

Coping Measurement in the Sports Context: A Systematic Review

Fernanda Schweitzer Almeida Pereira¹, Maria Augusta Passos², Andréa Duarte Pesca³
and Roberto Moraes Cruz⁴

Abstract

This paper consists in a systematic review of the literature concerning the measurement of coping in athletes, based on the identification of the related instruments developed and adapted to the sporting context and their psychometric properties. Therefore, were explored the databases Scopus, Web of Science, PsycInfo, Scielo and Virtual Health Library to promote a systematization of the survey of articles published between 2008 and 2017. Thus, 65 empirical articles were identified with measuring instruments of the coping construct in sports, with an emphasis on competitive situations. Among this, 65 identified instruments, 10 were developed and adapted specially for athletes and presented good psychometric properties that ensured accuracy and reliability. It is imperative to highlight the need to expand the number of longitudinal and qualitative studies on *coping* in sports, as well as the development of instruments.

Keywords: coping; measurement; psychometric properties; psychology of sport.

The scientific research in the field of sport psychology emphasize the athletes' ability to cope with situations that restrict, disrupt or restrain performance (Doron and Marti-nent, 2017). Threats and challenges can generate stress and hinder the athlete's performance. The routine in the reality of sports, especially the competitions, promote potential stressors in the athletes, including pain, fear, lack of confidence, psychological demands, stress, and other emotional responses, besides the demands of the sport itself (Calmeiro, Tenenbaum and Eccles, 2014).

A good adaptation to these stressful situations requires effective cognitive, behavioral and emotional self-regulation (Crocker, Tamminen and Gaudreau, 2015). Those who present a greater diversity of personal resources cope better with stress situations and, consequently, have greater ability to achieve sport success (Galli and Vealey, 2008).

The need to evaluate repertoires of coping in the sport environment is an important element to promote and enhance the full operation and performance of the athlete (Arnold, Fletcher and Daniels, 2016). Knowing the instruments that can provide good psychometric properties helps professionals working with athletes to examine the effectiveness of their strategies, assists in the preparation of interventions for specific populations of athletes, in addition to contributing to the development and improvement of these athletes' coping resources (Nicholls, Taylor, Carroll and Perry, 2016d).

Nicholls and Polman (2007) postulate that much of the studies concerning confrontation in sport adopt the

perspective of a dynamic process, which varies according to the situation, age and gender of the athlete. Therefore, the evaluation of cognitive and behavioral approaches provides consistency to the stress management interventions in the sporting context. For this reason, the purpose of this research is to verify what coping instruments were used in the period from 2008 to 2017, in researches in the field of sports, highlighting its psychometric properties.

Method

A systematic literature review was carried out to verify what instruments were used to measure the coping phenomenon in the context of sports and to demonstrate the psychometric properties of those developed and adapted for the sports context. The PRISMA protocol were used (Moher, Liberati, Tetzlaff, Altman and The PRISMA Group., 2009) to analyze and describe, in a retrospective and systematized approach, the scientific articles from the period between 2008 to 2017. Two researchers adopted the same article analysis protocol, maintaining similar inclusion and exclusion criteria, whose results were compiled at the end of the analysis.

The search for the articles was carried out from July to December 2017, in the multidisciplinary electronic databases: Scopus, Web of Science, PsycInfo, Scielo and in the Virtual Health Library. It was used as selection filter: language (Portuguese, English and Spanish), publication period (2008 to 2017) and sort of publication (article).

1 Federal University of Santa Catarina, Florianópolis, SC, Brazil. E-mail: fspicoesporte@gmail.com

2 Sport Psychology Laboratory, Faculty of Human Kinetics, University of Lisbon, Lisbon, Portugal. E-mail: mariaaugusta.passos@hotmail.com

3 Sport Psychology Laboratory, Faculty of Human Kinetics, University of Lisbon, Lisbon, Portugal. E-mail: adpesca07@gmail.com

4 Federal University of Santa Catarina, Florianópolis, SC, Brazil. E-mail: robertocruzdr@gmail.com

The descriptors used were: “coping”, OR “coping skills”, OR “coping strategies” AND “sport”, OR “athlete”, OR “exercise”, OR “assessment”, OR “evaluation”, OR “instrument”, OR “measure”, OR “psychometrics”.

