Development and Validation of Psychic Energy Assessment Scale for Gymnasts

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Abstract- The present study aimed to construct a Psychic Energy Scale by computing Exploratory Factor Analysis to validate the Psychic Energy Scale, before administering the EFA, the data was analysed for its sampling adequacy. The factor analysis was employed separately on each sub scale. Initially, seven items measure was administered to 120 Indian artistic gymnasts from different Gymnastics Centre of Allahabad, Hyderabad and Delhi. Exploratory factor analysis supported a 2-factor model that explained 57.98% of the variance. In the next stage five items measure was administered to 65 Indian Gymnasts from Bhoir's Gymkhana, Dombivali, Mumbai, the result supported by EFA as one factor model including four statements that explained 47.39% of variance.

Index Terms- Gymnasts, Psychic Energy, Sports Performance, scale for Psychic Energy

I. INTRODUCTION

The effective use of psychological strategies and interventions are now seen as the final prerequisite for optimal athletic performance (Orlick, 1986). Mental preparation incorporating arousal regulation appears particularly salient for explosive athletic performance, that is, where maximal motor activities of short duration are involved, e.g., Gymnastics, sprinting, diving. The term arousal is widely used in the literature to represent both physiological arousal or activation and psychological arousal (e.g., Gould & Krane, 1992; Hassett, 1978), and in the same way Apter (1989) defines arousal as being "worked up" or energized. This general meaning of arousal is not synonymous with anxiety or stress, and is multileveled and measurable at the physiological, psychological, and behavioural levels (Wrisberg, 1994).

Psychic Energy is a term sometimes used synonymously with arousal. It refers to the vigour, vitality, and intensity with which the mind functions and prepares the body to function. It can be either positive or negative. When performers go from low to high levels of psychic energy they are said to become psyched-up; while those who go from high to low levels are psyched-out. As in arousal, there is an optimum level of psychic energy. Several arousal theories aimed to address optimal levels for specific kinds of sports (Perkins et al., 2001). The 'Inverted U theory' by Yerkes and Dodson, states that too high or too low levels of arousal and anxiety cause a person to perform poorer compared with performance at a medium (controlled/ optimum) level of arousal.

Each athlete has different psychic energy responds to stress. The task or sport will also affect how they react to stress or the demand made on them during training or competition and it has multiple effects on athletic performance during sports. It enhances blood flow and oxygen in the brain, neural and musculoskeletal systems. Psychic Energy stimulates adrenaline and other stimulant hormone production. Psychic Energy that is excessively high or low hurts athletic performance. Some effects of arousal on sports performance include muscular tension, decision-making speed, concentration and focus, rhythm and coordination, the basic essence of Gymnastics and are enough to ruin the gymnast's performance.

Heightened blood flow and muscular tension is necessary for performance during sports and athletic activities to prepare the gymnasts mentally and physically. But excessive muscular tension hinders Gymnast's performance because muscle tissues become too stiff to respond appropriately. Stiff muscles may exhibit delayed reactions, early reactions, too much force or too little force. Athletes with muscular tension that is too low exhibit delayed reactions and too little force and this will be sufficient to drain out a Gymnast's performance which was the outcome after years of preparation and hard work.

Psychic Energy affects decision making by stimulated blood flow and oxygen to the brain and neuronal system. People with lower Psychic Energy exhibit slower decision-making than people with heightened Psychic Energy. Quick decision-making is necessary for performance during Gymnastics routines and athletic activities for calculating and planning the air born bodily movements. Excessively fast decision-making hinders athletic performance because it leads to erratic decisions that do not effectively evaluate situations. Low Psychic Energy and decision-making that is excessively slow hinders athletic performance because these athletes do not have the capacity to adequately calculate and judge the responses or response speeds, (effects-arousal-sports-performance.html).

Artistic gymnastics is known for short intervals of highly demanding exercises requiring high concentration, alertness, as well as emotional- and Psychic Energy (Johnson, 2009). Especially individual and jury sports such as Artistic gymnastics denote high rates of severe injuries (Johnson, 2009; Caine & Nassar, 2005; Kolt & Kirkby, 1999) and often use Observing Learning to enhance health and performance. Common stressors in Gymnastics are fear of injury, the subjective scoring system, social factors such as the presence of an attentive audience, performing skills under (time) pressure, wishing to perform well to please someone, and the perceived importance of the event (Tremayne & Barry, 1988). The stressors that are found within Gymnastics reveal that emotion, especially social pressure, anxiety and fear of injury, are important factors that influence the performance as well as the well-being of the gymnast. Therefore

ways of measuring these factors and techniques to regulate them are strongly needed.

