivity) and 22 items. He chose athlete students population to assess his instrument designing and reported its validity with Cronbach's alpha 0.96. The two added components to this scale are self-identity and positive affectivity; the earlier relates to self and the latter proves that the individual's positive feelings affect the favourite results of the athletic participation. This instrument has been applied in the present paper; because it is a comprehensive one and covers different aspects of Athletic Identity (Cieslak, 2004).

Meijen (2005) attempted to consider a seven-choice version of AIMS for Netherland athlete population and its psychometric characteristics (Meijen, 2005). He justified some scale's items based on the factor analysis findings and observed that the revised version is in more appropriate situation relative to the original version from the viewpoint of the structure validity. Moreover, its reliability and Cronbach's alpha were reported by him as 0.89. Li (2006) in his research tried to assess the validity of uni-dimensional (10-items) and multi-dimensional (9 and 7-item) of AIMS among the Hong Kong athlete population and made its Chinese's version (Li, 2006). The findings of his multi-dimensional scale (3-factor) have better conformity and structural reliability to those of uni-dimensional one. Meanwhile, the scales' internal stability has been reported in 0.81 to 0.86 ranges. he reminded the possibility of Hong Kong society's cultural affectivity on formation of self-identities such as athletic identity (Li, 2006).

Among the resent attempts to measure athletic identity we may name Visek et al. (2008) research (Visek, Hurst, Maxwell, & Watson, 2008). They considered psychometric characteristics of the English version of seven choice and three factor AIMS, among English language Hong Kong and American athletes for whom 0.76 and 0.88 Cronbach's alpha were reported, respectively. Using confirmatory factor analysis, they observed that in American athletes group, one choice has less factorial bar than the other six choices. Finally they rejected cultural effect on factorial structure and stated that the scale text translation way changes the cultural load of some scale's word (Visek, et al., 2008).

The purpose of the present research is to assess validity and reliability of the 22-items AIMS and to determine this instrument's psychometric characteristics, so that if the result is appropriate, the normalized scale usage in Iran will be facilitated.

2. Methodology

2.1. Method and Instruments

This research is an analytical-descriptive study. Cieslak's 22-items AIMS was applied to assess effective components on formation of athletic identity, since it contains five subscales of social identity (five items), exclusivity (five items), self-identity (4 items), negative affectivity (four items), and positive affectivity (four items). Moreover, ten-value scale (from 0 = perfectly disagree to 10 =perfectly agree) was used to make it quantitative.

2.2. Translation and conformity for Iranian Society

AIMS was firstly translated from English and offered separately to three experts of physical education, management and psychology. Experts' under-consideration viewpoints were changed into a unique form after challenges were overcome. 30 students' athletes of the Ferdowsi University-Mashhad participated in pilot study. The aim of this study was to consider this point that if the athletes receive sentences related to various scale's items proportionate to the test goals? And is there a unique perception for any item among the participants? At the same time the translated text was given an English language expert and asked to back translate the text, aiming at to ensure the correctness of the scale's translation and it was compared to the original version. The challenges and pilot study's results were considered and amended. The second pilot study conducted on 70 athlete students to assure the correctness of the scale's translation more. According to the findings of the second study, some changes were conducted on scale's items.

2.3. Statistical population and sample

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2.4. Statistical Methods

At the present research, exploratory factorial method was used to determine the principal components; and Cronbach alpha method was applied for specifying the internal stability. Also, confirmatory factorial analysis method was used to explain structural functions. Dependence and independence t test and Pearson correlation were utilized to measure the scale's structure reliability. Analyses were conducted using Spss-15, Statistica version 4 and Lisrel version 8.52 at significance level of $P > 0.05$.

3. Results

3.1 Scale Reliability

Completing scale by subjects, the resulted data were analyzed in factorial way using the principal components. This is among the exploratory methods and aims at determining the present factorial structure. The primary results of this analysis show that KMO ratio for the under-analysis correlation matrix equals 0.87 which is an index for sufficiency of scale's context sampling. Bartlett's test coefficient is used as indicator of the data correlation matrix's significance level, in order to test zero assumption, which is 1688.1 for this study ($P < 0.001$). Assuring the sufficiency of the context sampling and the data matrix significance, five components were selected and rotated in an oblique way. The aim of this rotation was to augment the matrix interpretativeness and to determine data structural matrix. It must be noted that the special value of these five factors evaluates just 53.77 percent of the scale variance.