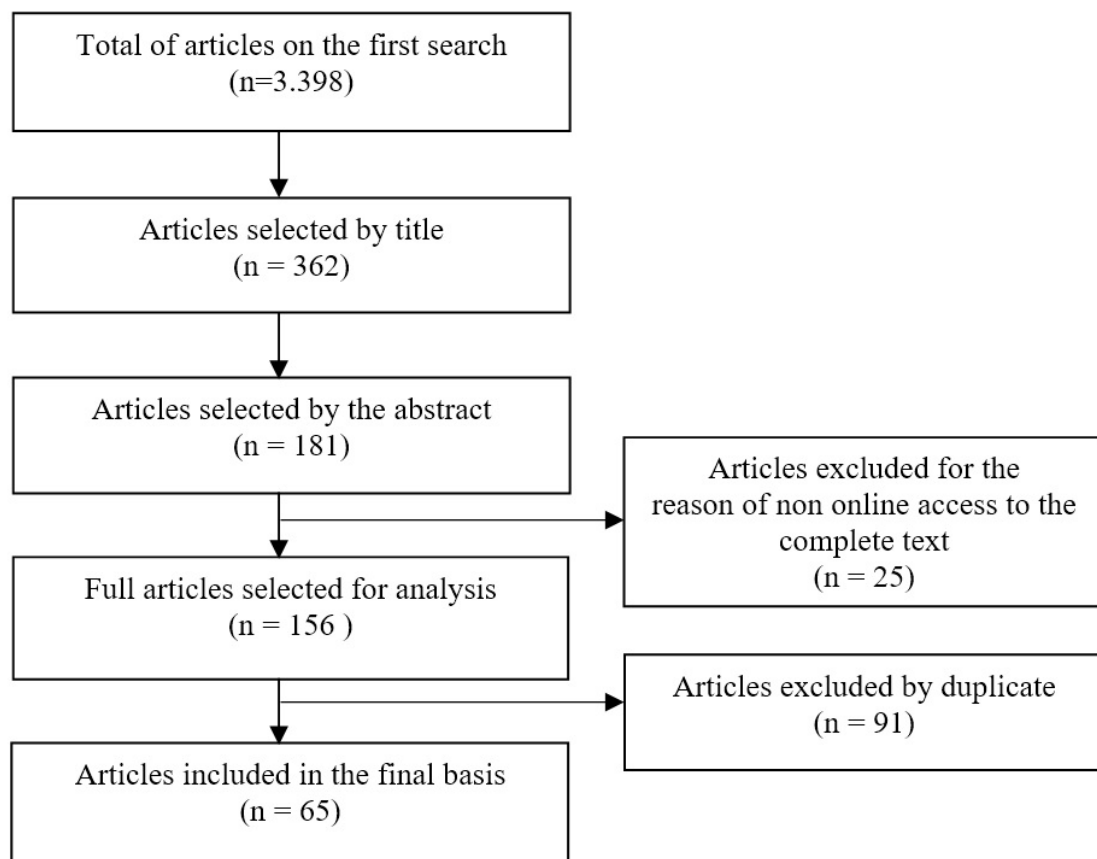
The inclusion criteria were: articles published in the period from 2008 to 2017, containing in the title the word coping / COPE / coping skills or strategy(s), associated with words of the context of sports (athlete and / or modality) and studies that evaluated coping in the context of sports and also contain measuring instruments. As exclusion criteria: theses, dissertations, articles of review, coping studies outside the sports context and articles without access to the complete text.

The articles were reviewed by title, abstract and full papers, with emphasis on the psychometric properties of specific instruments for athletes. Furthermore, was noticed the methodology used, the countries of production, the dimensionalities, the modalities and the samples searched.

Results and discussion

The searches in the databases initially resulted in 3.398 articles. Filters were used (Figure 1), to reach the final database, composed of 65 articles.

Figure 1. Flowchart of the articles selected from the systematic review



The systematic review selected 65 researches of coping measurement in sports context between 2008 and 2017. Among these mentioned studies, 37 reported measuring coping skills in athletes using specific instruments for the sporting context. In contrast, the other 28 studies referred that used non-specific instruments for the same purpose. Moreover, 59 studies presented a quantitative approach, while 4 of them were qualitative and 2 were mixed (quantitative and qualitative). Regarding the survey of data, 51 studies used the transversal method and the other 14 used the longitudinal.

The articles pointed the use of different resources to measure coping in athletes. Among these, stands out the specific instruments for athletes, the non-specific like a the video analysis method, daily verbal reports and semi-structured interviews.

The main constructs evaluated in the 28 studies that did not use specific instruments, related coping skills with different profile variables, instrument adaptations and psychological phenomena, such as anxiety (Nicholls, Polman and Levy, 2010c), motivation (Tazeegül, 2013), pain (Leznicka, Starkowska, Lulinska, Kowalczyk and Ligocka,

2017), sources of stress in the sport (Rutkowska, Bergier and Witkowski, 2014), goals (Evans, Hoar, Gebotys and Marchesin, 2014), personality (Allen, Frings and Hunter, 2012) and performance (Nicholls et al., 2010c).

In the sports context, 37 studies approached specific instruments to assess coping skills in athletes. Some of the constructs studied were resilience (Belem, Caruzzo, do Nascimento Junior, Vieira and Vieira, 2014), stress level

(Belem, Da Costa, Both, Steps and Vieira, 2016), self-determined motivation (De Oliveira, Nascimento Junior, Vissoci, Ferreira, Norraila da Silva and Lopes Vieira, 2016) and parental support with self-determined motivation (Vissoci, Do Nascimento Junior, De Oliveira, Vieira and Vieira, 2013). All instruments found presented good psychometric properties, according to the table 1.

