



## Relationships between catastrophising in the face of pain and competition anxiety in sportspeople

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### ABSTRACT

Catastrophising is considered to be an important prognosis factor associated with general pain condition, which may be relevant in the field of sport. A number of studies relate catastrophising to other psychological variables than pain, such as depression and anxiety. This study seeks to establish the relationship between catastrophising and competition anxiety by means of a sample of 61 sportsmen and sportswomen between 14 and 34 years of age. Even though sportspeople with higher rates of anxiety show higher levels of catastrophising, the findings of this study do not point to any statistically significant relationship between anxiety and catastrophic thinking.

**Key words:** Catastrophising; competition anxiety; sportspeople.

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### INTRODUCTION

Pain is a complex sensory experience, as it results from the relationship of physiological, cognitive, affective and behavioural processes. Cognitive and emotional variables are implicit in the perception of pain, which is also affected by other physiological factors (Infante, 2002). From a cognitive perspective, the way how cognitive factors combine or interact with sensory factors may help us get closer to a definition of pain (Plata-Muñoz, Castillo-Olivares and Guevara-López, 2004).

Pain is regarded as an important stressing agent which needs to be efficiently coped with in order to minimize the experience (Plata-Muñoz *et al.*, 2004). On the other hand, pain is a central aspect in the practice of physical and sports activities (Sullivan, Tripp, Rodgers and Stanish, 2000) and is usually considered to be an obstacle in the rehabilitation to injuries (Heil, 1993).

According to Sullivan *et al.* (2001), over the last few years, *catastrophising in the face of pain* has been a construct whose function to modulate painful responses has received a lot of attention. Coherent relationships have been shown between catastrophising and reactions of discomfort to painful stimuli. In general, as stated by Sullivan, Bishop and

Pivik (1995), most authors agree that the term catastrophising makes reference to a negative and exaggerated mental perception related to a real or anticipated pain experience.

Even though the reasons to associate catastrophising with pain are still unclear, (García-Campayo, Rodero, Alda, Sobradie, Montero and Moreno, 2008), it has been demonstrated that a model of a certain fondness for insecurity (McWilliams and Asmundson, 2007) and some degree of sensitivity to anxiety (Reiss, 1991) are crucial in its development.

A large amount of scientific literature suggests that the main consequences associated with catastrophising are more severe pain, greater consumption of pain relievers, reduction of daily activities and incapacity to work (Sullivan *et al.*, 2001). However, it has also been shown that there is greater sensitivity to pain (Edwards, Fillingim, Maixner, Sigurdsson and Haythornthwaite, 2004), more depression in the context of chronic pain (Edwards, Clifton, Bingham, Bathon and Haythornthwaite, 2006), interference in the use of pain coping strategies (Sullivan *et al.*, 2001), less adherence to pharmacological treatment in people with rheumatic diseases (Neame and Hammond, 2005), greater brain activity in the areas related to

pain processes such as attention, emotion and motor control in fibromyalgia patients (Gracely *et al.*, 2004), increase of different behaviours in the face of pain (Picavet, Vlaeyen and Schouten, 2002), worse prognosis (Stephens, Druley and Zautra, 2002), suicidal ideation (Edwards, Smith, Kudel and Haythornthwaite, 2006) and longer rehabilitation periods after surgical intervention (Kendell, Saxby, Farrow y Naisby, 2001).

Sullivan *et al.* (2001) frame the relationships observed between catastrophising and pain within a context in which catastrophising may contribute to a more severe pain experience, increasing the focus of attention of the pain and/or increasing emotional response in face of harmful stimuli. Besides this, catastrophising may emerge as a resource to cope with the negative emotions caused by chronic pain, with the intention of gaining social support.

