Journal of Physical Education and Sport ® (JPES), Vol. 22 (issue 12), Art 376, pp. 2980-2987, December 2022
online ISSN: 2247 - 806X; p-ISSN: 2247 – 8051; ISSN - L = 2247 - 8051 © JPES

Original Article

Assessment of convergent validity and reliability of instruments for measuring anxiety level in water using sport competition anxiety test modification, observation of behavior, and test performance

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Published online: December 25, 2022
(Accepted for publication December 15, 2022)
DOI:10.7752/jpes.2022.12376

Abstract
The aim of this study was to examine the convergent validity and reliability of instruments for measuring the level of anxiety in water using the Sport Competition Anxiety Test Modification (SCAT-M) instrument, anxiety behavior observation (ABO) and performance test (PT) as predictors. The participants were 60 college students, men (n = 44) and women (n = 16) (age range: 19–22 years), who could not swim 25 m. The descriptive analysis included the average, standar deviation (SD), and range; the inferential analysis of validity with internal validity for each instrument with a total score was based on the bivariate Person correlation. The obtained results included the intraclass correlations coefficient SCAT-M r = 0.562, (moderate), AOB r = 0.838 (high), and PT r = 0.559 (moderate). Reliability test-retest (separated by 1 week) SCAT-M r = 0.841(high), AOB r = 0.914 (very high), and PT r = 0.904 (very high). The validity predictive instrument SCAT-M, which is used to evaluate high anxiety and performance, exhibited the predictive validity of r = −0.043 (p = 0.02 < 0.05); it showed significant relationship but negative correlation and low performance. The AOB instrument, which is used to evaluate high anxiety and performance, showed significant correlation but negative r = −0.185 (p = 0.01 < 0.05), in the category of low level of performance. Validity predictive analysis has significant but negative relationship. Students with high level of anxiety, determined by both SCAT-M or ABO instruments, have low performance, can only submerge their head in the water, and have some floating ability. Conclusion: the measurement of water anxiety level using both the SCAT-M questionnaire and behavioral observation allows to determine the anxiety level of students in water and predict their basic swimming abilities.
Key Words: Validity, Reliability, Anxiety, Instrument, SCAT, Performance

Introduction

The study of anxiety, is attencedents, its relations with other psychological varibles, and its conseqquences has a long history of theoretical attention within sport psychology (Smith et al., 2006). Anxiety is the physiological or psychological reaction when a treat is perceived (Weinberg & Gould, 2007)(Sharma & Kanojiya, 2021). Conceptually anxiety in terms of negative affect (fear, apprehension, wory)(Martens, 1982). Charles Spielberger introduced the terms trait and state anxiety. Spielberger defined state anxiety as an immediate emotional state that is characterized by apprehension, pear, and tention. Trait anxiety, however, is a feature of personality. It is a predisposition to perceive certain environmrntal situation as threatening, and to respond to these situations with increased state anxiety (Spielberger, 1971) (Cox, 1990). Anxiety is also multidimensional in sense that it is believed that there are both cognitive and somatic components to anxiety (Cox, 2002). Competetive Anxiety copries four general elements; cognitive, somatic, affective, and motoric components (Hasanah & Refanthira, 2019). This research refers to the multidimensional anxiety theory which includes components of state anxiety, trait anxiety, cognitive anxiety, somatic anxiety (Martens et al., 1990). While the motor components are used to measure swimming performance abilities with test instruments.

