

Validity and reliability evaluation of the multidimensional Japanese athletic identity measurement scale

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ABSTRACT

Purpose: The purpose of this study was to evaluate the psychometric properties of the 7-item multidimensional Japanese Athletic Identity Measurement Scale (AIMS). **Participants:** In total, 1514 male Japanese students participated in this study. **Measures:** Athletic identity was measured using the Japanese AIMS (Hagiwara & Isogai, 2013). **Analysis:** Scale reliability and validity was confirmed by Cronbach's alpha and confirmatory factor analysis (CFA). The CFA fit estimation utilized the goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). The results indicated an adequate fit for the Japanese athletes relative to Brewer and Cornelius's (2001) three first-order factors (i.e., social identity, exclusivity, negative affectivity) subordinate to one higher-order athletic identity factor: GFI = .98, AGFI = .94, CFI = .99, RMSEA = .05. The internal consistency (Cronbach's alpha) of the items comprising the multidimensional Japanese AIMS was acceptable. This study thus developed a multidimensional Japanese AIMS, which can be used to measure three aspects of a Japanese athlete's identity, thereby potentially providing further insight into his or her identification with the athletic role.

Keywords: Japanese students; Collegiate sports; Identity; Scale development.

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INTRODUCTION

Athletic identity has been defined as “the degree to which an individual identifies with the athletic role” (Brewer, et al., 1993). It has been linked with retirement (Lally, 2007; Lavallee, Gordon & Grove, 1997), career immaturity (Miller & Kerr, 2003), sports performance (Tasiemski, Urmanski, & Wilski, 2013; Hagiwara et al., 2014), intention for sports persistency (Horton & Mack, 2000; Hagiwara & Isogai, 2013a; Hagiwara et al., 2018), and participation level in sports (Lamont-Mills & Christensen, 2006). Thus, athletic identity is an important psychological or emotional aspect to better understand athletes.

Brewer et al. (1993) originally developed an athletic identity measurement scale (AIMS) to assess athletes' identity in Western countries, and several studies conducted a cross-cultural psychometric evaluation of the AIMS compared with other countries (Visek et al., 2008; Proios, 2012; Tunckol, 2015; Silva et al., 2016). In addition, Hagiwara and Isogai (2013) developed the Japanese version of the AIMS to assess Japanese athletes. Therefore, the AIMS is the most frequently used measure of athletic identity worldwide. Previous studies have presented arguments about the number of items and factorial structure of the AIMS (unidimensional versus multidimensional) (Brewer et al., 1993; Hale et al., 1999; Martin et al., 1997; Brewer and Cornelius, 2001; Proios, 2012). Brewer and Cornelius (2001) examined its factorial structure and invariance in a sample that was collected from 10 years of various administrations of the AIMS and found that the abbreviated 7-item AIMS model was a multidimensional measure that comprised three first-order factors (i.e. social identity, exclusivity, and negative affectivity) (Table 1). Visek et al. (2008) and Proios (2012) also supported the multidimensional factorial structure of the 7-item AIMS model, indicating that the 7-item 3-factor model of the AIMS was better expressed by confirmatory factor analysis (CFA). Thus, this model of AIMS is an instrument that can be used to estimate an athlete's athletic identity. However, Brewer and Cornelius (2001) noted that further study would be needed to continue to examine the higher-order factorial structure of the 7-item 3-factor model of AIMS in other cultures. No study has yet investigated the higher-order factorial structure of the 7-item 3-factor AIMS in Japanese culture; therefore, the purpose of this study was to further evaluate the psychometric properties of the 7-item multidimensional AIMS in Japan.

Table 1. The AIMS' first-order factors and items.

First order factors	AIMS items
Social Identity	
AIMS1	I consider myself an athlete
AIMS2	I have many goals related to sport
AIMS3	Most of my friends are athletes
Exclusivity	
AIMS4	Sport is the most important part of my life
AIMS5	I spend more time thinking about sport than anything else
Negative Affectivity	
AIMS6	I feel bad about myself when I do poorly in sport
AIMS7	I would be very depressed if I were injured and could not compete in sport

MATERIAL AND METHODS

Participants

The participants were 1514 male Japanese collegiate students, all of whom currently play competitive sport at the varsity (953) or intramural level (561); their mean age was 19.18 years (SD ± 1.24).

Measures

Athletic identity was measured using the Japanese version of the AIMS (Hagiwara & Isogai, 2013b), based on the original developed by Brewer et al. (1993). This scale is a self-report inventory measuring the importance that individuals place on the athlete's role. Participants conveyed their agreement with statements such as "I consider myself an athlete," and "Sports is the most important part of my life." The scale consists of seven items to which individuals assigned a rating ranging from one (strongly disagree) to seven (strongly agree).