Each question's factorial load was compared in three extracted factors, using factorial load matrix. The results revealed that all questions' factorial loads are at acceptable level and not higher than 0.50. Therefore, as you see in table 1, there are some divergences between factorial loads and those specified in sub-scales. So, the items with factorial load of below 0.50 which were not subordinate to the given components were deleted. Table 2 shows the analysis and rotation of the main components varimax results after deletion of items possessing weak factorial load. Items deletion factorial reanalysis show the related change range from 0.499 to 0.778; i.e. 22-item and 5-factor scale must be replaced by a 17-item and 3-factor scale. Statistical values of all required presumptions for factorial re-analysis have been met and they are even higher than the predetermined level; so that sample volume sufficiency test and the coefficient of Bartlett test were calculated as 0.876 and 1418.9 ($P > 0.001$), respectively. Then, total variance of the scale equals 50.84 percent and 9 questions out of 17 relate to the first factor, 5 questions to the second factor and 3 questions to the third factor.

Table 1. Results of the principal components analysis with varimax rotation according to each scale items' factorial load

Items	Components				
	1	2	3	4	5
1	0.579	-0.191	-0.066	0.381	0.143
2	0.647	-0.281	-0.040	0.186	-0.110
3	0.377	-0.100	0.004	0.357	0.622
4	0.710	-0.062	-0.170	-0.015	0.013
5	0.569	-0.115	0.083	0.152	-0.052
6	0.347	0.457	0.384	0.086	0.041
7	0.579	-0.191	-0.066	0.381	0.143
8	0.129	-0.012	0.097	0.076	-0.053
9	0.528	0.576	0.119	0.009	-0.119
10	0.610	-0.041	0.380	-0.242	0.289
11	0.473	0.086	0.210	-0.463	0.267
12	0.174	0.142	0.282	0.658	-0.308
13	0.473	0.199	-0.452	0.094	0.303
14	0.665	-0.122	0.137	-0.106	0.074
15	0.698	-0.216	-0.154	-0.114	-0.177
16	0.639	-0.258	-0.111	0.084	0.070
17	0.539	0.607	-0.002	0.002	0.079
18	0.369	0.448	-0.562	-0.028	0.006
19	0.617	-0.149	-0.111	-0.160	-0.379
20	0.733	-0.144	-0.083	-0.149	-0.310
21	0.512	-0.108	0.387	-0.084	-0.074
22	0.528	0.576	0.119	0.009	-0.119

Figure 1 is a linear diagram for the special value of scale's components; the minimum required value for each sub-scale to remain in scale structure is one. As you see, all three sub-scales calculated minimum values as 5.768, 1.751 and 1.178 for the first, second and third subscales, respectively. Therefore, the scale has three separate and independent sub-scales and acceptable structure validity.

The findings show that 9 items (1, 2, 4, 5, 15, 16, 17, 20 and 21) out of 17 items of the revised scale are related to the first component which is called self-identity. Five items (7, 9, 10, 12 and 22) are on the second component named affectivity and lastly, three items (14, 18 and 19) are on the third component i.e. social identity. Scales existed in literature and experts' opinions were regarded in naming process. Table 3, shows the recognized structural components and fig. 2 is a diagram for structure components separately.

Table 2. Results of analysis and varimax rotation of the scale's principal components after deletion of items with weak factorial load

Items			
	1	2	3
1	0.603	0.070	0.134
2	0.707	0.108	0.062
3	0.645	0.179	0.123
4	0.528	0.236	0.292
5	-0.040	0.630	0.223
6	0.111	0.555	0.525
7	0.406	0.644	-0.081
8	0.249	0.547	0.043
9	0.329	0.013	0.574
10	0.570	0.399	0.042
11	0.723	0.129	0.160
12	0.686	0.093	0.099
13	0.110	0.502	0.622
14	0.155	-0.037	0.778
15	0.625	0.141	0.153
16	0.709	0.224	0.179
17	0.398	0.499	-0.143