Anxiety is often experienced in the world of sports by athletes when competiting, as well as in swimming, especially for beginners. Fear of the water environment is commonly found in students during the training process in swimming courses or learning to swim at school. Those who are afraid of water can affect their behavior such as being difficult to swim with, students tend to avoid swimming lessons. There are even those who are absent from class for various reasons. If forced to go to the swimming pool, do not follow the learning process. even though you look tense, nervous, it's hard to get into the pool. A typical experience for individuals afraid in the water has been noted as producing a frightening and negative experience with potentially serious implications. This can result in a lifetime of avoidance behaviors **(**Bellinda, 2011**).**

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Hancock (2001) anxiety exceeds the normal determined level, it will cause distraction, distress, and helplessness of the person which would reduce his efficiency and performance (Zobairy, M., Aliabadi, S., & Zobayri, 2013). In the process of learning to swim, they had difficulty when they were asked to slide, even they didn't want to dive their heads into the water. In alarming development can also be observed the number of female college students who unwilling to participate in swimming class or sometimes openly avoiding them. (Barnes et. Al., 1986) (Tajul Arifin et.al., 2013). In the swimming learning process, students who have feelings of fear of water will have difficulty mastering swimming skills. As the results of previous studies; Many students are afraid of water when they start to learn how to swim. Mostly, they do not dare to enter the water. Stallman, R. K., Junge, M., & Blixt (2008) observed that 26% of children who are learning to swim are afraid to enter the water. This issue will make the learning process more difficult for them.

To solve problems in the process of learning to swim for students who have anxiety about water, the teacher or trainer needs to know the condition of the anxiety level status of each student clearly. This can be done with an accurate assessment and measurement of the anxiety. Knowledge of the level of anxiety is clearly important, to determine the appropriate methods, approaches, strategies, determine the tools used. Anxiety test as an important and usual instructional phenomenon has a close relationship with the children and adolescents' educational improvement and function (Alboghasemi, 2002) (Ejei et al., 2011) The level of anxiety that each individual has, can affect the achievement of swimming learning outcomes. There were significant differences between students with high and moderate levels of anxiety in the achievement of freestyle swimming ability (Badruzaman, 2017). The instrument to be used in measurement must have valid standard requirements including validity and reliability.

Several instruments in the form of questionnaires in the field of sports to measure competitive anxiety have been carried out by many experts; State-Trait Anxiety Inventory (STAI) (Speielberger, Gorsuuch, & Lushene, 1970), Sport Competition Anxiety Test (SCAT) (Martens, 1977), multidimensional questionnaires, Cognitive–somatic Anxiety Questionnaire (Schwarz, Davidson, & Goleman, 1978), Competitive-State Anxiety Inventory-2 (CSAI-2) (Martens, Burton, Bump, 1983; Martens, Burton, Vealey, Smith, & Bump, 1983; Martens, Burton, Vealey, Bump, & Smith, 1990), Sport Anxiety Scale (SAS) (Smith, Smoll, & Schutz, 1990; Williams Jeans M., 2001) (William, 2001). Measurement of anxiety with the existing questionnaires is common in sports competitions. However, the measurement of specific anxiety (such as anxiety in water) has not been extensively performed.

Instruments for measuring anxiety can also be done using behavioral observation. Since arousal is associated with state anxiety (A-state), the electrophysiological indicators used to measure arousal can also be used to measure state anxiety. In addition, numeurous behavioral indicators of state anxiety have been developed. One category of behavioral measurement is direct observation (Low, 1973) (Cox, 1990).

Almost all of the instruments made by these experts are more intended for measuring anxiety in competitive sports. Meanwhile, researchers focus more on anxiety in the context of learning or swimming practice for beginners and determining levels and confirming with real results on performance. Until now, not many researchers have conducted research with a focus on this theme.

The aim of this study was an assessment of the convergent validity and reliability of the specific anxiety instrument in water using a modified SCAT questionnaire, behavioral observations and performance tests. And determine the level of anxiety for each instrument then verify the real appearance at each level.