Table 1

Specific instruments for athletes' coping measurement and their psychometric properties

Instrument (author)	Dimensionalities	Sample / Modalities	Psychometric properties
Modified COPE – MCOPE (Crocker and Graham, 1995)	Active coping Planning Search for instrumental social support Search for emotional social support Suppression of concurrent activities Humor Emotional ventilation Behavioural disengagement Auto fault Illusory thinking Increasing effort	377 athletes, 15-30- years-old (M = 20.5, DP = 2.5). Football, volleyball, hokey, basketball, american football, athletics and wrestling.	Construct validity: internal consistency analysis. Concurrent validity.
Athletic Coping Skills Inventory - ACSI-28 (Smith, Schutz, Smoll and Ptacek, 1995)	Manage adversity Performance under pressure Mental preparation and goal setting Confidence and motivation Concentration Freedom of concerns Treinability	772 university athletes. Football and university modalities	Construct validity: Scale's internal consistency analysis and confirmatory factorial analysis Convergent and discriminant validity Test-retest: stability of measure
Approach to Coping in Sport Questionnaire - ACSQ-1 (Kim and Duda, 1997)	Active planning/ Cognitive restructuring Emotional calm Mental withdrawn Search for social support Religion Risky behaviour	275 athletes, (M = 20.87 years-old, DP = 1.32 years-old). Football, basketball, baseball, handball, archery, tennis, golf, swimming, wrestling and running.	Construct of validity: Exploratory factorial analysis and internal consistency analysis
Coping Function Questionnaire for Sport – CFQ (Kowalski and Crocker, 2001)	Coping focused on the problem Coping focused on the emotions Coping focused on the evasion	683 high school student athletes, 13-19 years-old.	Content validity: Judges analysis Construct validity: factorial, exploratory and confirmatory analysis, internal consistency Convergent validity. Divergent validity.
Coping Inventory for Competitive Sport – CICS (Gaudreau and Blondin, 2002)	Thought control Imagery Relaxation Effort expenditure Logical analysis Search for support Unpleasant emotion ventilation. Mental distraction Desengagement / abandonment Social withdrawal	316 athletes, 14 to 28 years-old (M = 17.4, SD = 2.15). Golf, badminton, artistic skating, artistic gymnastics, downhill skiing, swimming, hokey, ice hockey, baseball, basketball e volleyball.	Content validity: Judges analysis. Construct validity: internal consistency analysis and confirmatory factorial analysis Convergent validity. Concurrent validity. Differential validity.

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Instrument (author)	Dimensionalities	Sample / Modalities	Psychometric properties
Coping Scale for Chinese Athletes – CSCA (Chung, Si, Lee and Liu., 2004)	Coping focused on the problem Coping focused on the emotion Coping focused on the evasion Coping focused on the transcendence	367 athletes, 14-37 years-old (M= 20.5 years-old, SD=3.3 years-old). Badminton, athletics, box, rowing, Chinese kickboxing, chess, taekwondo, archery, swimming, cycling, shooting, kayak, synchronized swimming, water polo, basketball, baseball and football	Construct validity: internal consistency analysis e confirmatory factorial analysis
Coping Style in Sport Scale – CSSS (Anshel and Sutarso, 2007)	Approximation behavior Cognitive approximation Cognitive avoidance Thought control Imagery Relaxation Effort expenditure Logical analysis Search for support Unpleasant emotion ventilation Mental distraction Desengagement / abandonment Social withdrawal	332 athletes; 18-23 years-old (M = 21.6; DP = 4.86) 596 athletes, 18 to 23 years-old. Football, American football, wrestling, rugby, swimming, tennis, volleyball, lacrosse, gymnastics, baseball, softball and ice hokey	Construct validity: internal consistency and confirmatory factorial analysis; Face validity Construct validity: confirmatory factorial analysis
<i>Inventário Atlético de Estratégias de Coping –ACSI-25BR</i> (Coimbra, 2011)	Managing adversities Performance under pressure Mental preparation and goal setting Confidence and motivation Concentration Freedom of concerns Treinability	375 athletes, 13-22 years-old. Tennis, judo, basketball, volleyball American football, indoor football, gymnastics, swimming, football, hapkido, jiu-jitsu, handball, Muay Thai, athletics	Construct validity: Exploratory factorial analysis, internal consistency Test-retest: stability of measure
<i>Cuestionário de Estrategias de Afrontamiento en Competición Deportiva</i> (Molinero, Salguero and Márquez, 2010)	Logical-effort analysis Search for support Relaxation Mental Imagery-Thought Control Resignation Departure of unpleasant emotions Mental distraction Distancing	306 athletes, 14-28 years-old (M= 20.1; DT= 4.2). Basketball, football, rugby, handball, volleyball, futsal, judo, tennis, athletics, swimming and table tennis.	Construct validity: internal consistency analysis and exploratory, confirmatory factorial analysis Convergent validity. Concurrent validity.

