

## ***The predictive role of rumination and trait mindfulness in pain and negative mood after a sport injury: a longitudinal study***

E. Vargas Moreno<sup>1</sup>, A. López-López<sup>2</sup>, J. L. González Gutiérrez<sup>2</sup>, B. Matías Pompa<sup>3</sup> and M. Alonso Fernández<sup>4</sup>

<sup>1</sup> Ayudante de investigación, <sup>2</sup> Profesor titular, <sup>3</sup> Estudiante de posgrado y <sup>4</sup> Profesor visitante.  
Departamento de Medicina y Cirugía, Psicología, Medicina Preventiva y Salud Pública e Inmunología y Microbiología Médica. Facultad de Ciencias de la Salud, Universidad Rey Juan Carlos. Alcorcón, Madrid

---

Vargas Moreno E, López-López A, González Gutiérrez J. L, Matías Pompa and B Alonso Fernández M. The predictive role of rumination and trait mindfulness in pain and negative mood after a sports injury: a longitudinal study. *Rev Soc Esp Dolor* 2017;24(3):125-131.

### ABSTRACT

**Introduction:** Daily sporting activity helps us to maintain a good quality of life and physical and emotional well-being. However, if this activity is not carried out properly, it may result in health risks, such as physical injuries. When injuries occur, they may involve pain and emotional distress. The psychological factors that influence their appearance are little-known.

**Objective:** This study focused on analyzing the predictive role of ruminative style and trait mindfulness in pain intensity and mood changes after a sport injury.

**Method and equipment:** We selected 15 athletes with a moderate sport injury which had taken place three days previously. They completed a battery of self-evaluation questionnaires at two moments of time: three days after the injury and one week after that. Furthermore, they kept a pain diary for one week, showing daily minimum, maximum and mean pain. Dependent variables evaluated were: pain intensity, anxiety and depressive symptoms. Independent variables were: ruminative style, rumination about the injury and trait mindfulness.

**Results:** Data was analyzed by linear regression, finding that rumination about the injury was a predictor of pain intensity for the week after injury, and of anxiety levels experienced ten days after the injury.

**Conclusions:** Ruminative processes regarding the injury increase the chances of negative mood occurring after injury,

mainly anxiety symptoms, and predict the intensity of pain experienced in the following 10 days. It would therefore be advisable to intervene to reduce or modify such processes immediately after injury in order to reduce post-injury anxiety and pain.

**Key words:** Sport injury, depression, anxiety, pain, rumination.

### RESUMEN

**Introducción:** La actividad deportiva habitual puede ayudar a mantener una buena calidad de vida, aportando bienestar físico y emocional. No obstante, si dicha práctica no se lleva a cabo de manera adecuada, puede conllevar riesgos para la salud, como la producción de lesiones físicas. Una vez producida, la lesión puede conllevar dolor y alteraciones emocionales. Sin embargo, los factores psicológicos que influyen en su aparición son muy poco conocidos.

**Objetivo:** El presente estudio se centró en analizar el papel predictor del estilo rumiativo y el *mindfulness* rasgo en el dolor experimentado y en los cambios en el estado de ánimo del deportista tras una lesión deportiva.

**Material y método:** Se realizó un estudio longitudinal en el que se evaluó a 15 deportistas, mayo res de edad, que habían sufrido una lesión moderada en los tres días anteriores al inicio del estudio. Todos ellos cumplimentaron una batería de cuestionarios de autoinforme en dos momentos temporales: a los tres días de producirse la lesión y una semana más tarde. Asimismo, durante toda la semana, cumplimentaron un diario de dolor en el que reflejaron la intensidad mínima, máxima y media diaria. Las variables dependientes evaluadas fueron: intensidad de dolor, ansiedad y sintomatología depresiva. Como variables independientes se evaluaron el estilo rumiativo, la rumiación sobre la lesión y el *mindfulness* rasgo.

