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ADAPTATION AND PSYCHOMETRIC VALIDATION OF THE INDONESIAN VERSION OF THE ATHLETE PSYCHOLOGICAL STRAIN QUESTIONNAIRE

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Adaptacja i walidacja psychometryczna indonezyjskiej wersji Kwestionariusza Obciążeń Psychicznych Sportowców

Streszczenie

Problemy zdrowia psychicznego (MHS) są istotnym zagadnieniem w sporcie wyczynowym, gdyż sportowcy, będąc stale narażeni na wysoki poziom stresu, wykazują zwiększoną podatność na występowanie zaburzeń psychicznych. Kwestionariusz Obciążeń Psychicznych Sportowców (APSQ) jest jednym z rekomendowanych narzędzi do wczesnego wykrywania objawów MHS. Jednakże wcześniejsze analizy psychometryczne APSQ dały niespójne wyniki dotyczące jego struktury czynnikowej, wskazując na możliwość zastosowania trzech różnych modeli: jednoczynnikowego, trójczynnikowego oraz hierarchicznego (drugiego rzędu). Celem niniejszego badania była ocena wła-

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ściwości psychometrycznych indonezyjskiej adaptacji APSQ (APSQid) poprzez porównanie powyższych trzech modeli. W badaniu uczestniczyło 375 sportowców z Indonezji (241 mężczyzn oraz 134 kobiety; średni wiek = 19,22 ±5,13 lat). Przeprowadzona analiza czynnikowa wykazała, że model hierarchiczny oraz trójczynnikowy (CFI = 0,950; TLI = 0,929; GFI = 0,959; SRMR = 0,044; RMSEA = 0,062) charakteryzowały się lepszym dopasowaniem niż model jednoczynnikowy. Wszystkie pozycje APSQid uzyskały akceptowalne wartości ładunków czynnikowych (λ = 0,53–0,72). Wskaźniki zgodności wewnętrznej były satysfakcjonujące dla czynnika samoregulacji (ω = 0,729; α = 0,728) oraz czynnika osiągnięć sportowych (ω = 0,713; α = 0,713), natomiast niższe dla czynnika zewnętrznego radzenia sobie (ω = 0,531; α = 0,559). Ogólna rzetelność APSQid była bardzo dobra (ω = 0,819; α = 0,822). Uzyskane wyniki wskazują, że APSQid jest narzędziem trafnym oraz rzetelnym, odpowiednim do diagnozowania objawów związanych ze zdrowiem psychicznym u indonezyjskich sportowców.

Słowa kluczowe: APSQ; zdrowie psychiczne; adaptacja; walidacja; indonezyjski sportowiec.

Abstract

Mental health symptoms (MHS) are a significant concern in competitive sports, as athletes frequently experience high levels of stress, making them susceptible to mental health disorders. The Athlete Psychological Strain Questionnaire (APSQ) is among the recommended tools for early detection of MHS; however, previous psychometric analyses have yielded inconsistent structural models, including a unidimensional model, a three-factor model, and a second-order model. This study aimed to evaluate the psychometric properties of the Indonesian adaptation of the APSQ (APSQid) by comparing these three models. A sample of 375 Indonesian athletes (241 males, 134 females; mean age = 19.22 ± 5.13 years) participated in the study. Confirmatory factor analysis indicated that the second-order and three-factor models (CFI = 0.950, TLI = 0.929, GFI = 0.959, SRMR = 0.044, RMSEA = 0.062) provided better fit indices compared to the unidimensional model. All the APSQid items exhibited acceptable factor loadings (λ = 0.53–0.72). Internal consistency reliability was satisfactory for the self-regulation factor (ω = 0.729, α = 0.728) and performance factor (ω = 0.713, α = 0.713), but lower for the external coping factor (ω = 0.531, α = 0.559). Overall reliability of the APSQid was excellent (ω = 0.819; α = 0.822). The findings indicate that the APSQid is a valid and reliable instrument for detecting mental health symptoms among Indonesian athletes.

Keywords: APSQ; mental health; adaptation; validation; Indonesian athlete.

