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Two dimensions of emotions in sports: Construction and validation of an assessment tool

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Abstract:

The present work aims at the description of the evidence of construct validity and internal consistency of the "Instrument for Sport Competition Emotions" (INECOD), newly created instrument that evaluates the perception of physiological and cognitive dimensions of emotion during the competition. Using a sample of 411 athletes from nine disciplines, obtein a three-dimensional factor structure (positive affect, negative affect and anxiety) in the two subscales. The results confirm the evidence of construct validity (explained variance of 59.8% and 62.3%) and reliability (from α = .538 and .822) presenting a tool that can be used in sport populations, and should be confirmed in future works.

Keywords: sport; emotions; instrument; competition.

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Introduction

In the area of sports and exercise, emotions have been researched with regards to different aspects: health (Garcés de los Fayos & Díaz-Suarez, 2013), sports organizations (Wagstaf, Fletcher & Hanton, 2012), spectators (Jones, Coffee, Sheffield, Yangüez & Barker, 2012), and team sports (Campo, Mellalieu, Ferrand, Martinent & Rosnet, 2012), though research has mainly centered on the emotions during sports competition and, in this regard, anxiety has been the main emotion studied (McCarthy, 2011). Over the past few years, however, theoretical models have been developed on pleasant emotions in sports (Jackson & Csikszentmihalyi, 2002). In any case, the focuses on sports emotions that have received the most attention are those that have considered a multidimensional construct (Hanin, 1986; Jones, 2003; Kerr, 1985). In this regard, the model that is presented as the basis for this tool must take into account the importance of the entire range of hedonic emotions while also evaluating the physiological and cognitive dimensions of the emotion separately. The goal of this work is to present the psychometric results on the construct validity and reliability scales of the INECOD tool designed for this task.

Method

Participants: For this study, 411 athletes from nine different sports participated. The average age of participants was 24.87 with a variability of 8.81 years. In terms of the time they have been playing their sport, participants reported an average of 9.35 years of practice (DT=6.97), and a slightly lower quantity (M=8.02; DT=6.41) of years of practice at the competitive level. In terms of gender, 75.1% of the subjects were men and 24.9% women.

Procedure: After carrying out a qualitative assessment of the scientific literature, the proposal for items, inter-observer concordance and the pilot phase (Cantón & Checa, 2012), a 21-item instrument was obtained and submitted for validation in this study. Subjects were asked to report the intensity with which they experienced these emotions while bearing in mind the cognitive and/or physiological dimension. The answers were anonymous and confidential and the questions were asked by trained interviewers within one hour after participating in a sports competition.

For the section on statistics, an exploratory factor analysis (EFA) was conducted for the two sub-scales of the INECOD tool in order to explore its factor structure. Due to the debate on the independence of the emotions, the exact relationship between pleasant and unpleasant emotions is not entirely understood and thus an oblique rotation was done, assuming the factors to be correlated. The correlations between factors were also presented to confirm this assumption in this specific sample. A d*ifference* of *means* test (*t-test) was also done as evidence of the construct validity to corroborate the two-dimensionality of the emotions studied.*

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Results

In terms of the construct validity, the results of the EFA are presented on Table 1. In the case of the somatic dimension, which explains 59.8% of the variance, the correlation matrix among components offers a statistically significant correlation in the expected direction (r=-.239) between positive and negative affect, and between negative affect and anxiety. (r=.353). In the cognitive dimension, in contrast, the explained variance was 62.97%; a statistically significant correlation was obtained and in the expected direction (r=.384) between positive and negative affect, and between negative affect and anxiety (r=.238).

Table 1 – Exploratory Factor Analysis (EFA) of the INECOD sub-scales

	Somatic Dimension			Cognitive Dimension		
	1	2	3	1	2	3
Sad	,696	-,372	,219	,695	-,466	,035
Furious	,672	-,043	,373	,773	-,203	,207
Depressed	,686	-,202	,233	,731	-,287	,348
Angry	,809	-,158	,393	,791	-,315	,315
Discouraged	,785	-,237	,252	,762	-,338	,218
Unhappy	,739	-,126	,109	,760	-,199	,043
Capable	-,194	,801	-,023	-,165	,735	-,152
Proud	-,213	,803	,067	-,321	,786	,047
Pleased	-,231	,805	,005	-,341	,836	,010
Energized	-,141	,728	,104	-,368	,814	,065
Tense	,335	,184	,745	,292	-,050	,810
Nervous	,284	-,060	,742	,161	,011	,863
Explained Variance	32%	19,24%	8,56%	35,99%	16,5%	10,48%
	α=.822	α=.795	α=.538	α=.780	α=.805	α=.651

In terms of the two-dimensionality of the emotions, the difference of means test (t-test) revealed significant differences in negative affect (t=-4.039; p<.000), positive affect (t=-3.429; p=.001) and anxiety (t=-2.518; p=.012), with scores always higher in the cognitive dimension. In terms of the converging validity, the experience of precompetitive anxiety in its four expressions correlate positively with the anxiety measured by the INECOD both in the somatic and cognitive dimension, with correlations between r=.180 and r=.260.

Discussion and conclusions

It can be concluded that the study achieved the goal of its exploratory phase: an assessment tool for the emotions of sports competition was validated. The explained variance of both subscales is sufficient (59.8% and 62.07%) if we consider the review of 60 factor analyses by Henson & Roberts (2006), where the average proportion of variance explained by the factors was 52.03%. On the other hand, the values of internal consistency are sufficient, taking into account the reduced number of items. In any case, the data from *Cronbach's alpha, α,* for the "Anxiety" factor on both subscales reveals that in the future, a few more items would be necessary (at least three), as suggested by some authors (Costello & Osborne, 2005).

Our review of the scientific literature indicates that a new tool is necessary, one that takes into account the fact that emotions are not rigid entities with a single, simple expression. Instead, emotions are comprised of dimensions: the physiological or somatic dimension and the cognitive or mental dimension, and it would also be useful to add the behavioral or expressive dimension (Lang, 1995). This is the conceptual basis for a tool that would incorporate the two-dimensional evaluation of emotional experience and its application to sports; and an instrument with which the psychological evaluation can be done simply and easily as required in this area of intervention.

The results show greater explained variance on the cognitive subscale, which supports the idea of differences in the perception of emotions among athletes. They are more conscious of the mental dimension of an emotion and not so aware of the physiological or somatic expression of the emotion. This fact, in addition to the significant differences found on the scores of the three factors on both subscales, confirms the hypothesis on the two-dimensionality of emotions in sports. In any case, it is clearly very difficult to confirm the hypothesis of two-dimensionality solely through self-reports, which is why it is necessary to incorporate psychobiological scales, which have also been used in the past few years (Lane, Wilson, Whyte & Shave, 2011).

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