**Resultados:** Los análisis de regresión lineal efectuados mostraron un efecto significativo de la rumiación sobre la lesión sobre la intensidad de dolor y la ansiedad sufrida diez días después de la lesión. La depresión fue predicha únicamente por la propia depresión medida en un primer momento, y el *mindfulness* rasgo quedó fuera de todas las ecuaciones.

**Conclusiones:** Los procesos rumiativos sobre la lesión aumentan las posibilidades de aparición de un estado negativo post-lesión, principalmente los síntomas de ansiedad, y predicen la intensidad de dolor experimentada durante los 10 días posteriores. Por tanto, sería recomendable realizar intervenciones que disminuyeran o modificaran tales procesos de manera inmediata a la lesión, con el fin de disminuir la ansiedad y el dolor postlesión.

**Palabras clave:** Lesión deportiva, depresión, ansiedad, dolor, rumiación.

## INTRODUCTION

Physical activity or sport is carried out by an ever-larger number of people, as it provides a large number of health benefits, such as physical and mental well-being or training and education for younger individuals, apart from psychological advantages, such as a reduction in depressive symptoms, stress and anxiety levels (1). Although it offers numerous advantages, it can also involve a series of associated risks to participants' health and quality of life. The most frequent is injury, which is the most significant in terms of physical and psycho-social repercussion (2).

Not all injuries are the same and they do not have the same consequences for athletes, with variability depending on personal and situational characteristics, as well as on competition level (3, 4). Injuries may be classified in terms of severity, according to their consequences, as:

Slight: they do not interrupt the sports activity.

Moderate: they limit participation.

Serious: lasting interruption of activity.

Serious causing chronic deterioration: they require permanent rehabilitation and previous performance will never be recovered.

Serious causing permanent disability: the sports activity must be given up (5).

The importance of studying injuries through the field of psychology stems not only from how often they occur but from their emotional and psychological consequences. Injuries will often bring about a wide range of adverse situations, both for injured athletes and for their environment. From the moment they occur, the individual will experience organic dysfunction that causes pain, an interruption or limitation of the sporting activity, changes in the sporting environment, possible loss as regards group sporting results, interruption or limitation of extra-sporting

activities and changes in their personal and family life (6). A study carried out by Olmedilla et al. in 2014 (7), on a sample of 13 injured football players, showed changes in the levels of some variables relating to mood. Accordingly, before the injury, players showed high levels of activation and self-confidence, while afterwards they had higher levels of depression, cognitive anxiety and somatic anxiety.

According to the Heil's affective cycle theory (8), it could be said that, after suffering a sport injury, individuals' mood will become more pessimistic, and more negative emotions will appear in the person such as loss of self-confidence, anxiety, depression and fear when returning to practise the sport. The pain experienced after injury, as well as the appearance of anxiety and depression symptoms, are not only significant factors because they diminish the quality of the athlete's life, but due to their possible implications in his or her recovery. In this respect, some studies show that situational and personal factors surrounding the time of the injury, such as the lack of social support or a negative mood, influence recovery speed, which will be slower, as the person does not have a positive attitude geared towards appropriately adhering to treatment (9). Despite the importance of pain and negative emotional changes after injury in recovery and quality of life, so far there have been no studies to analyze the predictive role of cognitive variables regarding its appearance or intensity. Studies conducted in other areas related with suffering from health problems suggest that cognitive variables, such as rumination, and personality processes, such as trait mindfulness, could play a role in moderating between the injury and the appearance of emotional problems, and they could also influence the intensity of post-injury pain. Rumination is considered a form of maladaptive self-reflection, as it only intensifies the emotional and psychological angst that the person is already suffering (10) and, because processing information on the basis of constant ruminations represents a significant vulnerability factor in the appearance of emotional distress after receiving a serious diagnosis, such ruminations may be taken as a key element in the appearance of depression and anxiety symptoms after a sport injury. In this respect, Priede et al., in 2013 (11), measured how ruminations influenced anxiety and depression experienced by patients that had just been diagnosed with cancer. They discovered that ruminations were associated with a greater incidence of anxiety and depressive symptoms in recently-diagnosed patients. Bearing in mind the above, the objective of this work was to conduct a longitudinal study to analyze the predictive role of ruminative style, rumination about the injury and trait mindfulness regarding pain intensity and the levels of depression and anxiety symptoms experienced by the athlete following the injury (ten days post-injury).