Introduction

Mountjoy et al. (2023) and Reardon et al. (2019) define mental health symptoms (MHS) as adverse thoughts, feelings, behaviors, and/or psychosomatic symptoms that are likely to cause subjective distress or functional impairment in daily life, work, and/or sports contexts. In the context of sports, this has become a serious issue and received much attention in the last decade. Elite athletes in the IOC International Athletes' Forum associate the term mental health symptom with “depression” (55%), “stress” (33%), and “anxiety” or “pressure” (20%) (Gouttebarge et al., 2021). The meta-analysis study also found the same thing in athletes who were still active, mental health disorders occurred in 19% related to alcohol, 34% anxiety or depression, whereas in former athletes, psychological disorders are related to distress (16%) and anxiety or depression (26%) (Gouttebarge et al., 2019). This indi-

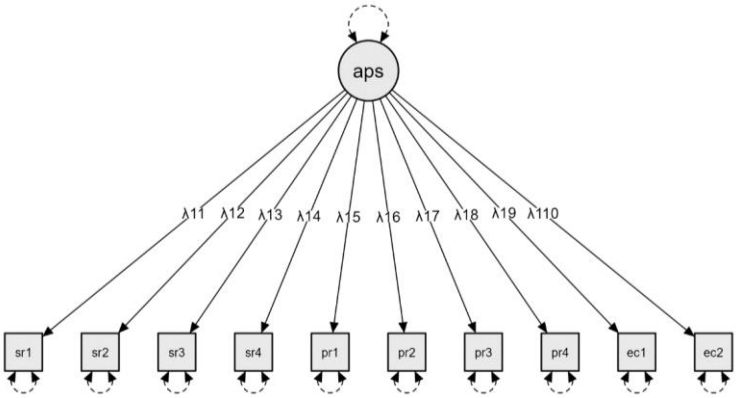
cates that issues related to mental health are very serious in the world of sports because the sports environment has high pressure making it prone to mental health disorders (Reardon et al., 2019; Schinke et al., 2018).

In initiating the consensus statement on athletes' mental health, the International Olympic Committee (IOC) stated at least eleven specific mental health disorders found in athletes based on research evidence, namely, sleep disorders, depression, suicidal tendencies, anxiety, trauma, eating disorders, hyperactivity, bipolar and psychotic disorders, concussions, drug abuse and addiction, gambling, and other behavioral addictions (Reardon et al., 2019). In the world of sports, this indicates that issues related to mental health are very serious. The seriousness of this issue requires evaluation, prevention and appropriate treatment in handling it, especially in developing instruments that can detect mental health disorders in the athlete population (Chang et al., 2020).

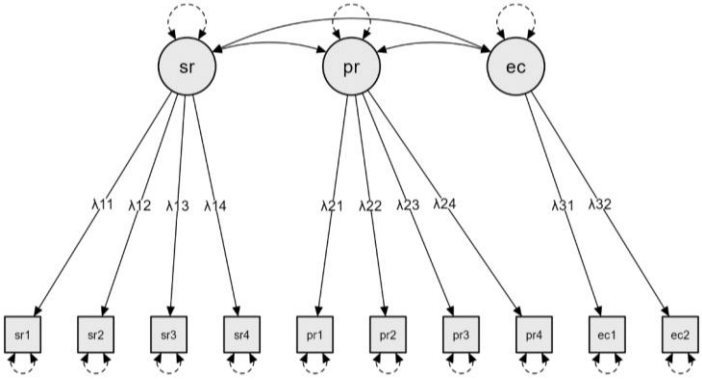
Several instruments that measure MHS have been developed by experts. For example, Kessler et al., (2002) created an instrument to measure psychological distress (K10, K6), and Kroenke, Spitzer, & Williams (2001) created an instrument to measure depression (PHQ-9). However, these two measuring tools are general in nature and were not tested in a sports context. That is why Rice and colleagues (2019) are trying to develop and validate an instrument related to psychological strain and specific to the sports context, namely the Athlete Psychological Strain Questionnaire (APSQ). By the International Olympic Committee (IOC), the APSQ is recommended as an instrument that can be used to detect early mental health problems in athletes (Gouttebarge et al., 2021).

Even though the APSQ is recommended by the IOC as an instrument for early detection of MHS, the use of the APSQ in different cultural and linguistic contexts must be free from cultural bias and adapt to the conditions of the culture in which the athlete lives. This is because the culture in which athletes live affects how important the meaning of involvement in sports is, so evaluation, management, and intervention for MHS must also adapt to the culture from which athletes identify themselves (Rahayuni, 2018; Schinke et al., 2018). One of the implications of this is the use of systematic psychometric procedural rules in measuring instruments translated from other cultures (Schinke et al., 2018). Thus, measuring tools such as the ASPQ must be adapted and tested psychometrically before being used in a different language and cultural setting.

