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Construct Validity of the Anxiety Rating Scale -2 with Youth Wrestlers

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ABSTRACT

The purpose of this study was to examine the construct validity of the Anxiety Rating Scale-2 in a field sport setting of wrestling. Participants were 91 youth-sport wrestlers competing in a state wrestling tournament (M age = 14.2, $U>SD = 1.2$). Fifteen minutes prior to competition, participating wrestlers completed the ARS-2 (Cox, Russell, & Robb, 1998). Wrestlers' match outcome was tracked (win, loss) and recorded. A one-way multivariate analysis of variance indicated a significant main effect for outcome. Follow-up descriptive discriminant procedures yielded structure coefficients suggesting the discriminatory ability of self-confidence in predicting outcome. Structure coefficients for cognitive anxiety, somatic anxiety, and self-confidence were -.29, -.27, and .99, respectively. These results support previous ARS-2 construct validity studies in that winning and losing wrestlers could be discriminated as a function of ARS-2 self-confidence score, but not cognitive anxiety and somatic anxiety scores. Results are discussed in terms of the importance of accurate short-form psychological assessment of precompetitive anxiety and the importance of self-confidence in moderating cognitive and somatic anxiety in wrestling.

Introduction

The Anxiety Rating Scale (ARS) was developed by Cox, Russell, and Robb (1998, 1999) as a short-form version of the Competitive State Anxiety Inventory-2 (Martens,

Burton, Vealey, Bump, & Smith, 1990) for use in valid and reliable assessment of precompetitive anxiety when time was of concern. Items were conceptualized as single statement "RPE-like" (Borg, 1973) rating scale items, allowing immediate assessment of athletes' precompetitive cognitive state anxiety, somatic state anxiety, and self-confidence. The short form was constructed by taking items from the inventory of Martens, et al. (1990). Responses were stepped into a multiple regression analysis to determine the best 3-item prediction model for somatic anxiety, cognitive anxiety, and self-confidence (Cox, Russell, & Robb, 1996). Then, three items were collapsed into a single aggregate statement for each subscale. Thus, the short form is derived directly from the CSAI-2 and multidimensional anxiety theory (Martens, Vealey, & Burton, 1990). In addition, results of previous investigations (Cox, et al., 1998, 1999) have shown scores on the short version to be moderately correlated (.60 to .70) with anxiety and self-confidence components of Marten et al's (1990) inventory.

Concurrent validity of the ARS has been established previously within team sports (Cox, Robb, & Russell, 2000; Cox et al., 1999) and individual sports (Cox, Reed, & Robb, 1997). Scores were moderately correlated with CSAI-2 subscales (Cox et al., 1997) and has compared favorably with Krane's (1994) modification of the Mental Readiness Form (MRF-L), originally developed as another short-form for assessment of competitive anxiety (Murphy, Greenspan, Jowdy, & Tammen, 1989). Studies in which these two short-form anxiety scales have been compared have consistently favored the cognitive and somatic subcomponents of the ARS (Cox, et al., 1997; Cox et al., 1999). Specifically, Cox et al. (1999) compared the ARS, MRF-L, and CSAI-2 in assessment of precompetitive basketball anxiety. Correlations among scores on the MRF-L and CSAI-2 cognitive, somatic, and self-confidence subscales were .52, .67, and -.62, respectively. Correlations of scores on the ARS with those on the CSAI-2 cognitive, somatic, and self-confidence CSAI-2 subscales for all participants were .60, .72, and .59, respectively.

Recently, the original ARS was revised because certain words used to describe one construct could easily be interpreted as describing another. For example, the word "nervous" appears as a somatic statement but could be interpreted as being related to cognitive anxiety. Therefore, the revised ARS, hereafter referred to as the ARS-2, was based upon subjective judgement of researchers (Cox et al., 2000) as to which three CSAI-2 subscale items seemed most logically related to these respective anxiety subscales. When compared with the original ARS, the revision exhibited the highest concurrent validity with scores on the original CSAI-2 ($r = .67$ for cognitive anxiety, $r = .69$ for somatic state anxiety, $r = .75$ for self-confidence; Cox et al., 2000). The construct validity of the ARS-2 was also recently demonstrated with team sport athletes. Examining male and female intramural basketball athletes, Cox, et al.(2000) reported that precompetitive scores on the ARS-2 discriminated between winning and losing teams. Specifically, Self-confidence, followed by Cognitive State anxiety were most important in discriminating between winning and losing teams. It was proposed that follow-up construct validity studies with individual sport athletes and different age groups (Cox, et al., 2000) be undertaken.