Various studies show that sportspeople are more tolerant to pain and they feel it with less intensity than do sedentary people (Ahern and Lohr, 1997; Hamilton, Hamilton, Meitzer, Marshall and Molnar, 1989; Sullivan *et al.*, 2000; Tajet- Foxell and Rose, 1995). However, catastrophising is a pain predictor for both groups of people and explains the differences in the perception of pain between men and women. (Sullivan *et al.*, 2000). Encarnacion, Meyers, Ryan and Pease (2001) compared pain coping strategies between a group of professional dancers and a group of sportspeople and they found that the dancers showed higher rates of catastrophising than sportspeople. In this same line, the work by Pappas, Tripp, Sullivan and Rubenstein (2004) relate catastrophising and pain after having caused pain to a group of female dancers, who were separated into three levels, beginners, intermediate and advanced and compared them to a control group. Catastrophising was significantly related to pain, as a predictor. The most expert dancers showed higher tolerance to pain than the beginners, and all the dancers in general coped with pain better than the control group. Meyers, Bourgeois and LeUnes (2001) found that university sportspeople with a higher potential risk of injury, as in full contact sports, experienced lower rates of catastrophising.

There are consistent reasons that justify the study of catastrophising and even though it is related to pain, it keeps being significantly associated with other adjustment measures to control the level of pain (Keefe, Rumble, Scipio, Giordano and Perri, 2004). Finally, there is evidence that the level of catastrophising may change over the course of psychological intervention programmes and that, in the long run, these changes are related to improvements in pain reduction, psychological state and physical capacity (Burns, Glenn, Bruehl, Harden and Lofland, 2003; Burns, Kubilus, Bruehl, Harden and Lofland, 2003). A pilot study carried out in Spain recently (Rodero, García Campayo, Casanueva and Sobradie, 2008) proves the efficiency of the cognitive behaviour treatment to reduce catastrophising in patients suffering from fibromyalgia.

One of the variables likely to be associated

with catastrophising is anxiety. It has been investigated from many points of view in the health and sport worlds but there are not many works that relate both of them in the field of sport, and those which do appear do so almost exclusively with samples of injured sportspeople. The most representative works may be those of Tripp, Stanish, Reardon, Coady and Sullivan (2003) and the review by Wiese-Bjornstal (2002).

Tripp *et al.* (2003) compare teenagers and adults with anterior cruciate ligament (ACL) injuries by relating pain, catastrophising and affective distress, that is, depression and anxiety, obtaining higher levels of pain, catastrophising and anxiety in teenagers. According to the review by Wiese-Bjornstal (2002), the sportspeople who best cope with pain, recover more quickly; those who adopt a catastrophic reaction are less successful in rehabilitation procedures than those with a positive perception; and, as for cognition, fear of pain increases tolerance to it and reduces anxiety.

These findings can be understood if we bear in mind the relationship between psychological pain and physical recovery. For example, factors of psychological pain such as depression and anxiety increase the activity of the autonomous nervous system (an increase in muscular tension, blood pressure, heart rate, breathing rate, etc.). They also damage the immune function, which may, in its turn, interrupt the sportsperson's physical recovery process (Cramer y Perna, 2000).

The study that is next described seeks to analyse the relationship between catastrophic thinking associated with pain and competitive anxiety in sports people, determining the relationships of catastrophising, considered globally, with anxiety, as well as the relationships between this and each one of the catastrophising factors taken separately (brooding, exaggeration and despair). Furthermore, it analyses the connections between anxiety and catastrophising in relation to sportspeople's gender. We hope that this study will provide findings that will fill in the gaps in knowledge about the relationships between anxiety and catastrophising in Spanish sportspeople.

## METHODOLOGY

### *Participants*

The sample consisted of 61 sportspeople, 31 females (50.8%) and 30 males (49.2%) between 14 and 34 years of age ( $M = 22.38$  years;  $TD = 4.62$ ). They were given a battery of questionnaires selected for the study. The subjects of the sample practised the following sports: male and female indoor football/soccer, male and female volleyball, female athletics, male swimming and life-saving, male and female tennis, male and female paddle and male judo. All the sportspeople were from the Murcia Autonomous Region, Spain, had a federation licence and participated in regional and/or national competitions. The sampling was an intentionally devised one of an opinatic character (Hernández, 1998).

### *Design and procedures*

This is a descriptive correlational study

with a cross-sectional design in which all the variables were assessed at the same time (Hernández, Fernández y Baptista, 2003). The data collection was carried out during the Spanish and University championships held in the cities of Seville, Malaga and Murcia, Spain. Once the corresponding permissions were granted by the championship organising boards and the sport federations, the questionnaires, on one sheet of paper, were handed out. Before this, the sportspeople had the activity briefly explained to them. They were informed that the findings would be known only by the research team, made up of a psychologist and a graduate in Sports Science, and aspects relevant to design intervention programmes addressed to competition sportspeople would be found out. The confidentiality of any information was always guaranteed. The questionnaires were answered in one session by each group of each one of the sports in a room that was given over for this purpose by the championship organizers.