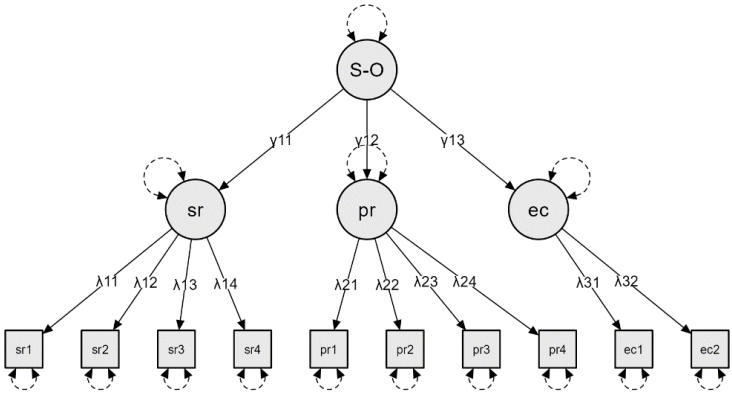
With the above understanding, it is not surprising that the APSQ has been widely adapted and tested in various languages, for example, Arabic (Musa et al., 2023), Japanese (Ojio et al., 2021), Turkish (Lima et al., 2022), Chinese (Tan et al., 2021), and Persian (Azadi et al., 2024). In general, there are three models (Figure 1) that have been scientifically proven regarding APSQ psychometric testing, namely the unidimensional model (Ojio et al., 2021), the first-order three-factor model (Lima et al., 2022; Tan et al., 2021), and second-order models (Rice et al., 2019; Azadi et al., 2024).



a) Unidimensional model



b) Three-factor model



c) Second-order model

Note: aps: athlete psychological strain; sr: self-regulation; pr: performance; ec: external coping.

Figure 1
Three APSQ models

The facts show that the APSQ testing results have not been consistent. Additionally, to the best of our knowledge, no one has attempted to adapt and test the APSQ in the Indonesian context. That is why, this research was carried out with the aim of adapting and testing the APSQ in the Indonesian context based on three models, namely unidimensional, three-factor model, and second-order model.

Material and methods

Participants

This research involved 418 athletes, but after data screening, 43 data units had to be excluded because several items were not responded to and the answer pattern was uniform from items 1 to 10. Thus, this study analyzed 375 respondents' data in further analysis. There were 241 (64.27%) male athletes and 134 (35.73%) female athletes with an average age of 19.22 years with a standard deviation of 5.13. There were 233 (62.13%) athletes involved in individual sports and 142 (37.87%) athletes involved in team sports. In this study, athletes are defined as people who train regularly to improve physical, mental, and technical capacity in individual or team sports and are actively involved in sports competition events for achievement purposes.

Instruments

The instrument adapted and validated was the Athlete Psychological Strain Questionnaire (APSQ) developed by Rice et al. (2019). The APSQ has three subscales, namely self-regulation difficulties (e.g., I was irritable, angry, or aggressive), performance concerns (e.g., I worried about life after sport), and externalized coping (e.g., I needed alcohol or other substances to relax). The three subscales are translated into 10 statements with alternative answers in the form of a Likert scale ranging from *none of the time* to *all of the time* (1 to 5). The confirmatory factor analysis (CFA) test results show that the model fits, namely the values obtained are CFI = 0.976, TLI = 0.966, RMSEA = 0.055, and SRMR = 0.032 (Rice et al., 2019). The original APSQ has a very good factor loading ($\lambda = 0.57 – 0.80$) and convergent validity shows a positive efficiency value with K10 ($p < .001$), while divergent validity with Warwick Edinburgh Mental Well-Being Scale (WEMWBS) shows a significant negative correlation coefficient ($p < 0.001$) (Rice et al., 2019). According to Rice et al. (2020), the total APSQ score ranges from 10 to 50 and is divided into three categories, namely moderate (15-16), high (17-19), and very high (20+).

Apart from the APSQ, we also use the mental toughness index (MTI) to test convergent validity. In contrast to the APSQ, where the statements in each item

use negative diction, all items in the MTI use positive diction or sentences. Gucciardi et al., (2014) developed the MTI to measure athletes' mental toughness and it was adapted and tested in the Indonesian context by Putra et al., (2024). It has seven dimensions, including self-belief (*I believe in my ability to achieve my goals*), attention regulation (*I can regulate my focus when performing tasks*), emotion regulation (*I can use my emotions to perform the way I want to*), success mindset (*I strive for continued success*), context knowledge (*I execute my knowledge of what is required to achieve my goals*), buoyancy (*I consistently overcome adversity*), and optimism (*I can find a positive in most situations*). The seven dimensions in the original version were translated into Indonesian, resulting in an MTIid which consists of eight statements with seven-point scale alternatives ranging from 1 (False, 100% of the time) to 7 (True, 100% of the time). The MTIid has a very good loading factor value (λ = .563 to 0.759). Meanwhile, the internal consistency reliability of MTIid is excellent (CR = 0.864; α = 0.862) (Putra et al., 2024).