Many authors stress the importance of optimal Psychic Energy during Artistic Gymnastics routines (Tremayne & Barry, 1988). Treymayne and Barry (1988) concluded that gymnasts with low levels of anxiety could easier ignore distracting, irrelevant stimuli and focus with little effort on relevant stimuli during performance, which is quite important during gymnastic routines. Optimal Psychic Energy models state that high Psychic Energy has a negative effect on performance (Perkins, Wilson & Kerr, 2001). Cottyn, Clercq, Pannier, Crombez & Lenoir (2006) already mentioned the significance of anxiety in gymnastics, especially when executing elements of high difficulty on gymnastics apparatuses. The nature of the apparatuses can elicit anxiety and stress in gymnasts and arousal regulation is expected to improve performance and well-being of the gymnast. Because of the demanding nature of the Gymnastics routines, the conceptualization was done to construct a scale to measure the Psychic Energy comprising Arousal Awareness and Arousal Regulation as variables for Indian artistic Gymnasts in this study. The purpose of examining the arousal awareness and arousal level of the gymnasts was to identify their weaknesses and intervene some valid arousal regulation methods for the better performance of the Indian gymnasts.

II. METHODOLOGY

The development of the scale was carried and completed in five steps. Each step is elaborated in detail.

Step 1—Background In the initial step, the purpose and objectives of the proposed research were examined to test the Psychic Energy of the Gymnasts so that the weaknesses and strengths of the Gymnasts will be assessed and appropriate intervention programme could be suggested. The Gymnasts who has represented minimum at the district/ state level championships and are able to read and understand the statements of the scale were selected as the samples for the study. A thorough understanding of the problem through literature search and readings was done. After a good preparation and understanding of Step1, it provided the foundation for initiating Step 2.

Step 2—Scale Conceptualization After developing a thorough understanding of the research on Psychic Energy and gymnast's sports performance, a discussion with experts and athletes was done before the statements for the scale were generated. In this step, content (from literature/theoretical framework) was transformed into statements. In addition, a link among the objectives of the study and their translation into content was established.

Step 3--Format and Data Analysis In Step 3, writing of statements, selection of appropriate scales of measurement, questionnaire layout, format, statements ordering, font size, front and back cover, and proposed data analysis was focussed. Five point likert Scale from strongly disagree to strongly agree was devised to quantify a subject's response on a particular variable by keeping in mind the importance of Understanding the relationship between the level of measurement and the appropriateness of data analysis.

Step 4--Establishing Validity after completing Steps 1-3, a draft questionnaire was ready for establishing validity. Content validity was established using a panel of experts and a field test. Depending on the objectives of the study, content validity was used. The following questions were addressed: Is the questionnaire measuring what it intended to measure? Does it represent the content? Is it appropriate for the sample/population? Is the questionnaire comprehensive enough to collect all the information needed to address the purpose and goals of the study? and Does the instrument look like a scale?

Addressing these questions coupled with carrying out a readability test by offering the scale to the experts, other researchers and athletes to read out the statements of the scale and provide the feedback to the researcher so that necessary changes could be made, if they had any problem in understanding the language and meaning of the framed statements enhanced questionnaire validity. Following a field test on subjects and the expert's opinion some necessary changes were made in the questionnaire.

Step 5--Establishing Reliability In this final step, reliability of the questionnaire using a pilot test was carried out. The internal consistency reliability test was used for the present research. Reliability was established by using a pilot test by collecting data from 120 subjects. On the collected Data exploratory analysis was computed using SPSS 17 (Statistical Package for Social Sciences) was applied, which provided the key pieces of information i.e Factor loading of the variables, Communalities extraction and KMO & Bartlett's sampling adequacy. After analysing the results 2 statements were deleted, in other words after factor analysis on 7 statements only 5 relevant statements were retained. Finally, the scale comprises of 5 statements.

Selection of Variables

On the basis of available literature and various researches it is said that Psychic Energy management play important role in enhancing the performance of the individual sports players..

Sample

A total of 120 male and female gymnasts, were selected as the subject from the different Gymnastics centres of Allahabad and Hyderabad. The subjects were ranging from 8 to 28 years of age. The gymnasts were explained with all the instructions and procedure of filling up the questionnaire and were requested to read the instructions carefully before giving the final response to the questions

Statistical Analysis

Exploratory Factor Analysis was computed to validate the Psychic Energy Scale, before administering the EFA, the data was analysed for its sampling adequacy. The factor analysis was employed separately on each sub scale. The findings with regard to different sub scale are presented from the table No. 1 to table No. 4.