The Modified COPE - MCOPE, developed in Canada by Crocker and Graham (1995) initially presented 9 dimensions of the original COPE instrument (Carver, Scheier and Weintraub, 1989), which were: active coping, planning, search for instrumental social support, search for emotional social support, suppression of competing activities, denial, humor, emotion ventilation and behavioral disengagement. The Canadian instrument also presented 3 dimensions of Ways of Coping Questionnaire (Folkman and Lazarus, 1985), which were, self-blame, illusory thinking

and increasing effort. Accordingly, there was a total of 12 dimensions, contemplated in 48 items adapted with relevant words and terms of the sporting context. For each item the athlete indicates the coping strategy used during the stressful performance situation in the Likert scale of 5 points (1 corresponds to “not used” and 5 corresponds to “very used”).

The psychometric property of MCOPE was verified by the validity of construct (internal consistency analysis), whose values were: active coping ($\alpha = 0.64$), planning (α

= 0.82), search for instrumental social support ($\alpha = 0.79$), search for emotional social support ($\alpha = 0.81$), suppression of competing activities ($\alpha = 0.73$), denial ($\alpha = .42$), mood ($\alpha = 0.92$), emotion ventilation ($\alpha = 0.87$), behavioral disengagement ($\alpha = 0.63$), self-blame ($\alpha = 0.76$), illusory thinking ($\alpha = 0.62$) and increasing effort ($\alpha = 0.80$). The denial coping dimension was forwent considering that the alpha coefficient and the variance of the estimated error were greater than the estimated real variance ($\alpha = 0.42$). Thus, MCOPE became an 11 dimensions instrument.

The MCOPE concurrent validity has also been performed with the PANAS instrument (Positive Affect and Negative Affect Schedule by Watson, Clark and Tellegen, 1988). The correlations between the dimensions of planning coping, increasing effort, active coping and suppression of competing activities, focused on the problem, show moderate intercorrelations ($r_s = 0.46$ to 0.69). The dimensions that were related with emotional coping (support seeking emotional reasons, outburst of emotion, disengagement, self-blame and mood) presented low intercorrelations ($r_s = 0.00$ to 0.34) and both dimensions of social support were strongly related ($r = 0.68$).

The instrument's psychometric properties were considered good. However, there are authors who indicate some limitations of the instrument, such as the weak theoretical foundation, the lack of a psychometric assessment with the gender and group invariance, in addition to the concern that the specific scales of the instrument cannot capture specific types of coping, as control of excitement or spiritual reflection (Nicholls et al., 2016d).

The MCOPE was used in the quantitative study of Arnold et al. (2016), which evaluated coping strategies against organizational stressors (environmental) and its effect on sports performance and over the athletes' affective sphere. The instrument was also applied on Dias, Cruz and Fonseca (2009) studies about perfectionism, revealing that athletes who present levels of "healthy" perfectionism have reported greater use of coping strategies directed to the active coping, while the ones who manifest levels of "unhealthy" perfectionism reported the use of more disengagement strategies.

The Athletic Coping Skills Inventory - ACSI-28 (Smith et al., 1995) was developed in the United States, initially with 87 items to evaluate the vulnerability and resilience in sports injury. Further studies reveal adaptations to the sporting context, presenting a reduction to 42 items (Petrie, 1993; Smith, Ptacek and Smoll, 1992) and the ACSI-28 version (Smith et al., 1995) with 28 items and 7 dimensions: coping with adversity, performance under pressure, mental preparation and goal setting, confidence and motivation, concentration, freedom of concerns and trainability, with 4 items each (Likert scale) whose variation is 0 (almost never) to 3 (almost always) and the sum of the scale is from 0 to 12 points. The total scale of total coping resources corresponds to the sum

of the 7 dimensions and varies from 0 to 84 points, wherein the higher the sum, the greater the repertoire of coping strategies of the athlete.

The internal consistency analysis of the ACSI-28 was $\alpha = 0.86$ (ranging from 0.62 to 0.78), test-retest ($r = 0.47$ to 0.87) and the degree of social desirability verified by the test Marlowe-Crowne ($r = 0.19$ to 0.33). The confirmatory factorial analysis testified the 7 dimensions of the ACSI-28. The convergent and discriminant validities were evidenced by significant correlations among the dimensions of the ACSI-28 and instruments of self-control, coping, anxiety, self-efficacy and social desirability. The test-retest reliability coefficients (after one week) were reasonably high for most dimensions and for total score. The exception was the trainability dimension, exhibiting relatively low stability (0.47). The instrument has acceptable test and retest reliability, as well as good internal consistency. The individual scales and the total score generally show a good theoretical relationship with other coping, anxiety and performance scales (Nicholls et al., 2016d).

The systematic review pointed out the use of ACSI-28 in studies on the constructs of mental resistance (Beckford, Poudevigne, Irving and Golden, 2016), performance (Christensen and Smith, 2016), motivational climate (Gano-Overway, Steele, Boyce and Whaley, 2017) and adaptation of the ACSI-28 instrument to the Spanish language (Graupera Sanz, Ruiz Perez, Garcia Coll and Smith, 2011).