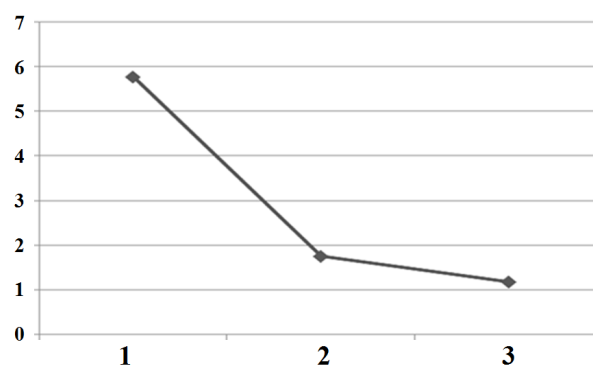


Figure 1. : Linear diagram for AIMS special values

Table 3. Results of the scale's principal components analysis presumptions confirmation after deleting the extra items

	Item number	Factorial load
Self-identity	1	0.603
	2	0.707
	4	0.654
	5	0.528
	15	0.570
	16	0.723
	17	0.686
	20	0.625
	21	0.709
	affectivity	7
9		0.555
10		0.644
12		0.547
22		0.499
Social identity	14	0.574
	18	0.622
	19	0.778

The results of the parameter estimation and t score related to correlation among variables and components in the revised questionnaire show a significant relation between all components and items ranging 0.477 to 0.734. Therefore, based on the structural equations' pattern, all the given variables are able to predict their components. In a precise study on parameter estimation values for each item, we recognized item 16 in self-identity ($t=28.349$, $P=0.001$), item 10 in affectivity ($t=15.578$, $P=0.001$) and item 19 in social identity ($t=11.273$, $P=0.001$) as the most important predictor variables in the related components. Table 4 shows values of parameter estimation, their t scores and the revised components.

Table 4. Results of the parameter estimation and t score for the correlation between variables and components of the revised scale

Component<-Item	Parameter Estimation	SD	t-test	P-value
1<-1	0.533	0.037	14.388	0.0001
1<-2	0.654	0.031	21.316	0.0001
1<-4	0.692	0.028	24.345	0.0001
1<-5	0.528	0.037	14.151	0.0001
1<-15	0.585	0.034	16.981	0.0001
1<-16	0.734	0.026	28.349	0.0001
1<-17	0.631	0.032	19.756	0.0001
1<-20	0.619	0.033	18.938	0.0001
1<-21	0.751	0.025	30.225	0.0001
2<-7	0.393	0.051	7.743	0.0001
2<-9	0.477	0.048	9.853	0.0001
2<-10	0.700	0.045	15.578	0.0001
2<-12	0.520	0.047	10.979	0.0001
2<-22	0.503	0.048	10.537	0.0001
3<-14	0.509	0.54	9.363	0.0001
3<-18	0.537	0.055	9.713	0.0001
3<-19	0.707	0.063	11.273	0.0001

Table 5 shows a brief values related to the main indices of the revised scale of fit structural pattern. As you see, the result of X2 test is significant ($X^2=2451.146$, $P=0.0001$) and the achieved values in all indices are at high and acceptable level; so that, the values in index of GFI and the AGFI were achieved 0.846 and 0.802, respectively which are evaluated as being at high and favourite level. Regarding the achieved results, the revised scale's factorial structure validity is confirmed.

Table 5. Values for confirmatory factorial pattern in index of fit based on the revised scale

Observed value	Indices of fit
2451.146	X^2
0.0001	P
0.846	GFI
0.802	AGFI
0.695	NFI
0.690	NNFI
0.608	James, Mulaik, and Brett Fit Index
0.731	Bollen's delta

Another method of determining structural reliability for each test is to verify the satisfactory correlation among sub-scales and the total test (Anastasi, 1982). The same is true for the current research the result has been summarized in table 6. As you see, all sub-scales have acceptable and positive correlation with each other and with total correlation test.