Procedure

The procedure of this research has been approved by the Health Research Ethics Committee of the researchers' institution, Cenderawasih University (Indonesia), with number 065/KEPK-FKM UC. All respondents were asked to provide informed consent before participating in this study. Thus, the data collected and analyzed are those that have been approved by the respondents. This research began with the application for permission from the developer of the APSQ instrument. Upon receiving permission to carry out language adaptation and testing in the Indonesian context, the researchers submitted the original APSQ to two English language experts to translate it into Indonesian. The results of this synthesis stage were then submitted to three sports psychology experts, all of whom were doctoral degree holders. They were asked to assess the suitability of each item of the MTIid of the APSQ with the original version. The assessment results from the three experts were then synthesized and submitted to an Indonesian language expert who checked the readability level of the Indonesian version of the APSQ. After that, the MTIid was tried out for its readability level on three athletes at the junior high school level, three athletes at the high school level, and three sports students. The final result of the Indonesian version of the APSQ instrument (APSQid) was submitted to different English language experts from the initial stage to be translated back into the original language. After the APSQid and APSQ back translations were received, they were sent to the APSQ developer to be validated and get input regarding the results of the language adaptation that had been done. Upon receiving input and after the APSQid was declared "OK" by the original developer, the researchers collected data on ath-

letes in Indonesia. The Indonesian version of the APSQ instrument or the APSQid is presented in the *Appendix.*

Statistical analysis

The initial analysis was conducted to check data, including missing data, and normality, whose test refers to the Skewness and Kurtosis values. Furthermore, using the Maximum Likelihood Estimation (MLE) estimator, confirmatory factor analysis (CFA) was calculated. Parameters such as chi-square ($\chi 2$), the comparative fit index (CFI), the Tucker-Lewis index (TLI), goodness fit index (GFI), standardized root mean square residual (SRMR), and root mean squared error of approximation (RMSEA) were used to assess the accuracy of the model tested (APSQid). The cut-off values used to assess model fit include CFI and TLI scores > 0.90, GFI scores ≥ 0.93, SRMR scores ≤ 0.07, and RMSEA scores ≤ 0.08 (Cho et al., 2020; Browne & Cudeck, 1992). The analysis continued to see the factor loadings of each item in the APSQid after the model was fit. The researchers applied the factor-loading criteria recommended by Comrey & Lee (1992) (i.e., > 0.71 = excellent; > 0.63 = very good; > 0.55 = good; > 0.45 = fair; < 0.32 = poor). Furthermore, to assess the internal consistency of the APSQid, the researchers conducted a reliability analysis for which we used McDonald's omega (ω) as well as Cronbach Alpha (α). The accepted reliability value is > 0.70. To test the convergent validity of APSQid with other instruments that measure mental constructs, the Pearson correlation was used. The analysis in this research was carried out with the help of the JASP Program, Version 0.18.1.0.

Results

Preliminary analyses

Initial analysis was carried out for data screening purposes, such as careless responding and data normality. We conducted data checks to ensure that the data analyzed are data that the respondent provided seriously so that the data truly reflect the respondent's condition. The screening results found that two respondents did not answer all the items in the APSQ. In addition, 41 respondents answered items 1 to 10 with the same pattern, for example, all of them answered “often.” The forty-three respondents' data were excluded in subsequent analysis. The results of the data normality analysis showed that a multivariate kurtosis value was 31.60 with a critical ratio (CR) of 19.75. This result indicates that the data are not normally distributed. Consequently, CFA analysis was carried out using bootstrapping (resampled 1000 times) and a confidence interval at the 90% level.

Descriptive statistics

The results of descriptive statistics are presented in Table 1. The respondents in this study consisted of athletes who participated in individual sports (62.13%) and team sports (37.87%). The educational level of the respondents was quite varied, including junior high school (9.07%), high school (22.40%), bachelor's degree (55.20%), master's (1.87%), doctoral (0.53%), while 10.93% did not answer (Table 1).

Table 1
Participant characteristics (*n = 375*)

	Total	Percentage
Gender		
Man	241	64.27%
Woman	134	35.73%
Sport type		
Individual	233	62.13%
Team	142	37.87%
Education		
Junior High School	34	9.07%
Senior High School	84	22.40%
Bachelor	207	55.20%
Masters	7	1.87%
Doctor	2	0.53%
No answer	41	10.93%

Table 2
Descriptive results and participant demographics (*n = 375*)

Indicator	Min	Max	Mean	SD	Skewness	Kurtosis
SR1	1	5	2.08	1.150	0.958	0.106
SR2	1	5	2.44	0.982	0.406	-0.228
SR3	1	5	2.28	1.099	0.5	-0.544
SR4	1	5	2.29	1.060	0.517	-0.446
PM1	1	5	2.74	1.130	0.186	-0.706
PM2	1	5	1.64	0.876	1.372	1.554
PM3	1	5	2.30	1.076	0.411	-0.605
PM4	1	5	2.45	1.269	0.402	-0.932
EC1	1	5	1.26	0.728	25.08	10.134
EC2	1	5	1.81	1.061	8.966	0.406

Note: Min: minimum; Max: maximum; SD: standard deviation; SR: self-regulation; PM: performance; EC: external coping.