Table 1: Correlation Matrix of variables

		PE39	PE2	PE10	PE18	PE25	PE32	PE44
Correlation	PE39	1.000	.053	.040	.142	.123	.154	.180
	PE2		1.000	.172	.310	.181	.073	.202
	PE10			1.000	.261	.114	.155	.065
	PE18				1.000	.201	.091	.252
	PE25					1.000	-.067	.191
	PE32						1.000	.046
	PE44							1.000

a. Determinant = .633

Table, clearly indicates the correlation matrix among different statements of the Psychic Energy Management. The determinant value has been listed at the bottom of the table. The computed value for Psychic Energy Management is 0.633 which is greater than the necessary value of 0.00001 (Field, 2005). All statements of Psychic Energy Management correlate fairly well and none of the correlation coefficient is particularly large, therefore there is no need to eliminate any statement at this stage. Kaiser-Meyer-Olkin was computed for sampling adequacy. The findings are presented in the table No.2

Table 2: KMO and Bartlett's Test for sampling Adequacy

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.666
Bartlett's Test of Sphericity Approx.Chi-Square	53.402
Df	21
Sig.	.000

Table no. 2 represents that data is appropriate for factor analysis. The above table represents the factor analysis by using the KMO and Bartlett's Test which measures the Kaiser-Meyer-Olkin measure of sampling Adequacy at .666, which falls into the range of .5 to .7 which shows the data is mediocre, which reveals factor analysis can be applied on the data.

Bartlett's test is significant at .001 therefore factor analysis is appropriate to apply on the collected data. The exploratory factor analysis on Psychic Energy Management items reveals that the communalities after extraction are ranging from .469 to .738. Three factor solutions emerges and accounts for 57.98% of the total variance with Eigen value 1.90 1.11 and 1.03 respectively in 5 retained items. The first factor for 23.04%, second for 18.907 and the third factor for 16.03% of the total explained variance. The factor loading of 3 items in first variable are ranging from .66 to .69 and in second variable the loading of two items are .784 to .636 and the third variable has .83, since the third extracted variable was deleted as it was not appropriate for the gymnasts. The EFA was again computed and the factor loading on the factor is presented in table no. 3.

Table 3: Factor Loading, Communalities Eigen values, Percentage of explained variance of the Psychic Energy Management Statements

Variables Item (5)	Component Matrix	Communalities Extraction
PE1	.759	.576
PE8	.558	.311
PE15	.806	.650
PE22	.710	.505
PE28	.573	.328
Eigenvalues	2.37	

| % of Variance | 47.39 | |

In the above table Self-Confidence is factor analysed. The communalities after extraction are ranging from .328 to .650. One factor solution with Eigen value 2.370 is emerged which account for 47.393% of the variance. All the five items are highly loaded on one factor and the factor loadings are ranging from .558 to .806, representing arousal regulation and awareness in psychic energy management.

Table 5: Reliability Statistics

Statement Numbers with item	Number of Item	Cronbach's Alpha	Cronbach's Alpha if Item Deleted
Psychic Energy Management_1			.642
Psychic Energy Management_ 8			.699
Psychic Energy Management _15	5	.704	.587
Psychic Energy Management _22			.653
Psychic Energy Management _28			.683

The table indicates that five statements in psychic energy management's cronbach's alpha is .704.

effectiveness of psychological skills training programs. (Anshel & Lidor, 2012; Marchant, 2010; Morgan, 1980).

III. DISCUSSION OF FINDINGS

The above analysed data and the interpreted table clearly reveals that initially there were 7 statements in the questionnaire testing Psychic energy management but after the factor analysis two statements were deleted on the basis of poor factor loading value, extraction value and to avoid the statements carrying the same meaning webbed in different words.

So, finally 5 statements were retained in the questionnaire, which was less time consuming and easily administrable, testing an important psychological factor namely, Psychic energy management. Further the questionnaire was administered on 120 subjects, the collected data was further analysed by calculating the item analysis which reveals that Psychic energy management had Cronbach's Alpha .715.

IV. CONCLUSIONS

1. The following statements were drawn under Psychic Energy Management Factor:

Psychic Energy Management

Arousal Awareness:
1. I do not allow my low level of energy to affect my performance.
2. I am aware of my body arousal.

Arousal Regulation
3. I can control my thoughts before the competition.
4. I can control my mind for realistic and constructive thoughts.
5. I feel myself more energized during competition

2. This scale may be administered for training purpose. However, this form of scale is not advised to use to asses as variable for Psychological Skills.

Psychological tests can play a crucial role in identifying the strengths and weaknesses of athletes and evaluating the

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