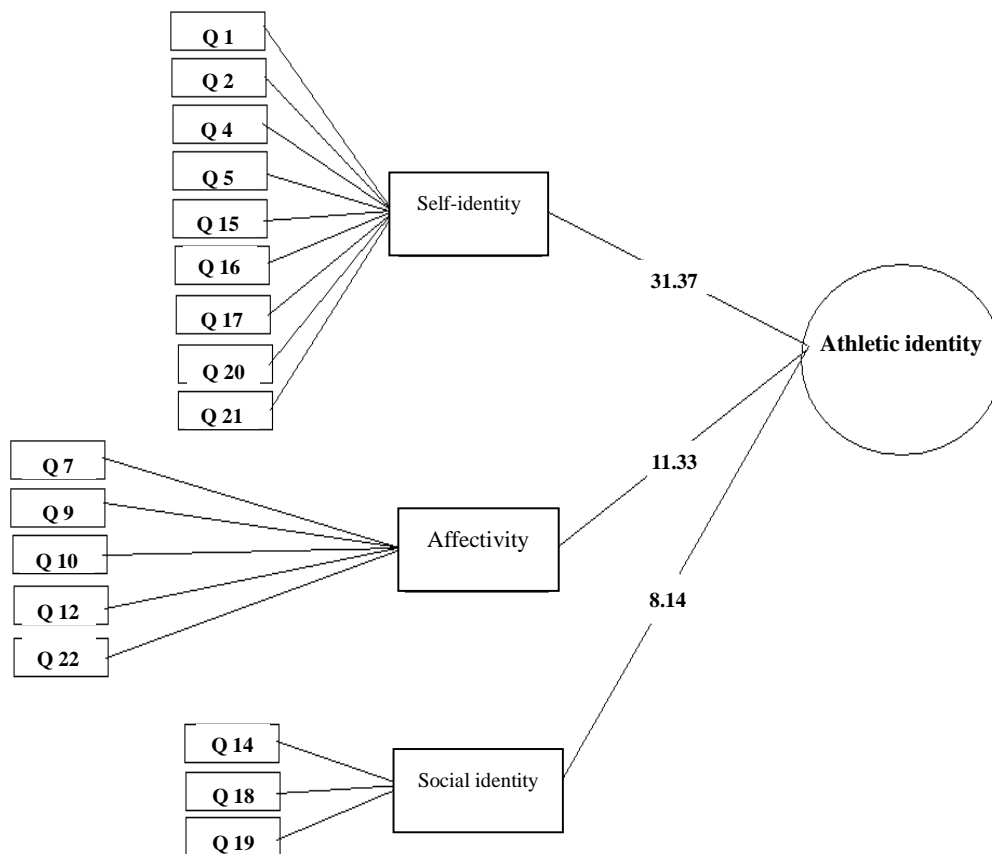


Figure 2. Structural diagram of athletic identity components in revised scale for the items separately

Table 6. Internal correlation coefficients of the subscales with each other and with total revised scale of athletic identity

Sub-scale	Self-identity	affectivity	Social identity	Athletic identity
Self-identity	-	0.566	0.446	0.918
affectivity	0.566	-	0.534	0.852
Social identity	0.446	0.534	-	0.790
Athletic identity	0.918	0.852	0.790	-

Moreover, the subjects' athletic identity averages were compared, regarding the athletes' gender to determine scale's differential reliability. The t-test results for independent groups show that there is no significant relation between male and female subjects' athletic identity. The related values are summarized in table 7.

Table 7. Comparison of the subjects' athletic identity regarding their gender and championship aiming at determining the differential reliability

Variable		Mean	SD	t-test	P-value
Male	200	124.71	25.84	-0.037	0.137
Female	184	124.60	22.60		

3.2 Scale Validity

Determination of the scale validity was conducted in two ways; internal stability and test-retest. To do so, Cronbach alpha, dependent groups' t-test and Pearson correlation were applied. According to the revised scale's Cronbach alpha coefficient, the total internal stability is 0.886; the first, second and third subscales' internal stability are 0.831, 0.782 and 0.704, respectively, based on which the scale's internal stability is assessed as being at acceptable level. Table 8 shows the values related to the revised Cronbach alpha coefficient regarding components, separately.

