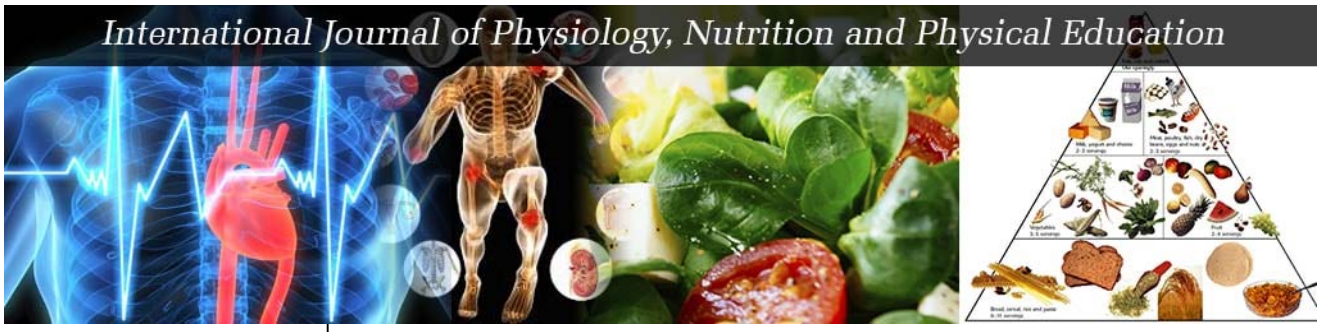

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Construction and standardization of sports anxiety questionnaire

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Abstract
This study describes the process of developing and validating a multidimensional Sports Anxiety Questionnaire for the north India sports population. The study was conducted in two phases. In the first phase, 96 test items were prepared and content validated. After consultations with the subject experts these were reduced from 96 to 39, data collected from 150 students were used to provide evidence for validity and reliability of the structure and its underlying dimensions. A five-dimensional structure emerged: Anxiety management, Uncertainty, Congnitive and somatic factor, Environmental factor and Self-doubts. In the second phase, data collected from 1500 sports students were used to confirm five-factor structure of the 39-item SAQ. The Cronbach's Alpha coefficients for the dimensions ranged from .880, demonstrating a satisfactory level of reliability. Further validation studies were also conducted and their findings provided. This validated scale will be a useful tool for both researchers and instructors to assess players' sports anxiety.

Keywords: sports anxiety questionnaire, cronbach's Alpha coefficients

Introduction
The relationship between anxiety and sport performance has attracted much research attention over the past 20 years, and researchers have tried to clarify this relationship by advancing several models and theories. It is generally recognized that psychological factors are of crucial importance in high-level competitive sports. The relation between anxiety and performance has been the subject of many thorough researches Craft *et al.,* Martens et al. Cognitive anxiety is characterized by negative concerns and worries about performance, inability to concentrate, and disrupted attention Krane *et al.,* Somatic anxiety consists of an individual's perceptions, which are characterized by indications such as sweaty palms, butterflies, and shakiness Martens et al.

Anxiety is one of the most frequently researched constructs in sport and exercise psychology (Cox *et al.,* 2003; Lundqvist and Hassmén, 2005) [21, 22] because it is a common emotional experience in stressful situations (Spielberger, 1972) [23]. Athletes can experience a great deal of performance-related stress in competitive sport. Precompetitive anxiety has been a particular focus of interest in sport and exercise psychology research (Martens *et al.,* 1990b) [24]. Anxiety in sports can have detrimental effects on performance (Hayslip *et al.,* 2010; Wilson *et al.,* 2006) [25, 26] and significant relationships have also been reported with perfectionism (i.e., negative reaction to imperfection; Stoeber *et al.,* 2007) [27], injury (Lavallée and Flint, 1991), and burnout in athletes (Cremades *et al.,* 2011). Importantly, athletes with a high level of trait anxiety had a higher level of state anxiety than athletes with a lower level of trait anxiety (Hanton *et al.,* 2002; Martens *et al.,* 1990b) [30, 24]. Thus, understanding sport-specific trait anxiety among athletes is important.