**Instruments**

Two instruments were used to analyse the following variables: the *PCS, Pain Catastrophizing Scale* (Sullivan *et al.*, 1995), and the *SCAT, Sport Competition Anxiety Test* (Martens, 1977).

The *Pain Catastrophizing Scale* (PCS), devised by Sullivan *et al.* (1995), is one of the most used scales to evaluate catastrophising in the face of pain. The subjects take their past painful experiences as a reference point and indicate to what degree they experienced some thoughts or feelings. A Spanish version for sportspeople was used devised by Olmedilla, Ortega, Abenza and Esparza, which is currently under revision. As well as the original scale, this self report consists of 13 items in a 5-point Likert type scale which ranges between 0 (never) to 4 (always), distributed into 3 subscales. First, brooding (BR), which makes reference to a state or feeling of constant worry and to the inability to stop pain related thoughts (4 items). Second, despair (DE), which manifests itself when one has lost the hope to achieve or get rid of something, or to let go of some physical and/or psychological aspect which is harmful to health (6 items). And third, magnification (MA), which makes reference to overemphasising the unpleasant side of painful situations and the expectations of negative consequences which approaches the concept of exaggeration and makes reference to passing the limits of normality (3 items).

The questionnaire gives a comprehensive score of catastrophic thought, as well as a score for each one of the scales. The internal consistency

coefficients of the original version by Sullivan *et al.* (1995) reach a value of **0.87** according to the index **alpha of Cronbach** for the comprehensive scale, 0.87 for the BR subscale, 0.79 for the DE subscale, and 0.60 for the MA subscale. These scores are very similar to the ones obtained by the version by Olmedilla *et al.* under revision, which reached a value of 0.82 according to the index alpha of Cronbach for the comprehensive scale, 0.73 for the BR subscale, 0.74 for the DE subscale, and 0.62 for the MA subscale.

The *Sport Competition Anxiety Test* (SCAT) by Martens (1977) is a most useful instrument to assess the competition anxiety trait, characteristic of sportspeople, and different to a general anxiety trait. It specifically assesses the sportspeople’s tendency to perceive the stress of the sports competition as threatening and to react with anxiety. It consists of 15 items in a Likert type scale with three possible answers, namely never, sometimes and almost always. The internal consistency coefficient of the scale is Cronbach’s alpha of 0.79 (Suárez, 1999).

**Statistical analysis**

In order to analyse data, competitive anxiety rates and catastrophising were compared. Anxiety rates were divided into four groups attending to the average standard deviation, which permitted the establishment of groups of sportspeople of homogeneous sizes and to compare catastrophising between the groups with higher and lower anxiety rates. In order to study the data, a descriptive analysis with the means and standard deviations was carried out by means of the SPSS 16.0 statistics pack. The one way or single factor ANOVA test was used to compare means of catastrophising and their respective dimensions between the groups of sportspeople according to their level of anxiety—low, medium, rather high and very high. The Pearson’s correlation coefficient was used to analyse the strength of linear dependence between variables. A signification level of  $p < 0.05$  was used in all cases.

**FINDINGS**

In order to analyse the data, the sample was divided into four groups under the criteria of levels of competition anxiety as follows: sportspeople with low levels of anxiety, with scores between 10 and 16; with medium anxiety, between 17 and 18; with a high level of anxiety, between 19 and 20, and scores over 21 for sportspeople with much higher levels. Table 1 shows the prescriptive data for each anxiety level group associated with comprehensive catastrophising and in relation to each one of their factors.