The ACSI - 28 presents adaptations in several countries, and is the only instrument adapted to the Brazilian sporting context. However, even presenting good psychometric qualities, authors question their development, once it was not based on assumptions of theories of coping processes (Crocker, Kowalski and Graham, 1998). In addition, authors emphasize the need to revise and improve the scale items, considering that in some circumstances it is not sufficiently intelligible (Gaudreau and Blondin, 2002).

Reviews show that the ACSI-28 is an instrument that measures only relatively stable psychological abilities and not coping skills (Hoar, Kowalski, Gaudreau and Crocker, 2006). The authors add that, despite not measuring the coping skills themselves, the instrument is satisfactory, as the psychological skills being evaluated are important in sports training for athletes. The limited number of studies to evaluate gender or group invariance was also questioned (Nicholls et al., 2016d).

The Approach to Coping in Sport Questionnaire - ACSQ-1 (Kim and Duda, 1997) was elaborated by authors from the United States and the United Kingdom. The ACSQ-1 evaluates the cognitive, affective and behavioral coping effort of athletes to manage the psychological hardship that may result in loss of performance during competitions. To respond, the athlete indicates on the Likert scale of 5 points (1 "never" and 5 "always") the frequency using coping skills in competitions. The differential of this

instrument is to present one dimension related to religious aspects and other of risk behavior. Initially, the ACSQ-1 was composed of 78 items and 13 dimensions. When performing the internal consistency and exploratory factorial analysis, remained 6 dimensions, with the following alpha values: active planning / cognitive restructuring ($\alpha = 0.83$), emotional calm ($\alpha = 0.70$), mental withdrawal ($\alpha = 0.70$), search for social support ($\alpha = 0.70$), religion ($\alpha = 0.71$) and risk behavior ($\alpha = 0.71$).

ACSQ-1 was applied by Carrasco, Campbell, López, Poblete and García-Mas (2013) to evaluate coping strategies, autonomy and psychological well-being in professional tennis athletes. The result pointed that the use of strategies such as active planning, cognitive restructuring, emotional calm and the search for social support, increase the perception of autonomy and, consequently, maintain athletes more engaged in sportive practice, presenting higher levels of psychological well-being.

The Coping Function Questionnaire - CFQ (Kowalski and Crocker, 2001) was developed in Canada, applied in samples of adolescent athletes from 13 to 19 years. It consists of 18 items, divided into 3 dimensions, according to their function: coping focused on the problem (effort to actively change and be able to remain in the situation that was causing stress), coping focused on emotions (effort to control thoughts or emotions while staying in the stressful situation) and coping focused on evasion (effort to leave the stressful situation). To respond to the CFQ, the athlete should indicate how much he / she used coping skills, ranging from "none" to "very".

The psychometric properties of CFQ were verified by the validity of content, analysis of judges and adaptation of the instrument to the population of the study. Regardless, the construct validity was performed by the exploratory factorial analysis and the confirmatory factorial analysis, indicating good suitability of items and dimensions. The confirmatory factorial analysis supported the three-dimensional coping model and the internal consistency analysis presented the Cronbach alpha values above 0.80 in the three coping functions (focused on the problem $\alpha = 0.85$; focused on emotion $\alpha = 0.85$ and focused on avoidance $\alpha = 0.92$). The convergent and divergent validity were significant, supporting correlations with other 3 coping instruments.

The experimental study by Allen et al. (2012) applied CFQ on personality instruments and physiological tests to explore the associations between dimensions of personality and motivational states of challenge and threat and also the associations between motivational states and coping in sport. With regard to coping, the study showed that conscientious and outgoing athletes tend to deal with competition demands, directly facing the problem, as athletes emotionally unstable, less open to new experiences and less concerned with cooperation and social harmony, tend to deal with demands by seeking emotional control or avoiding the stressor. The study also showed that perceiving

a situation as a threat, the athlete tends to decrease the engagement in the activity and uses more avoidance strategies. In contrast, when assessing the situation as challenging, present more engagement and strategies focused on problem or in the emotions management.

Another study using CFQ indicated that coping skills whose functions are related to the ability to reinterpret positively stressful events, staying calm and relaxed under pressure and maintaining emotional control are characteristics of mental tenacity, which may be a protection factor against the demands of the sport (Madrigal, Gill and Willse, 2017).

The study by Nicholls et al. (2016d) shows that despite the evidence of psychometric qualities, the instrument has some limitations, such as assessing only the coping function, not providing information on the specific types of coping strategies used to manage competitive stress and adaptation, being suggested the simultaneous use of other instruments that assess coping in detail (specific strategies) (Hoar et al., 2006). Another characteristic highlighted by Lidor et al. (2013) is that instead of athletes simply reporting what strategies they used to deal with the stressful situation, CFQ requires athletes to make inferences about the real function of their coping efforts. Finally, Lidor et al. (2013) and Nicholls and Ntoumanis (2010a) suggest who future studies evaluate the composition of the instrument's items, in order to reduce the redundant items and expand the psychometric assessment and validation in various sports populations.