In addition, previous studies indicated that there were significant relationships between athletic identity and sport commitment (Horton and Mack, 2000; Chen et al., 2010; Hagiwara & Isogai, 2013a; Hagiwara et al., 2018). Sport commitment can be defined as a "psychological state representing the desire and resolve to continue participation in a particular athletic program, specific sport or sport in general" (Scanlan et al., 1993). Thus, this study also measured sport commitment to examine the construct validity of the multidimensional Japanese AIMS.

Sport commitment was measured using the Japanese version of the Sport Commitment Scale (Hagiwara and Isogai, 2014) originally developed by Scanlan et al. (1993). This scale was also a self-report inventory measuring an athlete's psychological desire to continue sports participation. It comprised six questions including "How dedicated are you to playing sports?" "What would you be willing to do to keep playing sports?" and "How determined are you to keep playing sports?" A five-point Likert scale was used, the options of which varied depending on the question.

Procedure

Institutional review board approval was granted by the National Institute of Fitness and Sport in Kanoya. The research team informed the participants of the purpose of the study and gave instructions about the survey prior to participation. Data and informed consent were obtained while the participants were attending sports science classes in a classroom. Participation was completely voluntary.

Analysis

Using the aforementioned criteria for evaluating model fit, the unidimensional and multidimensional models were examined in separate stages. In addition, because a previous study (Proios, 2012) investigated both competitive and recreational group fit for the various models, this study also examined model fit for both the varsity and intramural groups.

Models were tested using CFA, which was also used in several previous studies (Proios, 2012, Visek et al., 2008, Brewer and Cornelius, 2001). The fit estimation for CFA utilized the goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). The fit values considered adequate were GFI, AGFI, CFI > .90 and RMSEA < .10 (Oshio, 2008). In addition, t-tests were conducted to compare varsity and intramural levels on each of the factors. Pearson's correlation coefficients were used to examine the relationships among athletic identity and sport commitment in order to confirm the construct validity of multidimensional Japanese AIMS. All data were analysed using IBM SPSS Statistics 22.0 and AMOS 22.0.

RESULTS

The 7-item 1-factor AIMS model was examined using CFA. The model indicated good fit to the data, and three first-order factors (social identity, exclusivity, negative affectivity) subordinate to one higher-order

athletic identity factor model also showed good fit (Table 2). In addition, the results of examining model fit for both the varsity and intramural groups also demonstrated good fit (Table 2).

The results of psychometric data analysis indicated that the 7-item, 3-factorial structure of the AIMS model showed better model fit than did the 1-factor model. The internal consistency (Cronbach's alpha) of the items for the 7-item, 3-factor AIMS model indicated satisfactory internal reliability for the social identity, exclusivity, and negative affectivity subscales (.86, .88, and .77 respectively) (Figure 1).

The result of a t-test revealed that there were significant differences between the varsity and intramural levels in all factors (Table 3). The varsity level indicated higher scores of social identity, exclusivity, and negative affectivity than did the intramural level. Finally, Pearson's correlation coefficients demonstrated that there were significant positive relations among sport commitment and each factor of the AIMS (Table 4).

Table 2. Psychometric data for the AIMS models.

Models	Type of participation	GFI	AGFI	CFI	RMSEA
Unidimensional Model 1 (7-item, 1-factor)	Varsity	.96	.91	.97	.07
	Intramural	.96	.91	.97	.07
	Total	.98	.96	.99	.06
Multidimensional Model 2 (7-item, 3-factor)	Varsity	.98	.94	.98	.06
	Intramural	.98	.94	.98	.06
	Total	.98	.95	.99	.05

Table 3. Descriptive comparisons of main variables by participation level.

Factor	Participation level					t-value
	Varsity (n = 953)(V)		Intramural (n = 561)(I)			
	Mean	SD	Mean	SD		
Social Identity	17.12	3.66	11.65	5.31	21.60	$p < .001$ V > I ***
Exclusivity	10.39	3.11	6.87	3.70	18.92	$p < .001$ V > I ***
Negative Affectivity	10.51	3.09	7.72	3.78	14.79	$p < .001$ V > I ***
AIMS Total	32.92	7.35	22.54	10.30	20.94	$p < .001$ V > I ***

Note: *** $p < .001$.

Table 4. Correlation coefficients between sport commitment and athletic identity.

	Sport Commitment (SC)	Social Identity (SI)	Exclusivity (Ex)	Negative Affectivity (NA)	AIMS Total (AIMS)
SC		.76**	.74**	.63**	.79**
SI	.76**		.82**	.68**	.95**
Ex	.74**	.82**		.72**	.93**
NA	.63**	.68**	.72**		.80**
AIMS	.79**	.95**	.93**	.80**	

Note: ** $p < .01$.