Apart from that, this study also found an average score for the dimensions of self-regulation (SR) = 9.09, performance (PM) = 9.13, external coping (EC) = 3.07, and the overall average APSQid score was 21.28 (Table 2). With these results, it appears that the average APSQid score tends to be very high, or, in other words, the research subjects experience very high psychological distress or mental health symptoms.

Confirmatory Factor Analysis

In terms of model suitability (goodness-of-fit) of the APSQid instrument, the analysis result showed that the second-order model and three-factor model are better than the unidimensional model (Table 3). The other parameters show that the model fits the data despite the p-value of < 0.05. In other words, no difference is found between the covariance matrix of the sample data and that of the estimated population. This confirmed the suitability of the model being tested. These results show that the second-order model and three-factor model (CFI = 0.950, TLI = 0.929, GFI = 0.959, SRMR = 0.044, RMSEA = 0.062) are better models than the unidimensional model, so further analysis was carried out on these two models (second-order model and three-factor model).

Table 3
Model fit of three CFA models for the Indonesian-version of the APSQ (*n = 375*)

Model	χ^2	df	p	CFI	TLI	GFI	SRMR	RMSEA [90% CI]
One-factor model	142.928	35	0.000	0.882	0.848	0.924	0.059	0.091 [0.076, 0.107]
Three-factor model	78.005	32	0.000	0.950	0.929	0.959	0.044	0.062 [0.045, 0.080]
Second-order model	78.005	32	0.000	0.950	0.929	0.959	0.044	0.062 [0.045, 0.080]

Note: χ^2: chi-square; df: degree of freedom; CFI: comparative fit index; TLI: Tucker-Lewis index; GFI: goodness fit index; SRMR: standardized root mean square residual; RMSEA: root mean squared error of approximation; CI: confidence interval.

Validity and reliability of the APSQid

Ten items in the APSQid have loading factors above 0.50 ($\lambda \geq 0.50$) and are statistically significant ($p < 0.001$) (Table 4). Slightly different from the results in the second-order model, in the three-factor model, four items are not significant at $p < 0.001$, namely the performance factor. However, these four items are significant at the $p < 0.01$ level. With these results, it can be stated that the 10 items in the APSQid have factor loadings as required, namely ≥ 0.50. Apart from that, a close look shows that the SR2, PM2, and PM3 indicators or items are in the excellent category. Items SR1, SR3, and EC2 are in the very good category. Item EC1 is in the good category, and items SR4, PM4, and PM1 are in the fair category. All items in the APSQid have a loading factor value ≥ 0.50, so this indi-

cates that the 10 items in the APSQid are valid indicators for measuring the latent construct of psychological strain in athletes, which consists of the factors of self-regulation, performance, and external coping.

Table 4
Loading factor value for the APSQid

Factor	Indicator	Estimate	Std. Error	z-value	p	95% CI		Std. Est (all)
						Lower	Upper	
Three-factor model								
SR	SR1	0.736	0.060	12.310	< 0.001	0.619	0.853	0.641
	SR2	0.705	0.050	14.155	< 0.001	0.608	0.803	0.720
	SR3	0.706	0.057	12.364	< 0.001	0.594	0.818	0.643
	SR4	0.573	0.057	10.066	< 0.001	0.461	0.684	0.541
PR	PR1	0.593	0.061	9.787	< 0.001	0.474	0.711	0.525
	PR2	0.624	0.044	14.121	< 0.001	0.537	0.710	0.713
	PR3	0.770	0.054	14.190	< 0.001	0.663	0.876	0.716
	PR4	0.683	0.068	10.089	< 0.001	0.551	0.816	0.539
EC	EC1	0.442	0.045	9.911	< 0.001	0.355	0.530	0.608
	EC2	0.676	0.066	10.246	< 0.001	0.546	0.805	0.638
Second-order model								
SR	SR1	0.426	0.060	7.129	< 0.001	0.309	0.543	0.641
	SR2	0.408	0.055	7.366	< 0.001	0.300	0.517	0.720
	SR3	0.409	0.057	7.139	< 0.001	0.297	0.521	0.643
	SR4	0.332	0.050	6.624	< 0.001	0.233	0.430	0.541
PR	PR1	0.211	0.080	2.627	0.009	0.054	0.369	0.525
	PR2	0.222	0.083	2.663	0.008	0.059	0.386	0.713
	PR3	0.274	0.103	2.663	0.008	0.072	0.476	0.716
	PR4	0.244	0.093	2.632	0.008	0.062	0.425	0.539
EC	EC1	0.280	0.046	6.089	< 0.001	0.190	0.370	0.608
	EC2	0.427	0.071	6.024	< 0.001	0.288	0.566	0.638