The Coping Inventory for Competitive Sport - CICS (Gaudreau and Blondin, 2002) was developed in Canada. It was originally developed in French, called *Inventaire des Stratégies de Coping en Compétition Sportive (ISCCS)*. The instrument checks athletes' coping actions used before, during and after competition. The items were designed to measure the numerous coping tools used by these individuals in the competitive events. The construction of the items avoided the use of colloquial expressions and terms referring to specific sports, broadening the applicability of the instrument in different sports. The CICS presents 10 dimensions arranged according to the functions of coping: focus on the task, distraction and disengagement, control of thought, mental imagery, relaxation, effort expenditure, logical analysis, search for support, unpleasant emotion ventilation, mental distraction, disengagement / abandonment, and social withdrawal.

The initial version of CICS had 111 items and was subjected to a content validity, being withdrawn, after the judges analysis, 16 items. The final version features 95 items and uses a 5 - point Likert scale (1 = not used / 5 = heavily used). The validity of construct was demonstrated by the scale's internal consistency analysis, being the Alpha Cronbach between $\alpha = 0.67$ and $\alpha = 0.87$, with 8 dimensions indicating $\alpha > 0.70$ and 2 dimensions indicating α between 0.60 and 0.70. The analysis also demonstrated

significant correlations between the dimensions of CICS. The confirmatory factorial analysis showed that the 10-dimensional model was adequate.

The CICS dimensions showed quality evidence of convergent and concurrent validity and significant correlation with the instruments of anxiety, affection, coping and personality. The differential validity was also performed, correlating expertise and gender of the participants.

The CICS was the most used instrument in the studies, corresponding to 12 of the 65 articles. By presenting the characteristic of measuring the periods before, during and after competition, CICS has become an important and usual tool in the preparation of athletes for situations of competitive stress, which may impair sports performance due to the lack of stress management. These 12 studies present a quantitative approach, of which 8 are transversal and 4 longitudinal. The quantitative and cross-sectional studies measure the stress confrontation co-relating it to phenomena such as personality (Laborde, You, Dosseville and Salinas, 2012), confidence (Levy, Nicholls and Polman, 2011), goals (Nicholls, Levy, Carson, Thompson and Perry, 2016a), coach and athlete relationship (Nicholls et al., 2016b), emotion (Nicholls, Perry and Calmeiro, 2014), coping efficacy (Nicholls, Polman, Levy and Borkoles, 2010b) and performance (Nicolas, Gaudreau and Franche, 2011). In contrast, those with a longitudinal perspective, related the skills of coping with achievement (Gaudreau, Nicholls and Levy, 2010), stress level (Molinero, Salguero and Márquez, 2012), passion and burnout in sport (Schellenberg, Gaudreau and Crocker, 2013) and resilience (Secades et al., 2016).

According to Nicholls et al. (2016d), CICS showed good evidence of validity in various sports populations, demonstrating adjustment to the 10-factor model. Limitations of the instrument were highlighted, some related to its measurement effectiveness, since it was developed to measure coping related to stress during competition, it has its limited effectiveness to assess coping during other types of sport-related stress, such as interpersonal conflicts, injuries, performance and organizational stress. In addition, Nicholls and Ntoumanis (2010a) claim that it is necessary to provide additional evidence for the hierarchical structure of CICS in various sports populations.

Lidor et al. (2013) points out a limitation of the instrument when verifying that the specific types of coping captured by the ten scales can be grouped only in one of the three functional dimensions of a higher order. However, Lazarus (1991) states that this would not be a limitation, since it is possible that some specific strategies can serve multiple functions.

Another limitation raised is that there is a possibility that all ten scales are not sufficient to capture all aspects of coping in sport, due to the complexity of the coping construct. However, despite these limitations, this is

the most popular instrument in sport and also the most used in quantitative research to examine competitive coping (Nicholls et al., 2016d). The Coping Scale for Chinese Athletes - CSCA (Chung et al., 2004) is an adaptation developed for Chinese athletes, highlighting the oriental cultural characteristics. The CSCA has 4 coping dimensions, in which 3 are similar to those used in CFQ instrument (Kowalski and Crocker, 2001): coping focused on problem, coping focused on emotion and coping focused on evasion. The fourth dimension is coping focused on transcendence, which has a strong cultural relevance for the Chinese (Yoo, 2000; Yoo and Park, 1998).

In this instrument the participants respond to 21 items on a 5-point Likert scale, ranging from 1 (never) to 5 (always). Its validity is demonstrated by the internal consistency analysis, presenting significant values of Cronbach's alpha for each one of its dimensions: problem-focused coping ($\alpha = 0.73$), emotion-focused coping ($\alpha = 0.78$), coping focused on avoidance ($\alpha = 0.75$) and coping focused on transcendence ($\alpha = 0.73$). The confirmatory factorial analysis consolidated the four factors model. A single study in the review indicated the adaptation process of the CSCA in Chinese athletes, using multidimensional Rasch (Yan and Mok, 2012).