Competitive anxiety is defined as sport-specific trait anxiety that regularly appears before or during competition (Martens, 1977) [11]. This context-specific approach complements the dual conceptualization of state-trait anxiety proposed by Spielberger (1966) [19]. Multidimensional anxiety theory (Martens, Burton, Vealey, Bump, & Smith, 1990) [24] holds that competitive anxiety, such as state and trait anxiety, can occur at the somatic or cognitive level. Somatic

anxiety refers to bodily reactions to over-activation, such as muscular tension, whereas cognitive anxiety refers to thought content, such as worries related to the potential consequences of poor performance. Two questionnaires have been developed based on the above theory. The Competitive State Anxiety Inventory-2 (CSAI-2; Martens *et al.,* 1990) [24] focuses on the situational occurrence of the phenomenon, and the Sport Anxiety Scale-2 (SAS-2; Smith, Smoll, Cumming, & Grossbard, 2006) [16] focuses on sport-specific trait anxiety, originally defined by Martens. While the study of state anxiety provides relevant information about an athlete's assessment of the competition, competitive trait anxiety (also called sport performance anxiety) provides information about an athlete's predisposition to respond to competition with state anxiety, which is a performance-related fear-of-failure construct (Smith, Smoll, & Passer, 2002) [16].

To design questionnaire for athletes, research in the field of competitive anxiety has focused on identifying differences in anxiety symptoms across groups that differ by gender, age or type of sport. With respect to gender, female athletes typically report higher levels of global competitive trait anxiety (Abrahamsen, Roberts, & Pensgaard, 2008; Martens *et al.,* 1990) [2, 24], factors related to worries (Grossbard, Smith, Smoll, & Cumming, 2009) [6] and competitive state anxiety. Moreover, some researchers suggest that gender serves as a moderator between the antecedents and consequences of anxiety. Specifically, moderating effects have been observed between the motivational climate and anxiety (Grossbard, Cumming, Standage, Smith, & Smoll, 2007) [6] and between anxiety and performance (Woodman & Hardy, 2003) [20]. With respect to age, research has focused on the increasing competitive demands associated with age and has observed slightly higher levels of cognitive anxiety in older athletes (Craft, Magyar, Becker, & Feltz, 2003) [3]. However, these studies have also found that older athletes exhibit better coping strategies and are more likely than their younger counterparts to perceive this type of anxiety as facilitating their performance (Craft *et al.,* 2003; Cruz, Dias, & Fonseca, 2010) [3]. With respect to the effect of the type of sport (i.e., individual versus team sports), studies have primarily focused on state anxiety. In their classic study, Simon and Martens (1979) [15] found that athletes who participate in individual sports such as gymnastics report higher state anxiety levels than do athletes in team sports such as basketball. Consistent with this research, Kirby and Liu's (1999) [9] study of Chinese athletes found that track and field participants report higher somatic anxiety and lower self-confidence than do basketball players. When the type of sport has been examined as a moderator variable, a meta-analysis of the relationship between the CSAI-2 and performance (Craft *et al.,* 2003) [3] has revealed a moderating effect of sport type such that cognitive and somatic anxiety exert a greater influence on performance in individual sports. Therefore, a review of the earlier research indicates that most previous studies have focused on the effect of single variables on state anxiety rather than trait anxiety and that few studies have compared the simultaneous effect of multiple variables on competitive trait anxiety.

Few studies have explored the cognitive-affective components of anxiety from a developmental perspective. In one instance, however, White and Farrell (2001) [1] administered the Revised Children's Manifest Anxiety Scale to children between the ages of 10 and 14 and used confirmatory factor analysis (CFA) to test several models, all of which posited separate arousal and worry factors. Their analyses provided evidence of cognitive-somatic differentiation. However, the average participant in this study was nearly 12 years old and no analyses were done by age group, so that we cannot be certain of cognitive-somatic differentiation in the younger age groups. Moreover, this question has not been explored within the context of performance anxiety. The availability of a trait scale with age-appropriate items could be a useful research tool in determining whether and at what age level cognitive-somatic differentiation in emotional experience emerges in sport-related anxiety reactions.