Russell and Cox (2000) performed such a study for six different sport events and found that winning and losing athletes could be discriminated as a function of their ARS-2 Self-confidence scores. Specifically, descriptive discriminant analysis indicated that Self-confidence, but not Cognitive state anxiety nor Somatic state anxiety, was meaningful in predicting game outcome. It seemed that cognitive and somatic state anxiety were not meaningful in discriminating game outcome because words representing these dimensions may have been interpreted differently by successful and unsuccessful athletes.

Previous construct validity results (Cox, et al., 2000; Russell & Cox, 2000) highlight the importance of Self-confidence in distinguishing successful and unsuccessful athletic performance. Jones, Hanton, and Swain (1994) found that, while there were no differences in perceived intensity of Cognitive and Somatic state anxiety of elite and nonelite athletes, elite athletes perceived their anxiety as more facilitative and also reported higher Self-confidence. This notion was recently supported in that athletes with lower scores in Cognitive and Somatic state anxiety and higher Self-confidence scores perceived anxiety as more facilitative toward performance and had higher pre-performance expectations (Wiggins & Brustad, 1996). A recent review of research on peak performance (Williams & Krane, 1998) concluded that the most consistent finding was higher Self-confidence among successful competitors.

Recently, more attention to different skill and age groups has been advocated within competitive anxiety research (Perry & Williams, 1998). Sport psychologists (Krane, 1995; Vealey & Garner-Holman, 1998) have called for more inclusive research and practice of sport psychology and Krane (1995) has emphasized that research should not focus solely on elite athletes. Specifically, anxiety-performance relationships that have been observed within empirical research with elite athletes have been assumed to hold within less skilled athletes or in youth sport settings, without direct observation (Krane, 1995). The rationale for examining ARS-2 construct validity is that more skilled athletes should display lower scores on precompetitive Cognitive and Somatic state anxiety but higher scores on Self-confidence than less skilled athletes, which would be observable in match outcome as more skilled athletes are likely to be winners. Scores on cognitive and somatic state anxiety have been lower for more successful athletes while confidence has been higher than that of unsuccessful athletes (Martens, Vealey, & Burton, 1990). In addition, more successful athletes seem to differ from less successful athletes on their precompetitive anxiety and self-confidence (Fenz, 1972; Mahoney & Avenier, 1977; Wiggins & Brustad, 1996). For example, Wiggins and Brustad (1996) found that with high school athletes, higher self-confidence and lower anxiety were associated with higher expectations, more facilitative perceptions, and better performance. Superior athletes, then, should not only be described by higher confidence and lower anxiety relative to less accomplished athletes, but this should also be reflected in resultant competitive outcome.

The present study continued the investigation of ARS-2 construct validity with a different age group in wrestling matches outcomes. It was hypothesized that for first-round wrestling matches in a state-wide tournament, the ARS-2 would discriminate

between winning and losing athletes, as Cognitive State and Somatic State anxiety scores would be significantly lower for match winners than for losers and that ARS-2 Self-confidence scores would be significantly higher for match winners than losers. Previous research on the multidimensional nature of anxiety (Martens et al, 1990) has found negative linear relationships between Somatic State anxiety and performance and Cognitive State anxiety and Somatic State anxiety have shown to be positively related in athletic settings. Therefore, it was hypothesized that for these youth athletes, higher Somatic State anxiety would reflect negative outcome.

Method

Participants

Participants were 91 male wrestlers ranging from 12 to 16 years old (M age = 14.2, SD = 1.2) competing in a state-wide wrestling meet at a large midwest university. Entries were individuals or members of club teams within their appropriate weight classes which ranged from 91 pounds to heavyweight (278 pounds).

Instruments

The ARS-2 was used to measure precompetitive Cognitive State anxiety, Somatic State anxiety, and Self-confidence. The reported concurrent validity with the CSAI-2 is .67 for Cognitive state anxiety, .69 for Somatic state anxiety, and .75 for Self-confidence (Cox et al., 1998). Evidence of construct validity is available for both collegiate intramural basketball players (Cox et al., 1999) and collegiate intramural individual sport athletes (Russell & Cox, 2000). The current inventory is based upon a single statement - rating scale format, using three aggregate statements and a 7-point Likert scale (1=not at all, 2=a little bit, 3=somewhat, 4=moderately so, 5=quite a bit, 6=very much so, 7=intensely so) so precompetitive anxiety can be assessed immediately prior to competition, and within competition, to assess changes in anxiety during competition. The current ARS-2 has three items. The item for Cognitive State Anxiety reads "I feel concerned about performing poorly, choking under pressure, and that others will be disappointed with my performance". The item for Somatic State Anxiety reads, "I feel jittery, my body feels tense, and my heart is racing". Finally, the Self-confidence item reads, "I feel comfortable, secure, and confident about performing well".