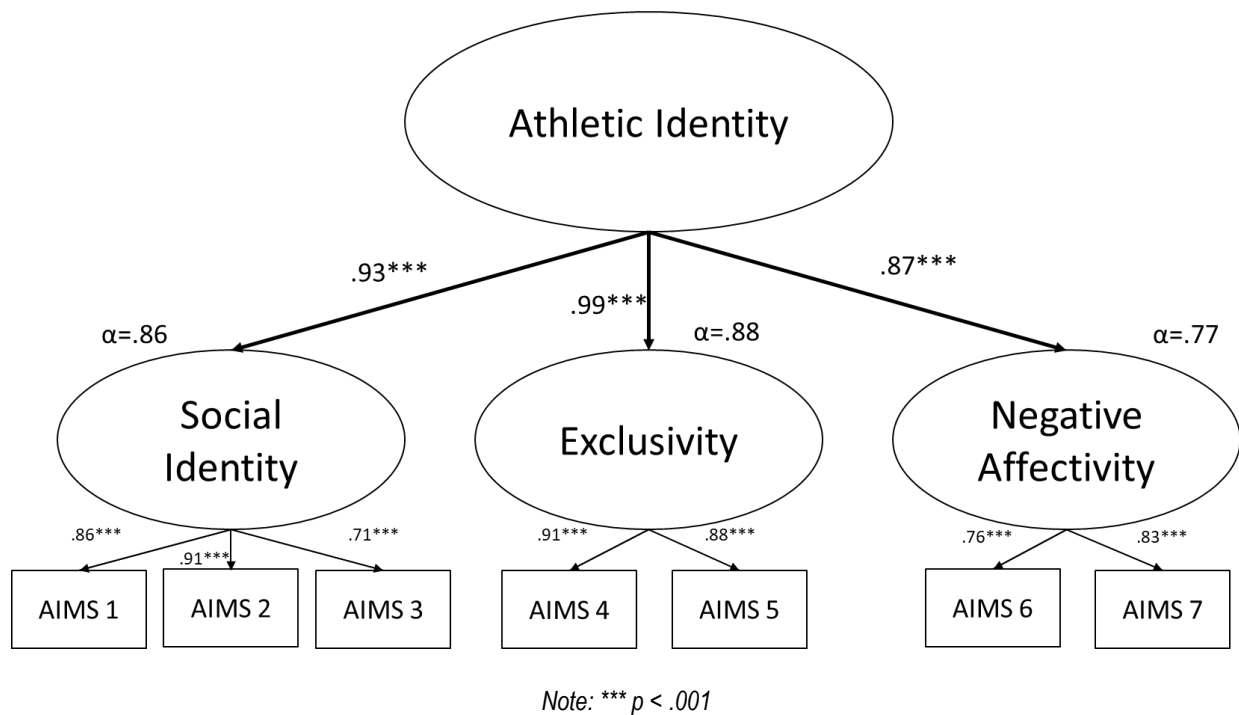


Figure 1. Results of the CFA of the multidimensional Japanese AIMS with all samples.

DISCUSSION

This study examined the factorial structure of the AIMS in a Japanese sample for the 7-item, 3-factor model (social identity, exclusivity, negative affectivity), and found that both unidimensional and multidimensional models of the Japanese AIMS were supported by the data.

First, the results of statistical analysis demonstrated factorial validity and reliability of multidimensional models of the Japanese AIMS. Previous studies indicated that the 7-item, 3-factor AIMS model is the most appropriate instrument to measure athletic identity (Brewer and Cornelius, 2001; Visek et al., 2008; Proios, 2012). Brewer and Cornelius (2001) indicated the psychometric properties of the 7-item, 3-factor AIMS model in the American population. Visek et al. (2008) and Proios (2012) also conducted psychometric evaluations in other cultures (Hong Kong and Greek respectively), and they, too, demonstrated the psychometric properties of the 7-item, 3-factor AIMS model. Therefore, the findings of this study supported those of previous studies and demonstrated the psychological properties of the 7-item, 3-factor AIMS model in Japan. Secondly, the results of a t-test showed that varsity level athletes have higher scores on social identity, exclusivity, and negative affectivity than do intramural level athletes in all factors. Previous studies mentioned that those with higher athletic levels had a higher degree of athletic identity (Houle, Brewer & Kluck, 2010; Horton & Mack, 2000; Hagiwara & Isogai, 2014). Thus, the results of this study correspond to previous findings and might thus indicate the validity of the developed scale. Finally, this study demonstrated significant positive relations among sport commitment and each factor of the multidimensional AIMS. Previous research has suggested significant relationships among athletic identity and sport commitment (Chen et al., 2010; Hagiwara & Isogai, 2013a; Hagiwara et al., 2018). Hagiwara et al. (2018) demonstrated a significant positive relationship between athletic identity and sport commitment in Japanese collegiate athletes. Since the current study also demonstrated a significant positive relationship between sport

commitment and each factor of athletic identity, the construct validity of the multidimensional Japanese AIMS may be confirmed.

In conclusion, the purpose of this study was to further evaluate the psychometric properties of the 7-item multidimensional AIMS in Japan and to demonstrate the factorial validity, reliability, and construct validity of multidimensional models of the Japanese AIMS. The multidimensional Japanese AIMS could be used to not only measure three aspects of a Japanese athlete's identity but also potentially provide further insight into his or her identification with the athletic role.

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