## MATERIALS AND METHODS

### Participants

The sample consisted of 15 mature athletes, 5 women and 10 men. Mean age was 24 years old. As a criterion for inclusion, athletes were required to have suffered a moderate-level injury in the previous three days, not report any chronic illness or psychiatric disorder and have a sufficient level of education to allow them to complete the evaluation tools and understand and sign the informed consent.

### Procedure, variables and tools

The procedure for carrying out the longitudinal study was as follows: the injured individuals were contacted through sports physiotherapists. They were asked whether they were willing to participate, they were provided with the information necessary and they signed their informed consent. Once three days post-injury had elapsed, the variables of interest were evaluated (moment 1; M1) and they were given the daily registration forms to measure perceived pain for that day and the following 7 days. After this period, they were again contacted to evaluate moment 2 (M2).

The first evaluation moment (M1) assessed predictive variables (ruminative style, rumination about the injury, trait mindfulness) and criterion variables (levels of depression and anxiety symptoms), in order to observe their initial level in the regression analyses, as well as trait anxiety, so as to monitor their relative significance. The second evaluation moment (M2) again assessed the criterion variables. Pain experienced was evaluated by daily assessments recorded on the days comprised between evaluation moments one and two, giving a mean value to produce a single score.

All participants signed their informed consent. The battery of questionnaires consisted of a form for personal data and information on the injury, and the following tools:

- STAI, State-Trait Anxiety Inventory (12,13). This is used to measure anxiety levels suffered by the injured athlete. Measurements for state anxiety were taken first and later for trait anxiety, so that "trait" results did not influence "state" results. The scale shows good internal consistency (0.90 and 0.93 for the S/A and 0.84 and 0.87 for T/A).
- BDI-II, Beck Depression Inventory (14,15). This was included to measure the degree of depression symptomatology. It shows good internal consistency, with a Cronbach's alpha of 0.91 (16).
- MAAS, Mindful Attention Awareness Scale

(17,18). This had the purpose of measuring individuals' capacity to be attentive and aware of experiencing the present. It has a Cronbach's alpha of 0.89 (18).

- Spanish version of the SRRS (Stress-Reactivate Rumination Scale) (19,20). This was used to measure rumination about the injury, that is, the individual's tendency to concentrate on maladaptive thoughts following and in relation to the injury shown by participants in the first three days after the injury occurred. To do so, this scale was modified, substituting the word stressor or stressful event with injury. The original scale has a Cronbach's alpha of 0.89 (21). The modification used also shows good internal consistency, with a Cronbach's alpha of 0.93.
- Ruminative Responses Scale (RRS) (22,23). This had the goal of measuring trait ruminative style, that is, habitually and excessively concentrating on the causes and consequences of symptoms. This scale has an internal consistency of 0.93 (23). It gave a total score for ruminative style and two scores corresponding to two sub-scales were also obtained: adaptive or reflective rumination (RRS reflection) and self-reproach or maladaptive rumination (RRS brooding) (23).
- Pain Diary: Visual Analogue Scales (VAS) (24). These were used to measure the pain level experienced by the injured individual over 7 days' evaluation. It is a visual scale with a 100 mm line, where the left end represents absence of pain and the right end maximum pain imaginable. Psychometric properties were: test/re-test reliability 0.947 and intra-class correlation coefficient (ICC) 0.97. Every day, participants filled in four VAS at the end of the day, where they had to report maximum, minimum, habitual and current pain experienced in that day. One single measurement per day was calculated as a mean weighing of the above. The variable's final score was the result of calculating the mean daily score.