Procedure

Use of human subjects for the purpose of research was approved and participants' inventories were coded for anonymity. Prior to the start of the tournament, the meet supervisor was briefed on the project and both parent's and meet supervisor's approval were granted prior to data collection. The tournament was structured such that each wrestler competed in a round-robin format with several other wrestlers in the same section of the draw. Athletes with the best round-robin win-loss record within their section of the draw then advanced to a single-elimination tourney for the remainder of the tournament. There were an average of six wrestlers in each section and matches consisted

of two three-minute periods. Prior to each first-round match wrestlers checked-in with meet officials and remained in a warm-up area, while they waited for their match. Wrestlers who agreed to participate were approached approximately 15 min prior to the start of their match and asked to complete the ARS-2 relative to how they felt at that moment in time. Athletes were also asked if they had any information regarding their opponent. Such information was deemed important to consider since information such as opponent's match record may have influenced perceptions regarding ability, thus wrestlers' pre-competitive anxiety.

Because precompetitive ARS-2 measures were compared with each wrestler's match outcome their performance was tracked and match result recorded. The rationale for examining only first-round competition was to minimize the bias on precompetitive anxiety levels as a function of the wrestler's previous round performance and outcome. As repeated assessment of precompetitive psychological constructs such as anxiety and self-confidence can be influenced by previous match outcome (Sonstroem, Harlow, & Salisbury, 1993) and repeated successful outcomes can alter performance expectations (Wiggins & Brustad, 1996) each participant was assessed only once. In the analysis, performance in the first round match was the independent variable.

Analysis

Data were analyzed using a one-way multivariate analysis of variance with outcome as the categorical independent variable and the three ARS-2 subscales (Cognitive State anxiety, Somatic State anxiety, and Self-confidence) serving as continuous dependent variables. Because scores on the dependent variables of interest (Cognitive State anxiety, Somatic State anxiety, and Self-confidence) have been correlated (Martens, Velaey, & Burton, 1990), it is considered inappropriate to examine them univariately (Pedhazur, 1997). Significant multivariate F ratios were followed up by descriptive discriminant analysis procedures using a combination of ARS-2 subscale scores to discriminate between outcomes of win and loss. Total structure coefficients were analyzed from a descriptive discriminant analysis to identify which component was the most important in discriminating between match outcome. In addition, intercorrelations among score on ARS-2 Cognitive State anxiety, Somatic State anxiety, and Self-confidence were calculated to estimate the magnitude of association. In all analyses an *a priori* alpha level of .05 was adopted.

Results

Pearson product-moment correlations were somewhat lower among the three subscales than previously reported (Martens, et al., 1990). Coefficients between scores on Cognitive State anxiety and Somatic State anxiety were .34, ($p = .001$), Somatic State anxiety and Self-confidence $-.22$, ($p = .04$), and Cognitive State anxiety and Self-confidence $-.16$, (*ns*). Table 1 contains the means and standard deviations across match outcome for scores on the subscales. A one-way multivariate analysis of variance for scores on ARS-2 subscales yielded a significant main effect for outcome, ($F = 3.94$, $p = .01$). The Wilk Lambda for this main effect was .88, indicating that 12% of the variance

of game outcome was accounted for by ARS-2 scores (Pedhazur, 1997). To estimate the relative contribution of the dependent variables in the significant main effect, the MANOVA was followed up by a descriptive discriminant analysis. For this study, the total structure coefficients for Cognitive State anxiety, Somatic State anxiety, and Self-confidence were -.29, -.27, and .99, respectively. While only Self-confidence reached statistical significance ($p < .05$), the coefficients for Cognitive State anxiety (-.29) and Somatic State anxiety (-.27) approached significance and were in the predicted direction.

Table 1

Means and Standard Deviations for Outcome on ARS-2 Cognitive Anxiety, Somatic Anxiety and Self-confidence Subscales

Outcome	<i>N</i>	<u>Cognitive Anxiety</u>		<u>Somatic Anxiety</u>		<u>Self-Confidence</u>	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Won	45	2.77	1.59	3.51	1.71	5.37	1.35
Loss	46	3.08	1.50	3.83	1.66	4.32	1.55

Discussion

The three subscales of the ARS-2 were examined for utility in explaining the relationship with match outcome for youth wrestlers to provide further evidence of the construct validity with a younger sample of athletes. Because the main effect for outcome was significant and there were only two levels of outcome, total structure coefficients provided evidence for the construct validity of the ARS-2 in that one can discriminate between winning and losing youth wrestling outcomes based upon ARS-2 Self-confidence scores. It is important to note that while ability was assumed to vary across athletes, ability per se, may not have influenced differences in self-confidence between winners and losers. In addition, wrestlers had no information regarding opponents' records or ranking, therefore, perceived ability of opponents was unlikely a factor.