In this study, three types of instruments were used, namely questionnaires, behavioral observations, and tests. The questionnaire instrument used adopts the SCAT instrument on the grounds that this research is specific, and which includes several anxiety components. Theoretical advances stimulated the development of new measuring instruments to assess the construct of trait anxiety. Daring the 1980s and thereafter, sport-specific trait anxiety has frequently been assessed using the Sport Competition Anxiety Test (SCAT, Martin, 1977). (Smith R.E., et al., 2006). Likewise, the SCAT instrument is based on the theory of Multidimensional anxiety which includes cognitive and somatic components (Marten, et al., 1990) (Cox, 2002). The use of the SCAT questionnaire instrument by providing modifications that are adapted to the conditions of the water environment. Measuring instruments that have just been made or modified, which will be used for measurement, must first be tested for validity and reliability standards, so that they can be recognized scientifically and widely used. In this study, to test validity, a convergent validity assessment was carried out, namely testing two different types of instruments (questionnaires and behavioral observations) but having the same construct validity. While the test instrument is a predictor to verify with facts and evidence. The level of relationship between the three instruments is a manifestation of the validity status of the convergent instrument. The various measures assess either actual or usual activity levels, but one would expect a relationship among them because they are measuring a similar construct (Kowalsky K., et al., 1997). Convergent validity (the extent to which different measures that are designed to tap the same construct correlate with each other (Cunningham W.A. et al., 2001). For the reliability assessment using test-retest for the three instruments. Charles (1995) adheres to the nations that consistency with which questionnaire (test) items are answered or individual's scores remain relatively the same can be determined through the test-retest method at two different times (Golafshani, 2003).

Instruments that are specific for an anxiety condition in a particular environment are very important to obtain a more accurate information. This is especially relevant for teachers or trainers and can help improve the learning or training process. In relation to water sports, for learning/training, the measurements should be adapted to the conditions dealing directly with water. Compared with the global anxiety measurement, these situation-specific measurements have been proven to be stronger predictors of behavior within their particular domain (e.g., Martins, 1977; Sarason, 1978)(Smith, R. E., Smoll, F. L., & Schutz, 1990). The situation-specific measurement is a more accurate and reliable predictor of behavior in specific situations (Morrow et al., 2011). A test is valid if it has been useful for predicting performance or behavior in another situation (Reiman & Manske, 2009). Whereas, convergent validity (a parameter that is often used in sociology, psychology, and other behavioral sciences) refers to the degree to which two measures of constructs are expected to be related or are, in fact, related (Taherdoost, 2016)**.**

Anxiety and Performance in swimming

Appearance in sports is an aspect that must be fought for and trained in order to achieve success. However, performance does not only rely on physical or technical abilities, but must also be supported by mental strength, one of which is anxiety. Every sport has specific requirements for winning. Athletes' success, whether in the beginning, intermediate, or or elite category can be primarily determined by their performance daring competitions (Ahmad et al., 2022). If an athlete before competing feels high anxiety, it can negatively affect performance. Certain anxiety conditions affect a person's performance (Cox, 1990). Sport psychologists know very little about the effect of positive stress (eustress) on athletic performance; it is known that the effect has the form of inverted-U.

In swimming, especially for beginners, anxiety in the water environment is evident in its performance in swimming ability. Students who seem to have a fear of high water, it is clear that their swimming performance is very bad. Unlike the students who looked calm, he could show his swimming performance better. In swimming, anxiety can affect muscle tension, which can cause the body's position to sink more, and difficulty performing swimming movement techniques, as well as irregular coordination of leg and arm movements. Increase arousal and state anxiety cause increased muscle tension and can interfere with coordination (Weinberg & Gould, 1995). Several studies have reported a linier but negative relationship between athletic performance and state anxiety. For exemple, in case of swimming (Barnes, Sime, Dienstbier & Plake, 1986) (Cox, 1990). Burton (1988) observed that the relationship between performance in swimming and state anxiety was linier and inversely related when the cognitive or wory subscale was used and quadratically related (inverted U). Swimmer must be able to minimize pre-performance cognitive anxiety in order to enhance their swimming performance (Mabweazara et al., 2016). There is a moderate relationship between anxiety and swimming skills (r = -0.407, sig. .000), thereby suggesting a significant negative relationship between anxiety and swimming skill (Muhammad T.J., et. Al., 2.13).