### Statistical analysis

An analysis of hierarchical linear regression was carried out for each of the criterion variables, using the Enter method to introduce the age and sex variables in a first block in all cases, together with the level of the criterion variable measured at moment 1, as well as other specific control variables for each criterion. In a second block, the potentially predictive variables

were introduced: ruminative style, rumination about the injury and trait mindfulness. In this second block, the method used was stepwise regression, in order to determine the variables that best predicted the criteria and discard those that did not significantly increase predictive capacity, so that the last step in the model includes the variables that actually explain the dependent variable. Data was analyzed with the SPSS-22 statistics package.

## RESULTS

Table I shows mean value and standard deviation of the variables used in the analyses.

Table II shows the regression analysis using anxiety at ten days post-injury (M2) as the criterion variable. Apart from anxiety in M1, trait anxiety was introduced as a control variable. As may be seen, the analysis' result is a model explaining 58.3% of the variance in the anxiety variable ten days after the injury (M2) ( $R^2$  corrected = 0.583). The only variable that finally remains in the regression model is rumination about the injury ( $\beta = 0.608$ ;  $p = 0.027$ ).

Table III shows the regression analysis using depressive symptomatology at ten days post-injury as the criterion variable. As may be seen, the analysis results in a model explaining 38.6% of variance in the depression variable in M2 ( $R^2$  corrected = 0.386) in which the only

psychological variable showing a significant beta value is depression level at moment 1.

As regards predicting mean pain intensity experienced during the 7 days evaluated (between days 3 and 10 post-injury), the regression analysis carried out (Table IV) results in a model explaining 37.4% of variance in the anxiety variable at ten days after injury (M2) ( $R^2$  corrected = 0.374). The only variable that finally remains in the regression model is rumination about the injury ( $\beta = 0.688$ ;  $p = 0.011$ ).

TABLE I  
MEAN VALUES AND STANDARD  
DEVIATIONS OF VARIABLES USED

	Mean	SD
State anxiety M2**	12.93	7.066
Trait anxiety M1*	21.13	10.295
State anxiety M1	22.67	15.022
Age	22.67	6.366
Rumination about the injury M1	47.56	18.608
Depression M1	11	5.757
Depression M2	7	5.113
Pain	2.9240	1.94146

\*M1: moment 1. \*\*M2: moment 2.

TABLE II  
REGRESSION ANALYSIS OF THE DEPENDENT VARIABLE ANXIETY MEASURED AT  
EVALUATION MOMENT 2

Model		Coefficients of regression				Coefficients of determination				Anova
		B	ES	Beta	t	R2	R2 corr	M	Change F	F
1	(Constant)	-4.145	11.767		-0.352					
	Age	0.267	0.330	0.204	0.807					
	Sex	-1.937	3.633	-0.134	-0.533					
	S. anxiety M1	0.065	0.198	0.139	0.330					
	T. anxiety M1	0.432	0.315	0.629	1.370	0.524	0.333	0.524	2.747	2.747
2	(Constant)	10.932	10.902		1.003					
	Age	0.081	0.270	0.062	0.298					
	Sex	-3.473	2.929	-.240	-1.186					
	S. anxiety M1	0.337	0.187	0.716	1.799					
	T. anxiety M1	0.206	0.263	0.300	0.782					
	Rumination-Inj	0.231	0.087	0.608	2.649*	0.732	0.583	0.209	7.016*	4.922*

M1: evaluation moment 1. S. anxiety: state anxiety. T anxiety: trait anxiety. Rumination-Inj: rumination about the injury. \* =  $p < 0.05$ .

**DISCUSSION**

This study's objective was to conduct a longitudinal analysis of the role played by some psychological variables relating to the processes of rumination and full attention, in predicting pain intensity experienced during the first days following a sport injury, as well as the degree of anxiety and depression symptoms at ten days post-injury. Study of the influence exerted by cognitive variables like rumination and mindfulness in post-injury pain and emotional impact is especially interesting from a clinical point of view, because unlike other psychological variables such as personality traits, they can be modified by cognitive-behavioral intervention techniques. Despite their importance, so far no study had analyzed this role.