Note: SR: self-regulation; PR: performance; EC: external coping; CI: confidence interval.

Apart from that, convergent validity testing found that all dimensions in the APSQid were significantly negatively correlated with MTI ($p \leq 0.01$), that is, they had a range of correlation coefficient values from -0.229 to -0.357 (Table 5). The correlation coefficient between dimensions in the APSQid shows a large correlation coefficient value, namely the r-value ranging from 0.653 to 0.866. All correlation coefficient values are positive and statistically significant ($p \leq 0.01$). These results indicate that the APSQid is reliable in measuring aspects of psychological strain in athletes.

Table 5
Convergent validity and inter-factor correlation of the Indonesian-version of the APSQ

Factor	Factor APSQ			APSQid	MTIid
	SR	PM	EC		
SR	-				
PM	0.544**	-			
EC	0.401**	0.453**	-		
APSQid	0.854**	0.866**	0.653**	-	
MTIid	-0.370**	-0.229**	-0.264**	-0.357**	-

Note: SR: Self-regulation; PM: Performance; EC: External coping; APSQid: Indonesian version of the APSQ; MTIid: Indonesian-version of the MTI; ** $p \leq 0.01$.

After testing the model, factor loading analysis, and convergent validity, the researchers conducted a reliability test. In general, reliability can be expressed as the internal consistency of an instrument which can be measured based on the level of item homogeneity. The overall results of reliability testing using the internal consistency method as measured by two parameters, namely McDonald's omega (ω) and Cronbach's alpha (α) are presented in Table 6. For the self-regulation factor, the values obtained are ω = 0.73, and α = 0.73. For the performance factor, the values obtained are ω = 0.72, and α = 0.70. For external coping factors, ω = 0.72 and α = 0.53 were obtained. Overall, the APSQid reliability value was ω = 0.84 and α = 0.82 (Table 6). With these results, it can be stated that the reliability of the APSQid is excellent.

Table 6
Result of reliability test of the Indonesian-version of the APSQ

Indicator	λ	λ²	δ	ω	α
SR1	0.641	0.411	0.589		
SR2	0.72	0.518	0.482		
SR3	0.643	0.413	0.587	0.729	0.728
SR4	0.541	0.293	0.707		
Total	**2.545**	**1.635**	**2.365**		
PR1	0.525	0.276	0.724		
PR2	0.713	0.508	0.492		
PR3	0.716	0.513	0.487	0.713	0.713
PR4	**0.539**	**0.291**	**0.709**		
Total	2.493	1.587	2.413		
EC1	0.608	0.370	0.630		
EC2	0.638	0.407	0.593	0.531	0.559
Total	**1.246**	**0.777**	**1.223**		
APSQ total				**0.819**	**0.822**

Note: λ: loading factor; δ: error; ω: McDonald's omega; α: Cronbach's alpha; SR: self-regulation; PR: performance; EC: external coping.

Discussion

This research aims to test the APSQ in the Indonesian context. The study results show that the second-order model and the three-factor model appear better than the unidimensional model. All items in the APSQid have a loading factor value ≥ 0.50 so it can be stated that the ten items in the APSQid are valid indicators for measuring the latent construct of psychological strain in athletes in Indonesia. These results are in line with previous research which found that the ten items in the APSQ were valid in measuring latent psychological strain in athletes with different cultural contexts (see, for example, Tan et al. (2021); Azadi, Meshkati, & Rice (2024)). Apart from confirming previous research, this study found that the unidimensional model had a low fit value compared to the other two models tested so that these results were different from the result of the research conducted by Ojio et al., (2021) which found that the APSQ-J was unidimensional. The Indonesian-version of the APSQ (APSQid) is more suitable as the second-order model and the three-factor model and this is in line with the research conducted by Lima et al., (2022) and Rice et al. (2019).