Although the major reason we undertook to develop a new scale was the assessment of multidimensional anxiety in sports students. Results of several studies indicate that the factorial validity of the SAS is not as sound as originally suggested. We were hopeful that the new scale would exhibit stronger psychometric properties and a better model fit. Our major focus was on developing a sports students-appropriate scale.

The Sports Anxiety Questionnaire (SAQ) originated as a competitive trait and state anxiety measure based on multidimensional anxiety theory that assesses both somatic and cognitive symptoms of sport anxiety. The factor analysis yielded 5 factors specific to the study of sports Anxiety. These factors include Self Doubt, Uncertainty, Cognitive and Somatic factor, Environment factor, Anxiety Management. These factors are considered relevant for construction of Sports Anxiety Questionnaire since the items falling under these factors have significant rotated factor loadings, which is evident from the results of factor analysis.

Objectives of the Study

The researcher has decided the following objectives.

1. To develop the statements for measuring anxiety of sports persons.
2. To construct and standardize a sports anxiety scale.
3. To develop norms of sports anxiety scale.

Population and Sample of the Study

In the present study, the data collected from fifteen hundred (N=1500) (male=750) (female=750) sports persons. The age of the subjects was ranged between 17 to 28 years. Further, the subjects were assigned to three age categories on the basis of their calendar age i.e. 17 to 20, 21 to 24 and 25 to 28 years age. All the sports persons were randomly obtained from the Inter University competitions and other similar state and national tournaments of North India.

Construction of Questionnaire

The first step of the construction of the The Sports Anxiety Questionnaire (SAQ) is to construct the items The questionnaire was prepared with basic concept or objective. The information required for judging the anxiety in the field of sports was extracted by reviewing the literature and guidance of experts. The statements/items included in the questionnaire were based on the available literature and suggestion of experts. Books, journals, newspapers, interviews in research papers, online published papers and periodicals were the sources for the relevant information needed for the study. In addition with the existed literature, experts from different fields such as psychology, education, sociology, physical education was taken.

Evaluation by Experts and Reconstruction of the Tool

The items were prepared by the researchers and evaluated by the experts of the subject and language. The researchers

followed their suggestions and made necessary modifications in the Sports Anxiety Questionnaire. This modified Sports Anxiety Questionnaire (SAQ) consisted of 39 items.

Statistical Technique/Procedure

The present work was a descriptive study based on a survey conducted male and female sportspersons. The purpose of the study was to construct the Questionnaire for Sports Anxiety and then develop norms for athletes in the age group of 17 to 28 years. The data was analyzed by calculating the percentage of response in favour or against each statement. The Percentage value of each statement was evaluated to see the responses which are in favour and against the each statement. The proportion of the responses for every single item was assessed and represented through tables and graphs. Factor Analysis (factorial design) was used to construct the Sports Anxiety Questionnaire.

Pearson's Product-moment correlation was calculated to establish validity, reliability and objectivity of the scales.

Percentile Scale was used to develop the norms of the Sports Anxiety Questionnaire. T-test was used to find out the significance of differences between male and female athletes.

Results

The principal component analysis was carried out on the data for factor analysis. Varimax orthogonal technique was used for rotation. After analysis, 39 items were selected for the final draft. The 39 items were distributed under 5 factors.