This study's results show that the level of rumination

about the injury shown by athletes during the first three days of its occurrence is a key factor in subsequent adaptation. In this respect, the regression analyses carried out, taking pain intensity experienced from 3 to 10 days post-injury as the criterion variable, show that the greater the rumination about the injury, that is, the greater the tendency of the subject to concentrate on maladaptive and/or negative thoughts relating to the injury, which is seen as a stressor that is difficult to manage, the greater the mean pain intensity experienced by the individual. Once the effect of rumination relating to the injury is taken into account, variables such as the athlete's general ruminative style or their baseline tendency to remain in a state of full attention (trait mindfulness) do not seem to be relevant in predicting pain.

**TABLE III**  
REGRESSION ANALYSIS OF THE DEPENDENT VARIABLE DEPRESSION MEASURED AT EVALUATION MOMENT 2

Model		Coefficients of regression				Coefficients of determination					Anova
		B	ES	Beta	t	R2	R2 corr	ES	M	Change F	F
I	(Constant)	2.985	6.475		0.461						
	Age	-0.061	0.206	-0.065	-0.297						
	Sex	-3.516	2.254	-0.336	-1.560						
	Depression MI	0.620	0.198	0.698	3.136*	0.518	0.386	4.006	0.518	3.937*	3.937*

Depression MI: depression measured at evaluation moment 1. \*= p < 0.05.

**TABLE IV**  
REGRESSION ANALYSIS OF THE DEPENDENT VARIABLE PAIN INTENSITY

Model		Coefficients of regression				Coefficients of determination				Anova
		B	ES	Beta	t	R2	R2 corr	M	Change F	F
I	(Constant)	2.841	2.746		1.034					
	Age	-0.011	0.099	-0.029	-0.107					
	Sex	1.213	1.098	0.304	1.105	0.095	-0.056	0.095	0.626	0.626
2	(Constant)	-2.970	2.849		-1.043					
	Age	0.078	0.082	0.215	0.949					
	Sex	1.323	0.846	0.332	1.564					
	Rumination-Inj MI	0.072	0.024	0.688	3.042*	0.508	0.374	0.414	9.254*	3.789*

Rumiación-Les MI: rumiación sobre la lesión en el momento 1 de evaluación. \*= p < 0.05.

The same occurs with predicting anxiety levels. Once the athlete's initial anxiety level is controlled, the greater the rumination about the injury during the first three days, the higher the anxiety levels that appear at 10 days following the injury. The predictive role of rumination regarding anxiety has been conducted in other studies with different populations, such as the study carried out by Nolen-Hoeksema and Larson in 1999 (25), which observed that ruminative style predicted increases in anxiety symptomatology in the general population with and without depression. The predictive role of rumination persists even when the effect of trait anxiety is controlled; furthermore, this is not predictive of post-injury anxiety, which is very interesting, as rumination about the injury is more easily modified. These findings are also coherent with the Response Styles Theory (26), regarding which it has been found that individuals who show constant rumination and focus on their symptoms, causes and consequences, may not only intensify a negative mood, but may also lengthen it over time.

The data shown in this study is relevant at a clinical level, as state rumination confined to the injury is highly susceptible to modification through cognitive-behavioral intervention techniques (27). Bearing in mind that rumination has been evaluated in reference to the first three days post-injury, it seems necessary to intervene immediately after the injury, training the athlete in specific techniques to reduce rumination, with the aim of minimizing pain and anxiety. According to different studies, the effect of rumination can increase if distracting elements are not brought into play, such as relaxation, distracting behavior or other cognitive elements that interrupt the ruminative process (28). Training athletes in these processes, both at a preventive level before injuries occur and in the moments immediately after the injury, would therefore be of great interest. Furthermore, some studies show that there exist elements relating to emotional intelligence, especially the processes of attention and emotional clarity, which are related with the tendency to generate rumination about stressors (29). Adjusting a proper level of attention towards emotions and increased emotional clarity would therefore be another possible objective to work on with athletes in order to restrict constant rumination (29) and, as a result, reduce post-injury pain and anxiety.