Previous studies have used anxiety testing instruments in sport. Specifically, the Sport Anxiety Scale (SAS-2) has stronger factorial validity than the original scale, and construct validity research indicates that scores are related to other psychological measures as expected. (Smith et al., 2006) The psychometric properties of the sport anxiety scale are described, as are its relations with other psychological measures and with pre competition affective state measures. Capitulo & Martin, (2015) stated that most swimming programs lack valid, reliable, and objective assessment tools for measuring and evaluating swimming achievement. Research instruments include questionnaires, interviews, and observation. A previous study revealed that, in general, the freestyle swimming performance of the respondents is fair. Cobley et al., (2019). Using accurate longitudinal reference data, corrective adjustment procedures effectively removed RAFs from 100 m freestyle swimming performance. Berukoff and Michael, (2010). The correlation between swimming self-efficacy and swimming performance had the strongest positive correlation (+0.7). Moderat negative correlation between fear of drowing and self-efacancy (-0.54). Avramidou (2007). The finding that lifeguards had generally lower levels of state anxiety than the swimmers may be related to their respective trait-anxiety levels. Sonstroem and Bernardo (1982), Burton (1988) and Gould, Petlichkoff, Simons, and Vevera (1987) have shown that the relationship between appearance and state anxiety depends on the level of existing anxiety. Linthorst et al., (2008) For swimming, it has been found that state anxiety may have either positive or negative effects on performance. (Linthorst et al., 2008)(Linthorst et al., 2008)(Linthorst et al., 2008)(Linthorst et al., 2008)(Linthorst et al., 2008)(Linthorst et al., 2008)(Linthorst et al., 2008)(Linthorst et al., 2008) Wibowo Danang, (2019). The correlation of anxiety level (pulse) with sliding learning outcomes is 0.681. This means that anxiety has a strong relationship with learning gliding outcomes in freestyle swimming.

Method

The method used in this study was the development method**.** The subjects in the study were 60 college students (44 men) and (16 women) (19–22 years old) who follow the Indonesia University of Education General Course of Physical education. The subject were recruited from two study programs, i.e., the sport science study program and electro education. Purposive sampling was used to recruit students. For the study, only students

who could not swim 25 m were selected. A beginner is any subject who could not swim 25 m using either the front crawl stroke or the back crawl stroke (Holt Alyce, 2015), and also includes for breaststroke.

The Sport Competition Anxiety Test (SCAT) instrument is a modified questionnaire adopted from Martens, Vealey, and Burton, (1990) in (Weinberg & Gould, 1995). Modifications are directed towards the activity of swimming. This instrument contains 15 items anxiety and uses three scales (i.e., rarely, sometime, and often). The SCAT score requirements are as follows: less than 17 – low level of anxiety; 17–24 – average level of anxiety; greater than 24 – high level of anxiety (Brian, 2005). SCAT instruments are modified and adapted based on the context and conditions of fear of water. The results are divided into three categories based on the level of anxiety, i.e., low, medium, or high.

Observation

The instrument used to measure emergency behavior in water, this approach has been adopted by Haris and Haris (1984) in (Cox, 1990). Along these lines, Harris and Harris (1984) have created a list of overt behavioral responses that can be used by the athlete to identity indicators of distress or anxiety.

The examination of the predictive validity of the test is performed using a basic swimming ability test of appearances, which includes the 1) test dive of the head, 2) front float, 3) gliding, 4) test of the leg movement to push, 5) test of the arm movement to push, 6) simultaneous leg and arm movement, 7) test of the ability to take a breath. Appearance tests are classified into three categories: 0–3 – weak appearance, 4–5 – medium, and 6–7 – good. The standard score criteria are as follows; a score of (0) – not able to perform the task at all; a score of (1) – able to perform the task for a short time or for a distance of at least 1 m.