The instrument Coping Style in Sport Scale - CSSS (Anshel and Sutarso, 2007) presents 3 dimensions of coping: approximation behavior, cognitive approximation and cognitive avoidance. The CSSS presents 10 items in which the participant reflects about intense situations and the corresponding feelings, answering a 5-point scale, where 1 represents "not at all" and 5 indicates "extremely high". The psychometric properties of this instrument were evidenced by the construct validity, with the internal consistency ($\alpha = 0.82$), confirmatory factorial analysis and face validity. The confirmatory factorial analysis with an acute stress scale points out the correlation between the two scales ($r = 0.48$, $p < .0001$), indicating that the general coping style is significantly related to general sources of acute stress (Anshel and Sutarso, 2007). The confirmatory factorial analysis also shows that both instruments have face, content, prevision and construct, validity, indicating reliable measures.

Two studies have shown the use of the CSSS instrument and both evaluated the stress-related coping in sports situations. Anshel, Sutarso and Jubenville (2009) examined the racial and gender differences in sources of stress perceived by the athletes as highly intense during the competition. The authors concluded that there are racial and gender differences and that these influence the confrontation in competitive sport.

In another study was measured the sources and cognitive assessments of acute stress as predictors of coping style between Chinese male and female athletes (Gan, Anshel and Kim, 2009). The results found in the study indicated that three sources of stress (verbal abuse by

others, coach dissatisfaction and environmental sources) and two cognitive evaluations (self-control and control by others) were significant predictors for the coping style of the athletes. They also add that the style of coping of an athlete differs according to the skill level and the gender.

The Dispositional Coping Inventory for Competitive Sport - DCICS (Hurst et al. 2011) is a version adapted by authors from Canada and the United States of the Coping Inventory for Competitive Sport (CICS - Gaudreau and Blondin, 2002). The instrument measures the coping strategies performed by athletes throughout their sports careers. The DCICS maintained the same factorial structure, form and number of items of the original version (CICS-Gaudreau and Blondin, 2002), modifying the essay of the items and the measurement scale. The purpose of these modifications was to allow the instrument to capture the athlete's perception of what they usually perform during a competition, rather than reflect on how the individual handled a specific competitive event. Therefore, the participants were invited to indicate what they "normally do during the competition". Likert scale items have been modified to indicate the present tense. The validity of construct, through the confirmatory factorial analysis, supports the 10-dimensional model.

Four studies used the DCICS instrument, presenting quantitative results and cross-cutting data. One of these studies concerns the development of the DCICS draft and its verification of initial evidence of factorial validity were demonstrated by the value of the internal reliability of the ten scales ranging from 0.60 to 0.80 (Hurst et al., 2011). The themes emotional maturity (Nicholls, Levy and Perry, 2015), cognitive maturity (Nicholls et al., 2015), motivation and resilience (Nicholls, Morley and Perry, 2016c) were measured using DCICS.

The *Inventário Atlético de Estratégias de Coping - ACSI-25BR* (Coimbra, 2011) is the most used instrument in researches involving Brazilian athletes and is an adaptation of the ACSI-28 (Smith et al., 1995) to the Brazilian Portuguese language. The ACSI-25BR underwent a process of translation and validation to the Brazilian context, with a sample of 375 athletes, from 13 to 22 years, of different sports modalities. The version was successful in its results (Coimbra, 2011).

The ACSI-25BR highlights good psychometric properties evidenced by the exploratory factorial analysis, by the internal consistency analysis and by the measurement stability (test-retest). The exploratory factorial analysis identified the distribution of items in 7 dimensions similar to the original version ACSI-28 (Smith et al., 1995). Both analysis (exploratory factorial analysis and internal consistency) showed 3 items with low scores, being excluded from the adapted version of the instrument. Because of the fact that it contains 25 items, the instrument is called ACSI-25BR.

The *Cuestionario de Estrategias de Afrontamiento en Competición Deportiva* (Molinero, Salguero and

Márquez, 2010) is an adaptation of the Canadian version of the Coping Inventory for Competitive Sports - CICS (Gaudreau and Blondin, 2002). The questionnaire went through the adaptation process, in which the results obtained suggest that the proposed model is acceptable and offers a new factor structure of eight factors, which differs in the form of the original, but not in terms of coping as a multidimensional construct.

The internal consistency was analyzed by Cronbach's alpha coefficient, with values between 0.70 and 0.81. The questionnaire consists of items that represent what athletes can do or think during a sports competition. The answers were presented on a Likert scale, 1 = not used / 5 = widely used.

To analyze the concurrent validity of *Cuestionario de Estrategias de Afrontamiento en Competición Deportiva*, the COPE Inventory was applied as a coping scale (Carver et al., 1989; Spanish version of Perczek, Carver and Price, 2000). Correlations were found with other theoretically related constructs or dealing with a measure of the state of anxiety CSAI-2 (Martens Burton, Vealey, Bum and Smith, 1990; Spanish version of Taberero and Márquez, 1994), and another of affections, PANAS (Watson, Clark and Tellegen, 1988; Spanish version of Joiner, Sandin, Chorot, Lostao and Marquina, 1997).