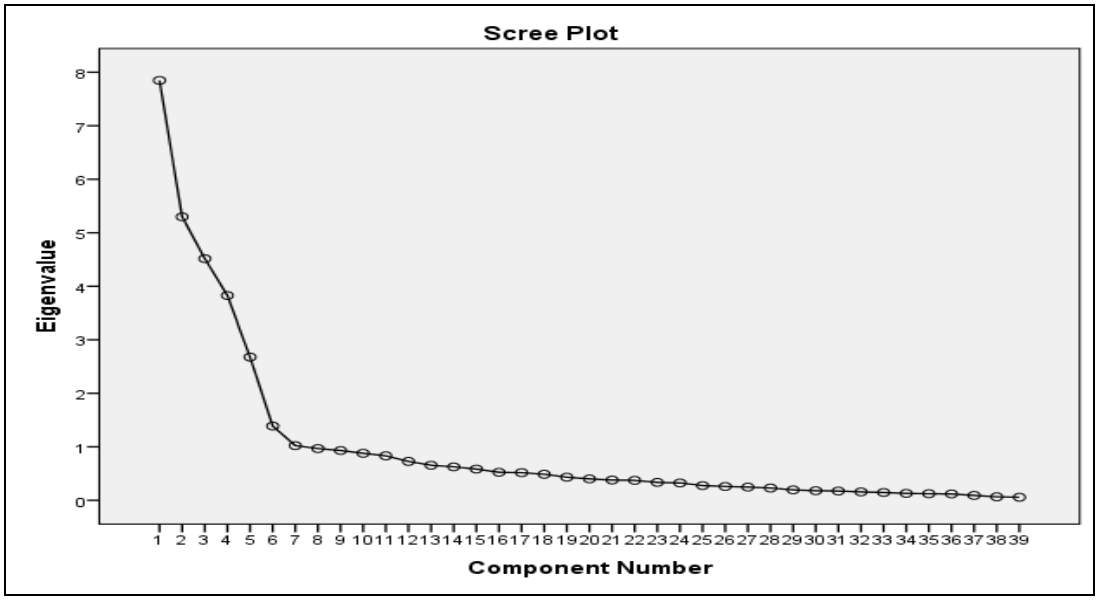

Fig 1: Scree plot showing five factors

According to Figure 1, there was a sharp drop in the first five factors. The KMO measures the sampling adequacy (which determines if the responses given with the sample are adequate or not) which should be close than 0.5 for a satisfactory factor analysis to proceed. Kaiser (1974) recommend 0.5 (value for KMO) as minimum (barely accepted), values between 0.7-0.8 acceptable, and values above 0.9 are superb. Looking at the table below, the KMO measure is .825, which is acceptable. Bartlett's test is another indication of the strength of the relationship among variables.

Rotated component matrix

The idea of rotation is to reduce the number factors on which the variables under investigation have high loadings. Rotation does not actually change anything but makes the interpretation of the analysis easier. Looking at the table below, we can. As we can see in the above table, on the basis of the factor loadings, factor 6 and 7 resides very low number of items and hence we can stick with only first five factors. Factor 1 comprises of nine items such as s30, s31, s32, s34, s35, s36, s37, s38 and s39; Factor 2 contains seven items such as s9, s11, s14, s15, s16, s27 and s28; Factor 3 contains eight items such as s10, s12, s13, s17, s18, s19, s22 and s29; Factor 4 comprises of eight items such as s1, s2, s3, s4, s5, s6 , s7 and s8; and Factor 5 contains six items such as s20, s21, s23, s24, s25 and s26. These factors can be used as variables for further analysis (Table 1).

Table 1: Rotated component matrix

Rotated Component Matrix							
	Component						
	1	2	3	4	5	6	7
s32	.942						
s35	.865						
s38	.859						
s36	.846						
s37	.830						
s34	.802						
s39	.740						
s31	.679						

s30	.632						
s16		.923					
s9		.903					
s15		.846					
s28		.723					
s27		.721					
s14		.703					
s11		.697					
s17			.850				
s18			.752				
s22			.735				
s13			.735				
s19			.690				
s29			.666				
s12			.607				
s10			.573				
s6				.887			
s7				.740			
s8				.718			
s2				.717			
s5				.684			
s1				.682			
s3				.665			
s4				.653			
s20					.866		
s23		.414			.754		
s26					.734		
s25					.716		
s24					.688		
s21					.684		
s33						.814	