With respect to depressive symptoms, the analyses show that none of the variables evaluated, except the level that participants showed at evaluation moment 1, predicts their level. In previous longitudinal studies with the general population, the relationship between rumination and depression appears to be very long-term. For example, Just and Alloy, in 1997 (30), found that, after evaluating response styles in non-depressed individuals,

those with higher scores in ruminative style were more prone to suffering depression 18 months later. Taking this data into account, a possible reason for the absence of predictive value in this study of variables relating to rumination may be the short time interval that separates the two evaluations. Finally, we should mention that this study has limitations to take into account. On one hand, the sample evaluated is small, which hinders the generalizability of data. On the other hand, the time elapsed between moments 1 and 2 is not long, and there may exist relationships that require a longer time period, which went unidentified. Despite these limitations, the results presented may have a certain clinical relevance, as having an identification of modifiable processes such as rumination, whose management at least partly allows a reduction in pain intensity and anxiety, is significant not only because the appearance of either symptom diminishes the quality of the athlete's life, but because high pain intensity and anxiety may give rise, together with other elements not evaluated in this study (e.g. catastrophism, fear of movement, etc.), to setting up mechanisms that lead to chronification of the pain (27) and a poorer recovery from the sport injury (9).

#### ACKNOWLEDGEMENTS

The physiotherapy center Atlas de Fuenlabrada, the sports club Trival Valderas and the club Voleibol Fuenlabrada for their collaboration in contributing participants in the study.

#### CONFLICTS OF INTEREST

The authors declare they have no conflicts of interest.

#### REFERENCES

1. Abenza L, Olmedilla A, Ortega E, Ato M, García-Mas A. Analysis of the relationship between mood states and adherence behavior in injured athletes. *Anal Psicol* 2010 Jan;26(1):159-68. DOI: 10.6018/92161.
2. Abenza L. Psicología y lesiones deportivas: un análisis de factores de prevención, rehabilitación e intervención psicológica. Murcia: Universidad Católica San Antonio de Murcia; 2010.
3. Palmi J. Componentes psicológicos de las lesiones deportivas. *Revista Psicología del Deporte* 2014;23(2):215-44.
4. Hinrichs TH. Lesiones deportivas. Barcelona: Hispano Europea; 1995.
5. Heil J. Psychology of Sport Injury. Champaign, IL: Human Kinetics; 1993.
6. Buceta JM. Aproximación psicológica a la lesión

