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Original article

## Construct validity test of spirituality in sports test (SIST) using confirmatory factor analysis (CFA) method

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### Abstract

*Aim.* This study aims to determine the construct validity of the Spirituality in Sport Test (SIST) instrument with the Indonesian version.

*Methods:* A total of 148 Indonesian athletes consisting of 78 and 70 males and females aged 18 to 35 years ( $M=22.25$ ,  $SD=3.75$ ) from ten different sports were involved. The construct validity test was conducted using the confirmatory factor analysis (CFA) method. Meanwhile, an internal consistency approach which includes Construct Reliability (CR), Cronbach's Alpha, and Average Variance Extracted (AVE), was used for the reliability test.

*Results:* The results indicate that the Spirituality in Sport Test (SISTid) instrument with the Indonesian version is a good fit model for CMIN/DF, RMSEA, GFI, TLI, NFI, and AGFI parameters. The factor loading item value moved from 0.56 to 0.83 with a significance value of 0.001. Furthermore, the internal consistency reliability test showed an AVE and Cronbach's Alpha value of 0.91 and 0.81, indicating that SISTid has high internal consistency reliability.

*Conclusions:* SISTid is a valid and reliable instrument for assessing athletes' spirituality in the setting of sports.

*Keywords:* Spirituality in Sport Test, confirmatory factor analysis, construct validity, Papuan athlete.

### Introduction

In 2017, the Indonesian mainstream media discussed the unusual celebration of Bali United football players after scoring a goal against Borneo FC. The three Bali United players, Ngurah Nanak, Yabes Roni, and Miftahul Hamdi, celebrated the goals according to their respective beliefs, namely Hinduism, Christianity, and Islam. The people were quite appreciative, and according to the Washington Post, a newspaper headquartered in the United States, the three players' celebration became one of the topics covered. It is typical for athletes to express gratitude to God Almighty, as the three Bali United players did. It sparked much discussion since Bali United players celebrated together but varied depending on their religious views. The public became excited and went viral on social media, and in this context, the sport seemed inseparable from the aspect of religion or the religiosity of athletes. Therefore, the dimension of religiosity should be a vital part considered in the context of sports (Jirásek 2015).

In the psychological literature, humans are microcosms because all elements of the cosmos are scattered and stand individually. However, something unique to humans is not contained in the macrocosm, namely spirituality or spiritual power. (Hidayat 2013). In the 1960s, psychology scientists began to study the creation of spirituality by linking components of violence, prejudice, and gender. (Paloutzian and Park 2005). However, the study of religion (religiosity) or spirituality (spirituality) was seen as something strange

(Bloom 2012) but believed to have a substantial role in a person's life (Jackson and Bergeman 2014). Even though there are two opposing views, psychologists see the construct of "spirituality" as an interesting dimension to further study various aspects of life. Therefore, educational, developmental, social, and clinical psychology experts aggressively research these dimensions (Wahyuningsih 2015). It is not surprising that research on spirituality is experiencing rapid development (Zinnbauer and Pargament 2000). Conceptual discussions regarding "spirituality" and "religiosity" continue to occur regularly, even though this has been explored extensively. At this level, the study is not trapped by the discussion, and it is guided by the opinions of Pargament (1999) and Zinnbauer & Pargament (2005), which oppose the polarization of "spirituality" with "religiosity." Therefore, the two terms will be used interchangeably in the article.

Sport is closely related to spirituality because history records the forerunner of the Olympics as part of a religious festival in Greece (Qoriah 2014). Ideally, sports activities cannot be separated from the spiritual dimension in athletes. However, studies on spirituality in athletes or sports have not been much conducted compared to other constructs such as motivation, anxiety, concentration, self-confidence, and other psychological aspects. The spiritual side of sports study has not been as popular as other categories such as exercise physiology, biomechanics, and exercise psychology (Qoriah 2014). Flower (2017) mentions that studies on spirituality in sports were only conducted

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around the 1990s; therefore, they are still relatively new. According to Parry et al. (2007), studies that discuss sports and spirituality had not developed as fast as other fields in sports science. However, in recent years, there has been an increasing interest from scientists to study aspects of religion or spirituality in the world of sports (Jirásek 2015). Religion and sport have been explored by philosophers, sociologists, psychologists, theologians, and religious leaders (Parker and Weir 2012). Therefore, studies on spirituality and sports have begun to attract many parties.