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

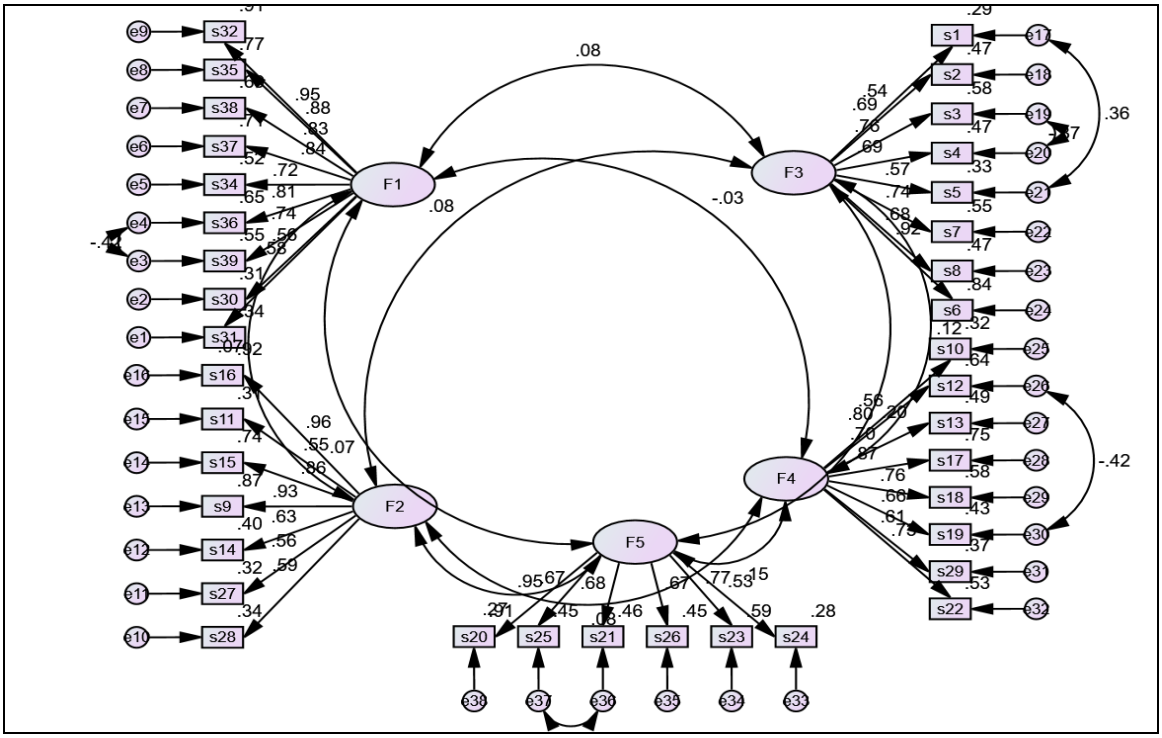

Fig 2: First order CFA model explaining influence of each factor

On the basis of CFA model explaining the influence of each factor, factor 6 and 7 resides very low number of items and hence we can stick with only first five factors. Factor 1 comprises of nine items such as s30, s31, s32, s34, s35, s36, s37, s38 and s39; Factor 2 contains seven items such as s9, s11, s14, s15, s16, s27 and s28; Factor 3 contains eight items such as s10, s12, s13, s17, s18, s19, s22 and s29; Factor 4 comprises of eight items such as s1, s2, s3, s4, s5, s6 , s7 and s8; and Factor 5 contains six items such as s20, s21, s23, s24, s25 and s26.

Reliability and Validity

Reliability of the scale was estimated by the method of Cronbach Alpha and found to be .88.

Content Validity is established by the experts. Concurrent validity of sports anxiety questionnaire of the scale was estimated by correlating scores in Sports Competitive Anxiety Test (SCAT) Rainer Martens (1977) [11] and it was found to be .844**. Predictive validity of sports anxiety questionnaire involves testing a group of subjects for a certain construct, and then comparing them with results obtained at some point in the future and it was found to be .907**

Construct validity of sports anxiety questionnaire is found .825**

Objectivity

To establish the objectivity the test data on 50 subjects were collected using test and retest method. The objectivity score for the Sports anxiety questionnaire is .89.

Norms

Norms are considered as the reference point in interpreting the test score of a particular variable measured using a psychological scale. It is essential feature of a standardized psychological instrument. Norms for the Sports anxiety questionnaire for total sample, Males and Females separately were developed. From the table it can be seen that Males and Females are having more or less equal sports anxiety.