- deportiva. I Simposium Nacional de Psicología del Deporte, lesiones deportivas, prevención y rehabilitación. Murcia: Universidad Católica San Antonio de Murcia; 2008.
7. Olmedilla A, Ortega E, Gómez JM. Influencia de la lesión deportiva en los cambios del estado de ánimo y de la ansiedad precompetitiva en futbolistas. Cuadernos de Psicología del deporte 2014 Jan;14 (1).
  8. Heil J. Psychology of sport injury. IL: Human Kinetics;1993.
  9. Wiese-Bjornstal DM, Smith AM, Shaffer SM, Morrey MA. An integrated model of response to sport injury: Psychological and sociological dynamics. J Appl Sport Psychol 1998;10(1):46-69. DOI: 10.1080/10413209808406377
  10. Garrido JM. Pensamientos obsesivos. Los peligros de la rumiación. 2013. Recuperado de: <http://psicopedia.org/917/pensamientos-obsesivos-los-peligros-de-la-rumiacion/>
  11. Priede A, González-Blanch C, Herrán A, Hoyuela F. Asociación entre rumiaciones y malestar emocional en pacientes recién diagnosticados de cáncer. Revista de Psicología 2013;10(1):131-40. DOI: 10.5209/rev\_PSIC.2013.v10.41952.
  12. Spielberger CD, Gorsuch RL, Lushene RE. STAI. Manual for the State-Trait Anxiety Inventory (Self-Evaluation Questionnaire). Palo Alto California: Consulting Psychologists Press; 1970.
  13. Bermúdez J. Ansiedad y rendimiento. Rev Psicología Gal Y Apl 1978;151(33):183-207
  14. Beck AT, Steer RA, Brown GK. BDI-11. Beck Depression Inventory-Second Edition manual. San Antonio, TX : The Psychological Corporation; 1996.
  15. Sanz J, Perdigón LA, Vázquez C. Adaptación española del inventario para la depresión de Beck G (BDI-11): 2. Propiedades psicométricas en población general. Clínica y Salud 2003;14(3):249-80
  16. Sanz J, García-Vera MP. Rendimiento diagnóstico y estructura factorial del Inventario de Depresión de Beck-11 (BDI-11). Anal Psicol 2013 Jan;29(1):66-75. DOI: 10.6018/analesps.29.1.130532.
  17. Shapiro SL, Schwartz GER. Intentional systemic mindfulness: An integrative model for self-regulation and health Advances in Mind-Body Medicine 2000;16(2):128-34.
  18. Soler J, Tejedor R, Feliu-Soler A, Pascual JC, Cebolla A, Soriano J, et al. Propiedades psicométricas de la versión española de la escala Mindful Attention Awareness Scale (MAAS). Actas Esp Psiquiatr 2012;40(1):18-25.
  19. Robinson MS. The role of negative inferential style and stress-reactive rumination on negative inferences in the etiology of depression: Empirical investigation and clinical implications. Dissertation Abstracts International: Section B: Sci Eng 1997 Sep;58(3B):1545.
  20. Alloy LB, Abramson LY, Hogan ME, Whitehouse WG, Rose DT, Robinson MS, et al. Toe temple-wisconsin cognitive vulnerability to depression project: lifetime history of axis I psychopathology in individuals at high and low cognitive risk for depression. J Abnorm Psychol 2000 Aug;109(3):403-18.
  21. Robinson MS, Alloy LB. Negative cognitive styles and stress-reactive rumination interact to predict depression: a prospective study. Cognitive Ther Res 2003 Jun;27(3):275-92.
  22. Nolen-Hoeksema S, Morrow J. A prospective study of depression and posttraumatic stress symptoms after a natural disaster: The 1989 Loma Prieta earthquake. J Pers Soc Psychol 1991 Jul;61(1):115-21.
  23. Hervás G. Adaptación al castellano de un instrumento para evaluar el estilo rumiativo: la escala de respuestas rumiativas. RPPC 2008;13(2):111-21. DOI: 10.5944/rppc.vol.13.num.2.2008.4054.
  24. Scott J, Huskisson EC. Vertical or horizontal visual analogue scales. Ann Rheum Dis 1979;38:560. DOI: 10.1136/ard.38.6.560.
  25. Nolen-Hoeksema S, Larson J, Grayson C. Explaining the gender difference in depressive symptoms. J Pers Soc Psychol 1999 Nov;77(5):1061-72.
  26. Nolen-Hoeksema S. Response to depression and their effects on the duration of depressive episodes. J Abnorm Psychol 1991 Nov;100(4):569-82.
  27. Vlaeyen JW, Linton SJ. Fear-avoidance and its consequences in chronic musculoskeletal pain: a state of the art. Pain. 2000 Apr;85(3):317-32.
  28. Gerin W, Davidson K, Christenfeld N, Goyal T, Schwartz JE. The role of angry rumination and distraction in blood pressure recovery from emotional arousal. Psychosom Med 2006 Jan-Feb;68(1):64-72.
  29. Hervás G, Vázquez C. Explorando el origen emocional de las respuestas rumiativas: El papel de la complejidad emocional y la inteligencia emocional. A y E 2006;12(2-3):279-92.
  30. Just N, Alloy LB. Toe response styles theory of depression: Tests and an extension of the theory. J Abnorm Psychol 1997 May;106(2):221-9.