Scientific evidence shows that spirituality contributes to athletes' peak performance with physiological factors (Flower 2017). Other studies have found that spirituality has been an essential factor in improving athletes' performance on the field (Roychowdhury 2019). Another expert states that religiosity (religion) has a strong influence in influencing humans to avoid fear (stress/anxiety) (Amir and Lesmawati 2016). In other words, spirituality can minimize the emergence of negative feelings such as fear and anxiety. In its development, spirituality has a significant influence and role in various aspects of human life (Peterson and Seligman 2004, Zinnbauer and Pergament 2005, Hood, Hill, and Spilka 2009). Several studies (Dillon and Tait 2000, Vernacchia and Henschen 2008)) state that it has a vital role in improving athlete performance on the field. In addition, it contributes to the psychological condition (mental health), personality, and the individual career of the athlete. In this context, Magdalinski & Chandler (2002) suggest that spirituality is an important construct in conducting a comprehensive sports analysis. Several studies have attempted to develop instruments that measure a person's spirituality or religiosity, for instance, The Spiritual Transcendence Scale [STS; 21], the Scale of Spiritual Transcendence [SST; 22], Daily Spiritual Experience Scale [DSES; 23]; Spiritual Well-Being [SWB; 24]; Spiritual Wellness Inventory [SWI; 25]; Psychological Measure of Islamic Religiousness [PMIR; 26]. In Indonesia, several instruments have been developed to show the construct of spirituality (Wahyuningsih 2015, Salsabila et al. 2019)). However, the measurement tools are not directly related to sports or athletes and are based on general spirituality constructs.

For spirituality, instruments related to sports have not been widely developed. Storch et al. (2001) studied elite university-level athletes using a general religiosity instrument, such as the Duke Religion Index (DRI) (Koenig, Parkerson, and Meador 1997). The search results related to spirituality measurement tools in the context of sports (athletes) were recorded only for the Sports Test (SIST) developed by Dillon & Tait (2000). Since the SIST has not been widely tested, the instrument's reliability and validity are still questionable. Studies have not found a spirituality measurement tool developed strictly for sports (athletes) in Asia. On the other hand, spirituality is a hugely

significant component of Indonesian society. (Qorih 2018).

Based on the description above, this research was directed to test the validity of the Spirituality in Sports Test (SIST) construct in the Indonesian version. Therefore, the test results will be beneficial in providing empirical evidence of the validity and reliability of the Indonesian version (SISTid). The results will be used to study the aspects of spirituality in the context of sports (athletes).

## Methods

### Participants

The subjects were elite athletes undergoing training camps to face the National Sports Week (PON). A total of 148 athletes (male = 78, female = 70) with an age range of 18 to 35 years ( $M = 22.25$ ,  $SD = 3.75$ ) from ten different sports were included.

### Instruments

The instrument tested was the Spirituality in Sports Test (SIST) developed by Dillon & Tait (2000) and later modified by Spittle & Dillon (2014). The original SIST consisted of 10 statement items with four alternative answers using a Likert scale. However, Spittle and Dillon transformed it into six different replies ranging from never (1) to always (6). An example of a SIST statement item is "I use spirituality or religiosity to deal with the external pressures from coaches, teammates, peers, or parents."

### Procedure

The procedure adopted in the study is as follows. First, an email was sent to Prof. Kathleen M. Dillon asking for permission to test the Indonesian version's SIST. Second, SIST was translated into Indonesian; third, the result was then submitted for inspection; fourth, a construct validity test was conducted in the field using the google form to minimize the occurrence of crowds due to testing the SISTid instrument. At this stage, the SISTid items were entered into the google form, and the links were distributed to Papuan coaches and athletes (see appendix to final SISTid).

### Statistical Analysis

Research data analysis was conducted using a Confirmatory Factor Analysis (CFA) approach. This approach is also called construct validity conducted by testing the internal structure of the measuring instrument (Azwar 2013). Several indices are used in this study to determine whether or not the model is fit. There are seven fit indexes taken as parameters, including Chi-square and p-value, Chi-square divided by degree of freedom (CMIN/DF), Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI), Tucker-Lewis Index (TLI), Normed Fit Index (NFI), and Adjusted goodness of fit index (AGFI).

For reliability, this study was tested using an internal consistency approach through Construct Reliability or Composite Reliability (CR) and Average Variance Extracted (AVE), and Cronbach's Alpha coefficient. All analyses were performed using IBM

SPSS (Leech, Barrett, and Morgan 2015) and IBM SPSS Amos programs (Arbuckle 2017).