The study by Molinero, Salguero and Márquez (2012), shows research with athletes using instruments that measure recovery and stress in athletes, in addition to humor and coping strategies. The authors concluded that there is a change in the use of coping strategies during a competitive period and that these can affect the balance between stress and recovery and, therefore, the possible trigger of overtraining.

Another study that used this questionnaire was by Secades et al. (2016), which analyzed the relationship between resilience attributes and coping strategies in 235 Spanish athletes. They were evaluated at the beginning of the last competitive mesocycle and after a competition. The authors showed that there was no significant difference in resilience scores between the two evaluated moments (competitive and after-competition mesocycle). They found a significant increase in the scores of coping oriented to emotions and distraction during the competition. Resilience scores were positively correlated with task-oriented coping and negatively correlated with disengagement and distraction during the two periods. The analyzes also showed that athletes with high quality of individual resilience achieved higher scores in task-oriented coping and, consequently, use to a lesser extent coping aimed at disengagement and distraction. Finally, the authors conclude that the results suggest that resilient characteristics can be associated in athletes with the use of potentially more adaptive coping strategies.

The present study indicated gaps and perspectives regarding the measurement of coping skills in the sporting context. The systematic review of the literature showcased a significant number of instruments used to measure the

coping construct in the sporting context. However, most of these instruments were specifically tailored to athletes, since their items did not present words and expressions used in the sports context. This scenario signals the need for developing instruments more appropriated to the investigated reality.

Few qualitative studies have been found, as well as the longitudinal ones. Both aspects need to be explored to contribute to the understanding of the phenomenon variation over the time (Calmeiro et al., 2014). Several researches and instruments focused on the measurement of coping in competitive situations, not evaluating in training situations, which also can be assessed as potentially stressful, beneficial or harmful to the sport performance.

The importance of analyzing the purpose of each instrument used for interventions is highlighted, since the orientation or theoretical model used by the authors who built / adapted the instrument, will direct the interpretation of the results found in the analyzes (Lane, Beedie and Devonport, 2011).

Studies on instrument construction, adaptation and validation appear in a higher scale. The studies covering the period from 2008 to 2017 show 10 instruments developed and / or adapted for athletes in countries such as the United States, Canada, United Kingdom, China, Spain and Brazil. All of these present good psychometric properties, evidenced, at least, by the construct validity. Therefore, this review indicates the concern of the authors in establishing parameters of quality, precision and reliability of their researches.

Different methods and ways of classifying the coping construct have been used in research in the sports context (Nicholls et.al., 2016d). This article contributed by providing information about the instruments available to professionals when providing assistance to athletes. Studies like this, contribute to the classifying and verifying the level of coping strategies used by athletes and, consequently, it helps in improving the athlete's well-being and sports performance.

Medición de afrontamiento en el contexto deportivo: una revisión sistemática

Resumen

Este artículo consiste en una revisión sistemática de la literatura sobre la medición del afrontamiento en atletas, basada en la identificación de los instrumentos relacionados desarrollados y adaptados al contexto deportivo y sus propiedades psicométricas. Por lo tanto, se exploraron las bases de datos Scopus, Web of Science, PsycInfo, Scielo y Virtual Health Library para promover una sistematización de la encuesta de artículos publicados entre 2008 y 2017. Así, se identificaron 65 artículos empíricos con instrumentos de medición de la construcción de afrontamiento en el deporte, con énfasis en situaciones competitivas. Entre estos, 65 instrumentos identificados, 10 fueron desarrollados y adaptados especialmente para atletas y presentaron buenas propiedades psicométricas que aseguraron precisión y confiabilidad. Es imprescindible destacar la necesidad de ampliar el número de estudios longitudinales y cualitativos sobre el afrontamiento en los deportes, así como el desarrollo de instrumentos.

Palabras clave: afrontamiento; medición; propiedades psicométricas; psicología del deporte.

Mensuração do coping no contexto esportivo: uma revisão sistemática

Resumo

O objetivo do presente estudo foi o de realizar uma revisão sistemática da literatura acerca da mensuração de *coping* em atletas, com base na identificação dos respectivos instrumentos, desenvolvidos e adaptados para o contexto esportivo, bem como as propriedades psicométricas relacionadas ao construto em tela. Foram utilizadas as bases de dados Scopus, Web of Science, PsycInfo, Scielo e Biblioteca Virtual da Saúde para sistematizar o levantamento de artigos publicados entre 2008 e 2017. Foram identificados 65 artigos empíricos com instrumentos de mensuração do construto *coping* no esporte, com ênfase em situações competitivas, sendo 9 instrumentos desenvolvidos e adaptados para atletas. Desses últimos, destacam-se boas propriedades psicométricas, assegurando precisão e confiabilidade no instrumento de medida. Observa-se a necessidade de ampliar a quantidade de estudos longitudinais e qualitativos sobre *coping* no esporte, bem como, o desenvolvimento de instrumentos para o contexto brasileiro.

Palavras chave: enfrentamento; medida; propriedades psicométricas; psicologia do esporte.

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