Procedures

The first phase of the instrument was in the form of the questionnaire level anxiety test (SCAT-M) and was given during the class to be filled out; after completion, the questionnaire was removed. Then, the instrument in the form of anxiety behavior (ABO) observation was applied while the subject was swimming in the pool. The subject was told to stand at the edge of the pool as if preparing to perform the activity. Every test observation was performed by three people. Observations were confirmed by two assessors and by reviewing the video. Both observers noted all student behavior signs indicating the fear of water. The next set of data was collected by conducting the performance test of basic swimming abilities in the water. The test was performed before the learning process. Three people perform each test. Appearance tests were performed in a swimming pool with the water level at the subject's chest. Each subject was given seven performance tests. All three instruments were tested twice at different sessions in a span of 1 week to calculate reliability. Each student who succeeds in performing the task gets 1 point (i.e., if the distance is at least 1 m, and if the time is at least 1 s). If this requirement was not met, the attempt was considered to be a failure.

Data analysis

To test the validity of using the internal factorial validity of the test, data from every sub-factor instrument SCAT-M, ABO and test performance with three levels of anxiety were correlated with the overall score. The test validity determinant was used for specific purposes. For the validity predictive analysis, instruments SCAT and ABO were correlated with the instrument performance test. Statistics analysis was performed using the Person product-moment correlation.

Results

Descriptive data

Descriptive data were used to provide an overview of the results of the score obtained by each instrument, as shown in Table 1.

Table 1. Data Score Instrument SCAT-M, ABO, and Performance Test Level

Level	Score	Instrument		
		SCAT-M (questionnaire)	**Observation (ABO)**	**Test performance**
High	Mean	27.3	22.3	1.1
	Sd.	1.6	1.03	7.9
	Range	24–32	17.23	0–2
Moderat	Mean	19.6	15.6	2.65
	Sd.	2.27	3.1	7.1
	Range	17.23	12–19	1–4
Low	Mean	7	14	4.5
	St	2.8	3.1	5.2
	Range	12–17	11–9	3–7

Note: SCAT-M – Sport Competition Anxiety Test Modification.
ABO – Anxiety Instrument Observation Behavior.

Table 1 shows the mean score of 27.3 for high anxiety for the SCAT-M instrument and 22.3 for the instrument of observation of behavior (ABO). The results of both instruments are similar. However, for the mean performance test instrument, the result is significantly different, i.e., 1.1. This indicates that the relationship between anxiety and appearance has a negative relationship. When anxiety is high, the result will decrease, or the appearance will be negatively correlated with the results of the appearance. If the anxiety is at a moderate level, the mean score for the instrument SCAT-M is 19.6, and 15.6 for the ABO instrument. At the moderate level, the two instruments do not show a striking difference. Furthermore, performance test results showed better score than high anxiety with the mean score of 2.65. At low levels of anxiety, the SCAT-M instrument has the mean score of 7, 14 for the ABO instrument, and 4.5 for the performance test results. This is in accordance with the theory of multidimensional anxiety; specifically, when anxiety is low, the appearance of going up is improved. Table 2 presents the results of calculating the correlation coefficient for the third instrument.

Table 2. Intercorrelation Coefficient Matrix Between the SCAT-M, ABO, Test Performance, and Level Instruments

Instrument	Instrument								
	Level	SCAT-M			ABO			Performance Test		
		H	M	L	H	M	L	H	M	L
SCAT-M	High		−0.332	−0.377	0.345	−0.122	−0.298	0.380*	−0.243	−0.188*
	Moderate			0.220	0.313	0.424	0.283	−0.178	0.609**	0.203
	Low				−0.010	0.036	0.258	−0.353	0.048	0.242
IAOB	High					0.093	0.019	0.076	−0.170	−0.185
	Moderate						0.486*	−0.051	0.664	−0.223
	Low							−0.110	−0.388	0.272
Performance Test	High								−0.125	−0.326
	Moderate									0.486*
	Low									