VARIABLE	Low anxiety (n = 18)		Medium anxiety (n = 16)		Rather high anxiety (n = 14)		Very high anxiety (n = 13)	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
BROODING	9,00	2,77	8,31	3,18	9,86	1,88	9,08	3,80
MAGNIFICATION	3,94	2,15	5,31	2,47	5,57	2,90	5,23	2,92
DESPAIR	9,50	2,33	9,25	3,61	10,57	4,31	9,62	3,93
TOTAL CATASTROPHISING	22,44	4,85	22,88	6,54	26,00	7,09	23,92	9,28

**Table 1.** Descriptive rates of catastrophising according to anxiety levels

As can be observed, the highest levels of catastrophising are found in sportspeople with rather higher anxiety levels. At any rate, no statistically significant differences were found in any of the relationships studied: neither between competition anxiety and comprehensive catastrophising ( $F_{3,57} = 0.793$ ,  $p = 0.503$ ), nor in the brooding factor ( $F_{3,57} = 0.679$ ,  $p = 0.569$ ), in the magnification factor ( $F_{3,57} = 1.329$ ,  $p = 0.274$ ), or in the despair factor ( $F_{3,57} =$

$0.391$ ,  $p = 0.760$ ).

Equally, no statistically significant relationships are found in any of the other relationships studied: neither between competition anxiety and comprehensive catastrophising ( $r = 0.071$ ,  $p = 0.584$ ), nor in the brooding factor ( $r = 0.017$ ,  $p = 0.896$ ), or in the magnification factor ( $r = 0.143$ ,  $p = 0.273$ ), or in the despair factor ( $r = 0.020$ ,  $p = 0.879$ ).

VARIABLE	Male		Female		P Value
	Mean	Standard deviation	Mean	Standard deviation	
ANXIETY	18,30	2,60	18,23	3,04	.919
BROODING	9,00	3,09	9,06	2,84	.933
MAGNIFICATION	5,10	2,37	4,81	2,86	.664
DESPAIR	9,87	3,26	9,55	3,74	.725
CATASTROPHISING	23,97	6,38	23,42	7,43	.759

**Table 2.** Values of the objects of study according to the sportspeople's gender

Table 2 shows scores on anxiety, on the various subscales of catastrophising and on the global scale in relation to gender. To be specific, no statistical differences are shown between men and women in anxiety ( $t_{59} = 0.102$ ,  $p = 0.332$ ), or in the brooding subscale ( $t_{59} = -0.085$ ,  $p = 0.933$ ), magnification ( $t_{59} = 0.436$ ,  $p = 0.664$ ), despair ( $t_{59} = 0.354$ ,  $p = 0.725$ ), or in global catastrophising ( $t_{59} = 0.308$ ,  $p = 0.759$ ).

## DISCUSSION

This study seeks to find out about the relationships between catastrophising associated with pain and competition anxiety in sportspeople. Firstly, it determines the relations of catastrophising, considered globally, to anxiety, as well as this to each catastrophising factor separately; brooding, magnification and despair. Secondly, it analyses these relationships in relation to gender.

If the total scores of the scale are considered, the findings show that groups of sportspeople with low and medium anxiety levels obtain very similar average scores, which are a bit higher in the group with very high anxiety level. The highest score comes from the sportspeople with rather high level of anxiety. However, none of these differences are statistically significant. On the other hand, if the sportspeople's scores are considered for each one of the factors, we can observe that, the same as what is shown in the global score scale, the group of sportspeople with a rather high anxiety level is the one which obtains the maximum average score. However, these differences are not statistically significant either. Neither are gender differences found in these relationships, in which, differently from other studies (Sullivan *et al.*, 2000), the male and female levels of catastrophising are very similar. These findings do not collaborate those obtained by Sullivan *et al.* (1995), whose sample of university students did find statistically significant relationships between catastrophising and other psychological variables, such as depression and the trait of anxiety.

In this sense, other studies have also found relationships between catastrophising and anxiety in clinical populations (McCracken, Zayfert and Gross, 1992), and in patients with fibromyalgia (García-Campayo *et al.*, 2008), although the correlation between catastrophising and anxiety was in this case relatively low.

The studies carried out with sportspeople, as well as with other types of samples, have also found relationships between anxiety and catastrophising (Tripp *et al.*, 2003), although in all these cases the sportspeople were ill or injured. There is then a common factor in those works which have actually found this relationship, namely the fact that the subjects under study were ill or injured, or at any rate, in a personal situation that could trigger some psychological processes, such as an increase of anxiety, greater concern and affectation, due to the feeling of pain associated with their circumstances. This issue may be verified by the empirical evidence of the stability of catastrophising in patients with chronic pain (Keefe, Brown, Wallston and Caldwell, 1989; Sullivan *et al.*, 1995), but this is not in the case of sportspeople who are not ill or injured. However, and this is really important from the intervention point of view, some researchers have shown that catastrophising may be reduced or even eliminated by means of psychological training programmes such as visualization (Rodero *et al.*, 2008) or by learning coping strategies (Spanos, Brown, Jones and Horner, 1981; Spanos, Radtke-Bodorik, Ferguson and Jones, 1979; Vallis, 1984).