### Results

The first result related to the SIST validity test is an expert review of the SIST translation in Indonesian, which obtained four notes. First, item number 1 is suggested to be changed to "I rely on spirituality or religiosity in my behavior during the game"; item number 2, changed to "I rely on spirituality or religiosity to maintain my fitness during the game"; Items number 3 and 4 suggest that the word "see" is replaced by "relying on."

After the SIST translation results were corrected according to expert advice and notes, the next step was to test the instrument by involving Papuan athletes. First, testing the accuracy of the model (model fit) was conducted using the chi-square method, probability value, CMIN/DF, RMSEA, GFI, TLI, NFI, and AGFI. The first test results found that the model did not fit the parameters used. Therefore, a revision of the model was conducted by correlating the covariance error based on the modification index (MI) value (Widarjono 2015, Ghozali 2017, Arbuckle 2017). The results were obtained after correlating covariant errors as presented in table 1.

The value used for chi-square/df/p-value 0.05; CMIN/DF < 2.00; RMSEA 0.08; GFI, NFI, and TLI 0.90; AGFI 0.80 (Hu and Bentler 1999, Brown 2015, Widarjono 2015, Hair et al. 2019). The results of the model feasibility test (goodness-of-fit) using seven methods showed that CMIN/DF, RMSEA, GFI, TLI, NFI, and AGFI parameters indicated a fit model. In contrast, the Chi-square parameter indicated that the model did not fit. According to Hu and Bentler (1999), Chi-square is very sensitive to sample size. The chi-square test produces a substantial difference between the model tested and empirical data as the number of samples used is increased. Therefore, the chi-square parameter found that the model did not fit, but the other six parameters were declared fit models; therefore, the SISTid with 10 items was declared a fit model.

After the feasibility test was conducted and the model fit was declared, the next step analyzed the factor loading value of each item that composes the Indonesian version of the SIST construct (SISTid) (Arbuckle 2017, Ghozali 2017). The criterion used was 0.50, and the item was then acceptable (Ghozali 2017, Hair et al. 2019). Therefore, from the SISTid, all items have a loading factor value above 0.50 ( $\lambda$  .50) which indicates the ten items have a good loading factor.

**Table 1.** Model fit test results

Parameter	Output	Criteria	Decision
$\chi^2/df/ p$	50.42/27/.004	$\geq 0.05$	Unwell
CMIN/DF	1.867	$< 2.00$	Fit
RMSEA	0.077	$\leq 0.08$	Fit
GFI	0.941	$\geq 0.90$	Fit
TLI	0.953	$\geq 0.90$	Fit
NFI	0.943	$\geq 0.90$	Fit
AGFI	0.880	$\geq 0.80$	Fit

Abbreviation:  $\chi^2$ : Chi-square; df: *degree of freedom*; p: *p-value*; CMIN/DF: C-square/DF; RMSEA: *Root Mean Square Error of Approximation*; GFI: *Goodness of Fit Index*; TLI: *Tucker-Lewis index*; NFI: *Normed Fit Index*; AGFI: *Adjusted goodness of fit index*

**Table 2.** Internal consistency reliability test results

No item	$\Lambda$	$\lambda^2$	$e$	CR	AVE	$\alpha$
Item 1	0.555	0.308	0.692			
Item 2	0.71	0.504	0.496			
Item 3	0.606	0.367	0.633			
Item 4	0.745	0.555	0.445			
Item 5	0.771	0.594	0.406	0.47	0.81	0.91
Item 6	0.727	0.529	0.471			
Item 7	0.715	0.511	0.489			
Item 8	0.764	0.584	0.416			
Item 9	0.643	0.413	0.587			
Item 10	0.833	0.694	0.306			
Total	3.39	2.33	2.67			

Abbreviation:  $\lambda$ : Loading factor;  $\lambda^2$ : Kuadrat loading factor;  $e$ : Error; CR: Construct Reliability; AVE: Average Variance Extracted;  $\alpha$ : Cronbach's Alpha