Table 8. Values related to the revised scale's Cronbach alpha based on components

Sub-scales	Number of items	Alpha
Self-identity	9	0.831
affectivity	5	0.782
Social identity	3	0.704
Total	17	0.886

Table 9, shows values related to determination of the validity of the revised scale's re-measurement for the athletic identity. As you see, the first and second tests results are too close in averages, so that T test provides no meaningful difference between them. Meanwhile, total time reliability (correlation coefficient) of the scale is 0.719 which is assessed as acceptable.

Table 9. Statistics related to dependent groups' t-test for determining the validity of the revised scale's test-retest

Test	Number	Mean	SD	t-test	P-value
Primary	123	121.36	26.12	1.186	0.238
Second	123	123.43	25.36		

4. Discussion and conclusion

The findings of this study revealed that the AIMS-Plus's advanced version is not of proper reliability to be applied in present research population; however, its revised Iranian version (AIMS-IRAN) has acceptable validity and reliability for Iranian samples. It contains three components of social identity, self-identity and affectivity. It also differs to main and multi-variable athletic identity i.e. the three-component scale of Brewer et al. (1993). The social identity item existed in all multi-variable athletic scales has a proper factorial load in the revised scale. The "self-identity" item in the revised scale with the highest scale variance shows the powerful bond of sport and cognitive structures related to self which controls it in Iranian society.

Another important point is disability of the advanced version of AIMS in differentiating self-identity and exclusivity factors. "Exclusivity" factor proves the individual's self importance, regarding his or her athletic performance and puts "self" in center of his or her subjects. Therefore, in the revised scale, factors of self-identity and exclusivity are along each other and considered as one component, based on the subjects' approach. This is in perfect conformity with the findings of Hale et al. (1999) who believed that an amended three-component model increases coordination and conformity; but differs to the findings of Brewer and Cornelius (2001) due to concentrating exclusiveness instead of self-identity. Moreover, the three-component model of this research is in conformity with Li (2006); Brewer and Cornelius (2001); Wisk et al. (2008) and contrary to those of Cieslak (2004), Martin et al. (1997), due to cultural differences and the problems related to the translation which may have changed some items' factorial load.

Disability of the main instrument in differentiating positive and negative being of affectivity is another point, based on the findings. The negative affectivity which has been translated in some researches as being exited was defined by Brewer et al. (1993) for the first time and applied in many researches and studies. However, positive affectivity was added to the advanced model of AIMS-Plus by Cieslak (2004). According to the present research, the importance of athletic identity of affectivity and being in its positive or negative direction is the next priority; so the affectivity in the revised scale is important from two viewpoints: a) it considers both positive and negative results of the athletic participation and; b) it does not determine any specific directing for athletic identity. Generally, the recent findings of some researches including those of Brewer et al. (1993), Brewer and Cornelius (2001) which considered positive and negative aspects of affectivity, separately, are contradictory. Among the reasons of this contradiction, we may name the cultural differences. It is possible that the effect's identity to be more important than it's positive or negative directing for Iranian society. Meanwhile, providing more logical scientific analyses requires more studies.

According to the findings, the values achieved for all main fit indices of the revised scale's structural pattern are assessed as high and acceptable. Therefore, its validity is confirmed. Satisfactory correlation between its sub-scales and total test shows that the scale's contracture reliability is at acceptable level.

Also, the scale's validity is confirmed due to its internal stability and sub-scales; while there is not any significant relation between the athletic identity's mean scores in two tests with 3 to 4 weeks interval. This finding confirms the validity of the revised scale's test-retest. The revised scale of athletic identity's reparative reliability may be evaluated based on the comparison of the subjects' athletic identity scores according to their gender. The results of this comparison reveal no significant difference among the subject's athletic identity according to their gender. The present finding shows the scale's ability to distinguish subjects.

Generally, regarding the importance of the athletic identity in explaining some athletes' behaviors and performances; and considering the efficiency of the scale in research plans, it is suggested that the revised scale's validity and reliability of the AIMS among other statistical populations involved in sport activities to be measured. Since, a scale's reliability does not restrict to the problems considered in this research, the evaluation of the predictive, sensitivity and specificity validities remains for future studies.

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