Note: H = High; M = Moderate; L = Low
** Level alpha: significant alpha = 0.01; *Level alpha: significant alpha = 0.05

Validity analysis uses internal factorial techniques. Scores for each instrument factor were correlated with total scores, based on the Pearson correlation (2 tailed). Based on the correlation test results, a validity value is obtained for the SCAT-M coefficient correlation: $r = 0.562$, $p = 0.01 < 0.05$. SCAT-M instruments have positive correlation, and significance belongs to the moderate category. For ABO, the correlation coefficient validity $r = 0.838$, $p = 0.00 < 0.01$. ABO has significant validity and strong relationship. Performance test, validity coefficient correlation $r = 0.559$, $p = 0.01 < 0.05$. The performance validity of the test instruments is significant, and the relationship is moderate. Reliability test results with test-retest (separated by 1 week) indicate that SCAT-M instruments have the reliability value of $r = 0.841$ (high) $p = 0.00 < 0.01$. The degree of stability of SCAT-M instruments is in the high category. The reliability of ABO has the value of $r = 0.914$ (very high), $p = 0.000 < 0.01$. Therefore, the degree of consistency of ABO instruments to measure anxiety level of students in the water is in the very high category. Performance test instruments have the reliability value of $r = 0.904$ (very high), $p = 0.000 < 0.01$. The reliability of the three instruments for measuring specific anxiety in water is in the very high category.

Table 2 shows the predictive validity of high SCAT-M anxiety instruments and performance test results, and the validity value has a negative correlation with a value of $r = -0.188$, $p = 0.043 \leq 0.05$. This means that three is a significant relationship between the measurement using SCAT-M instruments and the test of appearance; however, the trend is negative. For students with high anxiety, SCAT-M instrument and performance test results have low predictive ability. Likewise, for students with high anxiety, the measurement results obtained using the ABO instrument and the performance test results have a predictive validity value with the value of correlation coefficient of $r = -0.185$ $p = 0.043 < 0.05$. Both variables are sufficiently strong but have a negative relationship. The results of measurements using SCAT-M with low anxiety indicate a sufficiently strong relationship but are negative in the performance test results with the value of $r = -0.353$ $p = 0.126 < 0.05$. The results of the ABO instrument, for students with low anxiety, and the performance test show a strong negative relationship with the value of $r = -0.110$ $p = 0.000 < 0.01$. The measurement results of the SCAT-M instrument, for students who have moderate anxiety, show a very weak correlation with the validity predictive value of $r = 0.203$ $p = 0.05$. However, the results of measurements using behavioral observation (ABO), which

have a moderate predictive level, and the results of performance test show a weak negative relationship, $r = -0.051$ $p < 0.05$.

In accordance with the instrument performance measurement, the components/content are tested. 1. Place the head in the water. 2. Float the body in the water. 3. Slide. 4. Glide and move the legs. 5. Glide and move the arms. 6. Slide the feet and arms. 7. Make an effort to move forward and take a breath. High anxiety level (0-2) is recorded during floating performance tests. The score of 0 is given if there are students who are not able to put their heads in the water. The moderate levels of anxiety can be tested at the low anxiety level of 1–4 and 2–6.

Discussion

Both instruments as a means of collecting accurate research data are very important. Similarly, an instrument to measure anxiety in sport is needed. An instrument to measure anxiety has been created by experts with regard to the appearance of the sport. There are many types of sports including swimming. In swimming, the anxiety factor in water can affect the appearance in advanced. Whereas Burton (1988) found that overly anxious swimmers swam more slowly. In the letter study, a negative linear trend was found between cognitive anxiety and swimming performance, and a positive linear trend was found between self-confidence and performance (Avramidou et al., 2007).