The results of the convergent validity test show that the APSQid is significantly correlated with the MTIid (r = -0.357; p ≤ 0.01). Obtaining a negative correlation coefficient value indicates that there are differences in the statements in the two instruments. Each statement in the APSQ is negative because it is used to measure psychological strain (Rice et al., 2019; Rice et al., 2020), while the statements in the MTI are positive and measure mental toughness (Gucciardi et al., 2014). The MTI in the Indonesian version (MTIid) has been used to test the convergent validity of other mental toughness instruments, such as the PPI-A (Putra et al., 2024), and for research examining the mental dimension (Wandik et al., 2024). This means that the comparison instrument used in this study is reliable in the Indonesian context. With the results obtained, it can be stated that the APSQid is a valid and reliable set of instruments for revealing the mental dimensions of athletes, especially in the context of psychological strain.

The results of the APSQid reliability testing using the internal consistency method show that the self-regulation factor had a value of ω = 0.729, and α = 0.728. For the performance factor, the values obtained were ω = 0.713, and α = 0.713. For the external coping factor, the values obtained were ω = 0.531, and α = 0.559. Overall, McDonald's value was ω =0.819 while Cronbach's value was α = 0.822. The Cronbach's alpha reliability value is greater than the test in Arabic (α = 0.76) (Musa et al., 2023), Chinese (α = 0.81) (Tan et al., 2021), and Persian (α = 0.79) (Azadi et al., 2024). However, compared to testing in the Turkish language version (α = 0.83) (Lima et al., 2022), and Japanese (α = 0.84) (Ojio et al., 2021), the results of our research appear to have slightly lower Cronbach alpha values. However, the reliability of the APSQid is included in excellent internal consistency.

This research fills the gap in the need for MHS assessment of Indonesian athletes as an initial evaluation for preventive measures and curative psychological treatment. In Indonesia, the process of preparing athletes has involved sports psychologists, but the holistic implementation (e.g., education, evaluation, and mental intervention) has not been optimal (Rahayuni, 2018). For this reason, research related to mental health, especially the development of mental training programs, is currently carried out (Sutoro et al., 2023). In other words, research related to mental health will contribute to increasing awareness about the importance of mental health in athletes so that this dimension is not ignored in the training process.

The APSQ has been used to carry out evaluations and research on mental health conditions in elite athletes (Rice et al., 2020), student-athletes (Taylor et al., 2023), and professional football athletes who have to compete throughout the season (Kilic et al., 2021). The APSQ can be used to detect mental health disorders in athletes early and support the performance of sports psychologists and health professionals who work with athletes, so that they can determine appropriate intervention, rehabilitation, and remediation actions for them (Rice et al., 2020). It is expected that the APSQid can also serve the same function, namely as an instrument for early detection of MHS in Indonesian athletes. In addition, in the subject of Indonesian athletes, this study shows that the average score of the subjects is in the very high category (average APSQ score = 21.28 ± 6.46). This finding is different from the findings of the study conducted by Lima et al. (2022) which showed that the average APSQ score for athletes was 19.01 ± 6.89 or in the high category. Thus, through this study there is new information related to the average APSQ score, especially in the sample of athletes in Indonesia and the difference in average scores from athletes from other countries can be caused by sociocultural differences.

For example, someone takes the APSQid test and if the test results show a high score, it can be stated that the respondent is experiencing a psychological disorder. Generally, psychological disorders in athletes include anxiety, trauma, eating disorders, and even depression which can lead to suicidal thoughts (Reardon et al., 2019). In other words, the APSQid test gives us information about the poor mental health condition of the respondent. This information can be the basis for providing interventions such as counseling, relaxation, mental imagery, and other relevant techniques. Apart from that, other examples of the APSQid test results can also be integrated into mental training programs, such as mental toughness training circles (Sutoro et al., 2023). The existence of information related to athletes' mental health condition can be used as initial information before providing mental training interventions.

In addition, although the APSQid score can be used as an indicator to find out how a variable can be a predictor of MHS, we are of the view that the APSQid

should be used carefully following applicable psychological assessment standards as appropriate. The APSQid should not be used as part of athlete recruitment because it will abuse athletes' basic rights to maximize their potential. However, it would be better if the APSQid was used in the middle of a training season or league where athletes have shown symptoms of burnout. Administration of assessment using the APSQ can also be done individually by involving sports psychologists, doctors, and other health workers; especially if the athlete has just gone through a traumatic event such as an injury, defeat, or a fairly tough match. Interpretation of the APSQid should be carried out by a sports psychologist or other sports professional who is competent in the field of sports psychology.