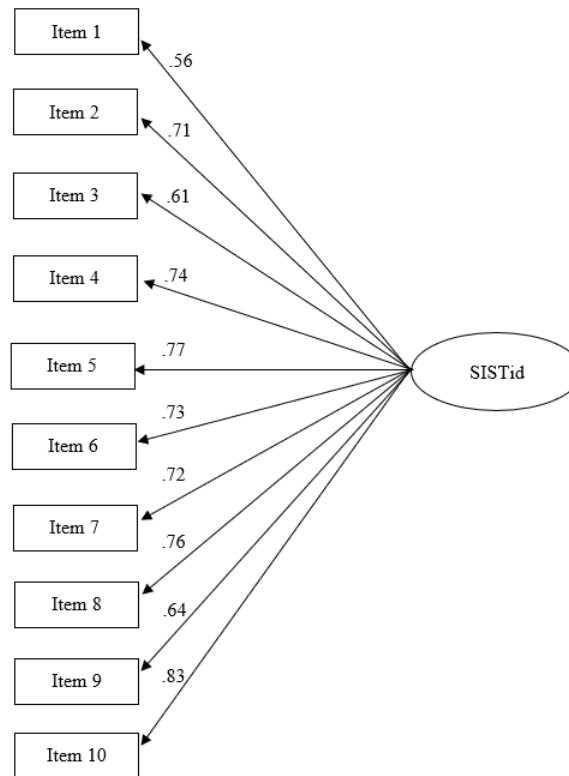


Fig. 1 results of CFA SISTid. The values in the figure are standardized coefficients

Aside from the factor loading value shown in Figure 1, the following analysis was performed to determine the importance of the estimated parameters (Widarjono 2015, Arbuckle 2017). The significance test results showed that all items in the SISTid had a value greater than 1.96 and were significant at the 0.001 level. Therefore, the ten items are indicators of the latent variable of spirituality.

The subsequent analysis was conducted to determine the reliability value of SISTid. This study uses an internal consistency approach through Construct or Composite Reliability (CR) and Average Variance Extracted (AVE). The minimum and maximum value assigned to the CR parameter to indicate that the construct is acceptable was 0.70 and 0.50 (Ghozali 2017, Hair et al. 2019). Additionally, Cronbach's Alpha coefficient was used to determine the reliability of the measuring instrument. The results (CR, AVE, and Cronbach's Alpha) are presented in table 2.

Table 2 shows that the CR value is below the expected value ( $< .70$ ), but AVE and Cronbach's Alpha, are above the recommended value (AVE = 0.81; = 0.91) (Widarjono 2015) (Ghozali 2017). The results indicate that SISTid has a high internal consistency reliability value. This is by the original version of SIST, which has a high-reliability value, namely = 0.98 (Dillon and Tait 2000, Spittle and Dillon 2014).

## Discussion

The results of construct validity testing conducted on elite Papuan athletes have found that the SISTid property meets the feasibility of the fit model in several methods such as CMIN/DF, RMSEA, GFI, TLI, NFI, and AGFI. In addition, the factor loading value of the ten items moves between 0.56 to 0.83 with a significance value of 0.001. This indicates that the ten SISTid items measure the latent variable of spirituality. The internal consistency reliability test found an AVE value of .81 and Cronbach's Alpha of 0.91, indicating that SISTid had a high internal consistency reliability value. Therefore, it is a valid and reliable measuring tool for the spirituality of athletes in the context of sports.

SISTid is a measuring tool for the dimension of spirituality not identical to a particular religion, such as the Psychological Measure of Islamic Religiousness developed by Raiya et al., (2008) and identical to Islam. It is different from the Spiritual Transcendence Scale (STS) developed by Piedmont (1999), the Daily Spiritual Experience Scale (DSES) developed by Underwood & Teresi (2002), Spiritual well-being developed by Ekşi & Kardaş (2017), and the Spiritual Wellness Inventory developed by Ingersoll (1996), which measures the dimension of spirituality in a general context. Furthermore, SISTid was created based

on the specific context in sports. The research that examines aspects of spirituality and sports should use the measuring tool to reveal the spiritual dimension of athletes.

Even though a reasonably rigorous test has been conducted, the study has limitations. First, only one measuring instrument was tested, and no one theoretically measures similar and different dimensions. In the original version, the convergent validity test used the Spiritual Involvement and Beliefs Scale (SIBS) from Hatch et al., (1998). Second, the respondents were limited to training camp athletes to prepare for the XX PON. Third, the original version of the test was conducted on several athletes, such as students (Dillon and Tait 2000).

### Conclusion

The results and discussion deduced that the Indonesian version of the psychometric property of SIST (SISTid) is a valid and reliable tool to measure the spirituality of athletes in the context of sports. Therefore, SISTid can be used to measure spirituality in Indonesian athletes. However, since the subjects covered have restrictions, certain recommendations can be made, including (1) the next construct validity test should be conducted by measuring similar and different constructs (2) involving more characteristics of the research subject.

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