A good instrument must have various standardized requirements for it to be useful. One of the terms of the instrument must be specific in terms of measurement tools. There should be an instrument that is specifically designed to measure anxiety in water. (Gore, 2000) performed tests on the road or field, but tests in the water are most specific. The results of testing the validity of the analysis showed that the SCAT-M instrument had a moderate score validity with a coefficient of determination of 32%. This is the standard criteria for anxiety SCAT-M instruments, and the remaining 68% is the standard criterion of ABO instruments and the appearance test. The results of the coefficient of determination at 32% are small, which is due to the influence of the results of the appearance test instruments having an inverse relationship with anxiety. The results of previous studies showed that the three instruments have significant validity values with a fairly strong correlation to measure student anxiety levels for beginners (Amir, 2012). IAOB instruments score a strong validity of $r = 0.838$, $r^2 = 80$ (80%). This shows that the contribution of the standard criteria for ABO instruments is quite large, and the remaining 20% is from the appearance and SCAT-M tests. The magnitude of this contribution, because of the anxiety criterion in the students, was clearly and immediately recorded through observation by two researchers. Thus, the degree of objectivity was higher because it was assisted by a video tool to re-check in detail the criteria for anxiety. Burton (1988) observed that the relationship between performance in swimming and state anxiety was linear and inversely related when the cognitive or worry subscale was used and quadratically related (inverted U). The instrument test performance showed $r = 0.559$, $r^2 = 30$ (moderate) validity, which was significant, and the coefficient of determination was 31%. This is indicates that 31% is the standard criteria for the appearence test, and the remaining 69% is contributed by SCAT-M and ABO instrument criteria, both of which have an inverse relationship with appearance. Thus, the validity of the test instrument was found to be in the moderate category.

The results of this study show that ABO instruments have better validity than SCAT-M instruments and the performance test for moderate categories according to several studies that have reported a linear but negative relationship between athletic performance and state anxiety. For example, in the case of swimming Barnes, Sime, Dienstbier & Plake (1986) in (Cox, 1990), this is in accordance with the measurement anxiety used for the Hamilton Anxiety Rating Scale (HAM-A) (Kautsar et al., 2015). The results of testing the validity and reliability with HAM-M showed that the instrument is able to reveal the level of anxiety regarding employee productivity and the consistency of respondents in filling out reliable instruments (Kautsar et al., 2015); Vitasari Prima, 2011) in a study on validity and reliability using the State Trait Anxiety Inventory (STAI) on Malaysia engineering students. Results showed a validity of 0.79 and reliability of 0.850. It was concluded that the STAI instrument was valid and reliable to measure student anxiety. Abolghasemi et al. (1996) used the Ahvaz test anxiety inventory instrument to measure symptoms of test anxiety. These options have points 0, 1, 2, 3, with the higher score showing that the test anxiety is high. Additionally, minimum and maximum scores in this test were 0 and 75, respectively. The alpha coefficient for the overall sample was obtained, which were for girl and boy students were 0.95 and 0.92, respectively (Abolghasemi, et al., 1996;(Ejei et al., 2011) Thus, the three instruments have significant validity values with a fairly strong correlation coefficient to measure student anxiety levels in beginners.

The results of testing the predictive validity, which correlated between the results of the measurement with the SCAT-M instrument, and the results of the appearance test were obtained; the results of the instruments SCAT-M with high anxiety levels and the results of the performance test showed a significant but negative relationship with a coefficient correlation of $r = -0.188$ (small) and low performance. Both instruments thus have significant predictive validity. Moreover, the results of testing predictive validity between ABO instruments that have high anxiety and performance test results showed a significant predictive validity but was negative with a

moderate correlation coefficient. This also is shown in the low-performance results. Previous research using Spielberger's State-Trait Anxiety Inventory (STAI) was used to evaluate athlete anxiety levels. The analysis and observations confirmed a moderately strong correlation ($r = -0.407$, $p=. 0.000$) between the level of anxiety (state anxiety) experienced in the water and their swimming skills. Thus, this suggests a significant negative relationship between anxiety and swimming skills (Sattari et al., 2013). Thus, measuring specific levels of anxiety in water both using the SCAT-M questionnaire and behavior observation (ABO) can be used to predict the level of ability of beginner student swimmers. The low-level abilities were mostly limited to the ability to dive a head, float, and glide at a distance of 2 m.