Even though we have tried to test the APSQ rigorously, there are several limitations in this study. First, this study used only the MTI as a convergent validity test. On the other hand, several other similar instruments reveal psychological disorders in athletes (e.g., CSAI-2R, SAS-2, DASS-21, K-10) which can be used as a comparison. Second, this study did not test the EFA on the APSQ as was done by Ojio et al., (2021) and Chen-hao et al. (2021). We consider it important to carry out the EFA test to further understand the psychometric structure of the APSQ, considering that there are three different models produced in the APSQ test. Third, although the sample size is adequate for the CFA (n = 375), the representation of this research sample is dominated by the respondents with a bachelor's degree (55.20%) and there are 10.93% of the respondents who do not report their education level. Fourth, the reliability of the external coping subscale ($\alpha = 0.532$; $\omega = 0.556$) is below the generally accepted threshold of 0.70. This raises concerns about the consistency of this subscale even though the overall reliability of the APSQid is very high ($\alpha = 0.816$; $\omega = 0.842$). Apart from that, multivariate kurtosis also shows a significant value (CR = 19.75) which means it is not normal and can affect the results of statistical analysis and reliability estimates.

Due to these limitations, suggestions for future studies are that researchers should add other instruments such as the CSAI-2R or SAS-2 in addition to other instruments related to mental health, both for convergent validity and divergent validity purposes. Apart from that, the analysis carried out should use the EFA first before carrying out the CFA. In the field of research, the APSQid appears promising as a measuring tool for descriptive studies with large samples, or in other correlational or quantitative research. Therefore, it is necessary in the next study to consider linking the dimensions of physical capacity, religiosity, happiness, and other relevant dimensions so that the study results will be more comprehensive.

Conclusions

The Indonesian version of the Athlete Psychological Strain Questionnaire (APSQid) is a set of instruments that are valid and reliable in detecting mental health problems in Indonesian athletes. In other words, the APSQid is a reliable instrument for revealing psychological strain. That is why, the APSQid can be used by practitioners in Indonesia to detect early mental health in athletes, which can then be used as initial information to provide support and improve mental health for athletes.

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Statement of Ethics

This study was conducted in accordance with the World Medical Association Declaration of Helsinki. The study protocol was reviewed and approved by the Health Research Ethics Committee of our institution, Cenderawasih University, Indonesia (No. 065/KEPK-FKM UC; date: August 1, 2023). All participants provided written informed consent to participate in this study. They were thoroughly informed about the purpose, type, and methods of the research and were assured that they could withdraw at any time without providing a reason.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interests with respect to the research, authorship, and/or publication of the article *Adaptation and Psychometric Validation of the Indonesian Version of the Athlete Psychological Strain Questionnaire.*

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Appendix

Athlete Psychological Strain Questionnaire Versi Indonesia (APSQid)

PETUNJUK PENGISIAN: Mohon ingat kembali pengalaman Anda empat minggu terakhir dan berilah tanggapan terhadap setiap pernyataan berdasarkan seberapa sering hal itu terjadi pada Anda. Silakan dijawab dengan cara memilih salah satu alternatif jawaban yang tersedia. Alternatif jawaban yang tersedia adalah: TIDAK PERNAH (TP), SANGAT JARANG (SJ), KADANG-KADANG (KK), SERING (S), dan SELALU (SL). Sebagai contoh:

Saya kurang termotivasi.

Tidak Pernah	Jarang	Kadang-kadang	Sering	Selalu
TP	**SJ**	**KK**	**(S)**	**SL**

Anda hanya perlu memilih salah satu alternatif jawaban yang sesuai dengan kondisi Anda dengan cara melingkarinya.

No	Pernyataan	Tidak Pernah	Sangat Jarang	Kadang-kadang	Sering	Selalu
1	Saya sulit bersosialisasi dengan teman satu tim.	TP	J	KK	S	SL
2	Saya merasa sulit melakukan sesuatu yang seharusnya dilakukan.	TP	J	KK	S	SL
3	Saya kurang termotivasi.	TP	J	KK	S	SL
4	Saya mudah tersinggung, marah, atau bersikap agresif.	TP	J	KK	S	SL
5	Saya tidak berhenti mengkhawatirkan cedera atau performa Saya.	TP	J	KK	S	SL
6	Latihan membuat Saya semakin stres.	TP	J	KK	S	SL
7	Saya merasa sulit untuk mengatasi tekanan dalam seleksi.	TP	J	KK	S	SL

No	Pernyataan	Tidak Pernah	Sangat Jarang	Kadang-kadang	Sering	Selalu
8	Saya khawatir tentang kehidupan setelah pensiun sebagai atlet.	TP	J	KK	S	SL
9	Saya membutuhkan minuman keras atau zat lain untuk menenangkan diri.	TP	J	KK	S	SL
10	Saya mengambil risiko yang tidak biasa di luar lapangan.	TP	J	KK	S	SL

TERIMA KASIH