The study of catastrophising is very recent in Spain (García-Campayo *et al.*, 2008; Rodero *et al.*, 2008) and has only been undertaken with patients suffering from fibromyalgia. Therefore it has not been studied in samples of sportspeople, a population whose pain develops with a sports injury, a daily event likely to be analysed from the perspective of catastrophic thinking. For this reason, the findings of this study should be taken with caution and further research with samples of injured and non injured

sportspeople is necessary. In these new studies relationships between anxiety and catastrophising could be observed, including the latter with other basic psychological processes, such as depression or pain perception, in the line of the studies carried out by Sullivan (Sullivan, Stanish, Waite and Tripp, 1998; Sullivan *et al.*, 1995; Sullivan *et al.*, 2000; Tripp *et al.*, 2003). At any rate, these issues should direct the research in order to develop criteria useful to implement psychological intervention programmes which may help the sportsperson to recover from an injury or to carry out injury prevention measures.

It is necessary to consider that assessment of catastrophising and its three associated variables, namely brooding, magnification and despair, might be very relevant in the rehabilitation processes of injured sportspeople, since they are usually to be found in highly stressful situations and there is empirical evidence (Jensen, Turner, Romano and Karoly, 1991; Lazarus and Folkman, 1984) that magnification and brooding may be related to assessment processes in which the subjects may focus on and exaggerate the threatening value of a painful stimulus. As for despair, it may be related to assessment processes in which the subjects negatively assess their ability to cope with painful stimuli in an effective way. As happens with other groups of subjects, sportspeople with high rates of catastrophising might not adequately use their attention-paying abilities, whether it be due to either to their inability to use distraction strategies (Heyneman, Fremouw, Gano, Kirkland and Heiden, 1990) or to their lack of sufficient attention to coping strategies (Spanos *et al.*, 1979). As pointed out by Sullivan *et al.* (1995) the possibility exists that pain related intrusive thinking or excessive focusing on the sensation of pain may interfere with the subjects' attempts to use strategies to reduce their pain. All of that seems to give great importance to the psychological training programmes, in the line of the work by Rodero *et al.* (2008).

Therefore, assessment of catastrophising may be very useful in understanding the psychological processes associated with the increase of both physical and emotional anguish as a response to unpleasant stimuli. To be specific, and from an applied perspective, this assessment may be useful to identify those sportspeople who are likely to manifest disproportionate anxiety responses to some medical procedures, above all to those related to surgical and physiotherapeutical intervention, as well as those related to the behaviour required to adhere to efforts implying high levels of suffering.

#### **Limitations of the study and avenues for future research**

Assessment of catastrophising by means of self report instruments, in the line of that pointed out by Sullivan *et al.* (1995), makes the participants remember painful experiences from the past to respond to the items and starts from the assumption that the cognitive and affective reactions to pain are consistent with a number of different pain situations. For this reason, it might be interesting to assess catastrophising using the same samples of sportspeople to study two different situations, namely when they are training and competing, and during the

time when they are injured, which would be helpful in finding out about the reliability of the assessment instrument.

In addition to this, even though this study has not found gender differences, probably because of the small size and heterogeneity of the sample, and given the fact that women seem to be more prone than men to using catastrophising (Jensen, Nygren, Gameral, Goldie and Westerholm, 1994), or at least to brooding and despair (Conway, DiFazio and Bonneville, 1991; Endler and Parker, 1994; Nolen-Hoeksema, 1987), it might be advisable to carry out research on sportsmen and sportswomen practising the same sport and at similar competition levels.

To conclude, the sportspeople in this research study were a heterogeneous group in relation to different kinds of sports. They have been studied both as individual sportspeople and as members of sports groups. As has just been stated, it would be recommendable to carry out research with more homogeneous sports groups, both in the type and/or sports speciality as in the level of competition.

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