Based on the findings of this study, students who have high anxiety results based on the IAOB or SCAT-M results has been predicted to have basic capabilities or performance on the low side or vice versa. In line with the multidimensional theory by Martens et al. (1990) (William (2001), the predictions for somatic anxiety were obtained by predicting an inverted-U relationship between somatic A-state and performance. Thus, it is believed that anxiety can be subdivided into somatic and cognitive forms and that each of these can then be used to make different performance predictions. This is in accordance with some of the findings of previous research that found students who showed higher anxiety levels, especially during their first swimming classes, that achieved lower results in swimming skill tests (Sattari et al., 2013). Avramindou et al. (2007) and Sattari et al. (2013) found a negative linear trend between anxiety and swimming performance as well as a positive linear trend between self-confidence and performance. Cognitive state anxiety was excluded from the hierarchical regression in which case somatic state anxiety became a significant predictor of performance (Mabweazara et al., 2016). The behavior observation instrument that contains 27 items with some additions of observations-behavior often are dealing directly with water. After analysis of the correlation of test results, it is significant once the validity is compared to the test instrument performance. Previous research on basic swimming ability tests was almost similar; it has seven components, which are 1) introductory confidence and adjustment skills, 2) breathing and bouncy skills, 3) gliding and body control skills, 4) initial diving skills, 5) leg movement, 6) arm movement, and 7) coordination and combination swimming skills (Cureton, 2015).

Conclusions

Based on the results of the analysis of study validity, reliability, and predictive validity of the instruments to measure specific anxiety to water in the form of a questionnaire, i.e. SCAT-M, instrument observation of behavior (ABO), and test performance, all three showed significant scores for the validity coefficient correlation. Instrument SCAT-M showed moderate strong validity, observation behavior (ABO) showed a strong coefficient correlation, and the performance test instrument was in the moderate strong category. The results of reliability testing using the SCAT-M instrument showed high reliability. The ABO instrument showed reliability in the very high category, and the performance test showed reliability in the very high category. All three instruments showed the same high level of consistency. The results of analysis of the predictive validity with SCAT-M measurements showed a high anxiety level, and the performance test showed a significant relationship, but with negative and low performance. The measurements with the ABO instrument showed a high level of anxiety, and the performance test showed a significant validity of predictive values but negative and low performance. The results of measurements of specific anxiety on the water using either the SCAT-M instrument or behavioral observation, the students who have high anxiety can be predicted correctly when they have low performance test results. Their low appearance results is limited to the ability to dive their heads into the water and float. Some can glide but only 2 m. On the contrary, for students who have low anxiety, both measurements using the instruments SCAT-M and ABO can be predicted to show high ability on the screening test. They have high-level performance, i.e., they have coordination in the movements of the legs and arms and are able to breathe limitedly between three and four times.

Recommendations

Instruments as specific measurement tools are needed for data accuracy, especially instruments for measuring the level of anxiety in the water. This is important especially for teachers in sport schools, such as swimming coaches, to better define strategies, methods, and approaches for teaching swimming to beginners, and they should perform measurements against the anxiety of students who are afraid of the water. Thus, the instrument SCAT-M can be used to evaluate the anxiety status of students. Instrument SCAT-M can be performed in class before students are given swimming practice. This aims to predict the level of basic swimming ability and can be used as an alternative method of measuring anxiety in water, if students object to testing in water. For the special beginner swimming coach, this is to check the important approach of testing student anxiety via performance tests with bias or test the level of basic capabilities.

Acknowledgement

The authors would like to thank Falcon Scientific Editing (https://falconediting.com) for proofreading the English language in this paper.

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