Results supported previous findings on construct validity (Russell & Cox, 2000) in that the MANOVA results indicated outcome was related to ARS-2 scores and the descriptive discriminant analysis identified precompetitive Self-confidence was meaningful in this relationship. Cox et al., (2000) found that both Self-confidence and Cognitive State anxiety were meaningful in discriminating between winning and losing athletes. Within this study, Cognitive State anxiety and Somatic State anxiety fell just below the level to be considered meaningful to the discriminatory power of the ARS-2. Given these limitations, the ARS-2 was still effective in differentiating winning and losing athletes.

Ideally, a stronger relationship between precompetitive ARS-2 scores and wrestling outcome was desired. Nevertheless, this study provided further support for construct validity of the ARS-2 in an authentic competitive setting. The structure coefficient for ARS-2 Self-confidence meaningfully ($r = .99$) discriminated winning and losing, supporting previous findings (Cox et al., 2000; Russell & Cox, 2000). These results reinforce the importance of self-confidence in the athlete's potential for positive athletic outcomes.

It should be noted that in the present investigation, curvilinear and interactive relationships between cognitive anxiety and somatic anxiety were not considered. In addition, research has shown that, when performance begins, Somatic State anxiety may dissipate rapidly, whereas Cognitive State anxiety fluctuates throughout a contest as the probability for success or failure changes (Fenz, 1975; Hardy & Parfitt, 1991).

Recent developments in precompetitive anxiety assessment have indicated that athletes with higher self-confidence perceive their anxiety as more facilitative (Wiggins & Brustad, 1996). The present study did not incorporate a directional scale with ARS-2 subscales which measure only intensity of precompetitive anxiety. Differential interpretation of precompetitive anxiety, however, may have accounted for the nonsignificant results with cognitive and somatic anxiety. It has been noted that various individual difference variables such as interpretation of direction of anxiety (Jones & Swain, 1995) and predisposition of high negative affect (Jones, Swain, & Harwood, 1995) influence measurement of performance outcomes. The nature of the sport has also previously been identified as an important factor influencing the anxiety response (Martens, et al., 1990), and it is more likely that anxiety symptoms of high intensity will be interpreted as facilitative for short duration, explosive sports such as wrestling. Mean ratings of Cognitive State anxiety and Somatic State anxiety ($M = 2.9$, $SD = 1.6$ and $M = 3.6$ and 1.7 , respectively) were higher than those of intramural individual sport athletes ($M = 2.5$, $SD = 1.6$ and $M = 2.4$, $SD = 1.5$, respectively) (Russell & Cox, 2000), indirectly consistent with differential interpretations of Cognitive State and Somatic State anxiety across athletes. From a dispositional perspective, successful performers do not differ from unsuccessful ones on intensity of precompetitive anxiety, but the former typically have a more positive interpretation of these symptoms in terms of consequences for performance (Jones & Swain, 1995). Specifically, Jones and Swain found that, after they administered a revised CSAI-2 to athletes and categorized them as elite or nonelite, differentiation of the two groups using the intensity component was not possible. However, the directional component did differentiate athletes as elite athletes viewed intense responses as more facilitative to performance. Finally, Jones (1995) reported that advances in assessment of competitive anxiety require measures which accurately reflect cognitions and emotions and take into consideration cognitive appraisal in a multidimensional model. Since only 12% of the variance in winning/losing was explained by the ARS-2 scales, it may be that a more substantial portion of the variance may have been accounted for by assessing wrestlers' functional interpretation of precompetitive anxiety components.

Results from this study and previous work (Cox, et al., 2000; Russell & Cox, 2000) lend encouragement for the construct validity of the ARS-2 scale as a short-form anxiety scale which may be used to assess precompetitive anxiety when time is a concern. By integrating a directional scale into the inventory, the construct validity could be supported if cognitive anxiety was rated as significantly more facilitative by successful performers (Jones, Swain, & Hardy, 1993). This differential interpretation would account for the lack of discrimination of outcomes for cognitive and somatic anxiety.

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