Percentile	Male	Female	Male (17-20)	Female (17-20)	Male (21-24)	Female (21-24)	Male (25-28)	Female (25-28)
100	157	166	157	168	155	153	151	155
95	144	159	144	163	145	143	143	145
90	140	157	140	161	142	140	138	142
85	137	155	137	159	138	137	135	138
80	136	154	136	158	137	135	133	136
75	134	151	134	157	136	133	130	133
70	132	146	132	157	134	132	127	129
65	131	142	132	156	133	131	124	125
60	130	138	131	155	132	131	123	124
55	129	135	130	155	131	130	121	123
50	128	132	129	155	130	129	119	122
45	126	130	128	154	129	129	117	120
40	124	129	127	154	128	127	115	117
35	123	126	125	153	128	125	113	114
30	120	124	124	152	127	124	110	112
25	118	121	122	151	124	121	107	109
20	116	118	119	148	123	119	105	107
15	111	114	116	145	119	117	101	104
10	107	108	115	141	117	112	98	102
5	100	104	109	131	109	107	92	95
0	79	80	101	116	93	91	79	80

In this table the norms of the Sports Anxiety Questionnaire for the male athletes have been presented. The scores of the scale have been displayed parallel to the Percentile Scores. The 100th score on Percentile Scale is equivalent to high level of sports anxiety. The 50th Percentile Score is equivalent to average level of sports anxiety. The lowest level of anxiety is equivalent to 0 on the Percentile Scale. The other scores have been correspondingly shown against the Percentile Scores, which have been spread up from 0 to 100 with a difference of 5 in each step i.e. 0, 5, 10, 15, 20 and so on. The above table shows the different prescribed percentile between 0- 100 which is divided into four quarters 0-25, 26-50, 51-75, 76-100 percentiles. In first quarter the scores 79 is for 0 and 118 for 25 percentiles which represent the low level of anxiety, in second quarter the scores 119 is for 26 and 128 is for 50 percentiles which represents the average level of anxiety, in third quarter the scores 129 is for 51 and 134 is for 75 percentiles which represents the above average level of anxiety, in fourth quarter the scores 135 is for 76 and 157 is for 100 percentiles which represents the high level of anxiety.

Conclusions

The following conclusions can be drawn from the present study: -

1. The factor analysis yielded 5 factors specific to the study of sports Anxiety. These factors include Self Doubt, Uncertainty, Cognitive and Somatic factor, Environment factor, Anxiety Management.
2. These factors are considered relevant for construction of Sports Anxiety Questionnaire since the items falling under these factors have significant rotated factor loadings, which is evident from the results of factor analysis.
3. The Sports Anxiety Questionnaire developed by the researcher is valid.
4. The newly developed test inventory of sports anxiety meets the criterion of scientific authenticity, as the test is reliable, objective and valid.
5. This inventory is applicable to the sports population of the North India.
6. Significant differences were found between male and female athletes on variable sports anxiety.

Discussion

The measurement of sports anxiety associated to sports performance is an important issue to be resolved. It appears that we have been using general scales related to sports anxiety, which do not reflect in depth the characteristics that differentiate individuals in different sports. Our assumption to develop a Sports Anxiety Questionnaire is based on a premise that there are specific characteristics which help to persist in sports and to excel in it, provided the right type of training and environment are available.

A keen observation of the newly constructed Questionnaire may reveal that it has been developed on the broad base of research that supports the constituents of the sports anxiety. The emergence of the larger number of factors in Sports Anxiety Questionnaire implies that the research field is wide

enough to provide evidence in this regard.

There are five factors which have constituted the scale and the highest rotated loadings are evident in each factor which have enabled us to label them accordingly. The fact however remains that these factors may not have been properly focused upon by the researchers in this field. However, this scale limits us only to the population that has been covered by it. It is therefore recommended that the research in this field may be extended to other states and countries to develop more specific tools to represent each culture

Table of norms reflecting a distribution of the Sports Anxiety Questionnaire has been prepared separately for males and females since significant differences have been found between them. The difference between athletes of different age group found significant hence, different norms have been prepared separately for different age group of male and female athletes. Hull Scale and Percentile Scale have been used to develop norms for the male and female athletes. Normative tables may be useful for the coaches interested in comparing their trainees to determine if improvement is required in some specific characteristics. However, this has its own limitations, because it is difficult to change some of the characteristics, while others can be changed to a limited extent.

In summary, the constituents of Sports Anxiety Questionnaire may help in more scientific research in the field of sports. However, there are psychological and physical variables that are changeable due to experience, which implies that norms will have to be repeated from time to time.

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