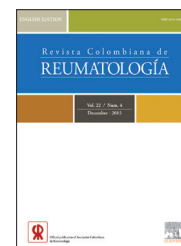




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Original Investigation

The Relationship Between Perceived Pain and Personality Styles in Rheumatic Patients^{☆,☆}

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ABSTRACT

Aim: This study examines the relationship between perceived pain and personality styles in individuals with rheumatic diseases. Our hypothesis suggests that maladaptive styles of normal personality will be related to the level of pain.

Material and method: To verify this hypothesis, a cross-sectional study was performed using the Millon Index of Personality Styles (MIPS, 2001) and the Visual Analogue Scale on a sample of 105 participants grouped into rheumatoid arthritis, ankylosing spondylitis, and control groups.

Results: The data show that the dimensions of personality related with pain vary depending on the groups. Thus the cognitive scales *extraversion* and *thought* predict perceived pain in the arthritis group, the control index *negative impression* is predictive in the spondylitis group, whereas the control group has no significant results.

Conclusions: These results support the personality styles influence when managing pain in rheumatic patients, especially in those with rheumatoid arthritis. Thus, the data suggests that a cluster of psychological interventions based on patient involvement in personally relevant activities could diminish the rumination and attention paid to their own pain.

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La relación entre el dolor percibido y los estilos de personalidad en pacientes reumáticos

R E S U M E N

Palabras clave:

Dolor

Personalidad

Enfermedades reumáticas

Objetivo: Este estudio investiga la relación entre el dolor que experimentan personas con enfermedades reumáticas y su personalidad. La hipótesis propuesta apunta a que los estilos más desadaptativos de la personalidad normal se relacionarán con el nivel de dolor. **Material y método:** Para ello se ha aplicado el inventario de personalidad normal MIPS (Millon, 2001) y la Escala Visual Analógica, siguiendo una metodología transversal que incluye a 105 personas en 3 grupos, 2 de ellos formados por personas con enfermedades reumáticas (artritis reumatoide y espondilitis anquilosante) más un grupo control.

Resultados: Según los datos hallados, las dimensiones de personalidad que predicen el dolor varían en cada grupo. Así, para los afectados de artritis las escalas cognitivas *extraversión* y *pensamiento* son las que mejor predicen el dolor, mientras que para el grupo de espondilitis ha sido un índice de control: *impresión negativa*. En cambio, para el grupo control no se han encontrado resultados significativos.

Conclusiones: Los resultados vienen a apoyar la influencia de los estilos de personalidad a la hora de manejar el dolor de pacientes reumáticos y apuntan hacia posibles líneas de intervención psicológicas, basadas en la implicación de los pacientes, especialmente los diagnosticados de artritis reumatoide, en actividades personalmente relevantes, disminuyendo la reflexividad excesiva y la atención prestada al propio dolor.

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Introduction

Pain is the complaint most frequently referred by people who suffer from rheumatic diseases of the group of the inflammatory arthritis, such as rheumatoid arthritis and ankylosing spondylitis.¹ Both are systemic and chronic diseases of unknown origin which affect mainly the joints. Their most important symptoms are pain and functional limitation; therefore, their medical treatment has a double purpose: on the one hand is focused on the short term attempting to control these symptoms and, on the other hand, it seeks to slow the progression of the disease on the medium and the long term. As well, people who suffer from moderate and severe pain have frequently comorbidities such as sleep problems and anxiety.² But far from being circumscribed to the personal and family spheres, pain also affects the public sphere because of the additional medical costs entailed by their treatment, comorbidities and job losses.^{2,3} Thus, the specific and personalized treatment is an inseparable part of the overall intervention of the described diseases, but even with all of that, not always is possible to establish the therapy that can totally eliminate pain.⁴ For that, adding to the pharmacological treatment certain patterns of physical exercise, mental self-management or psychological interventions, since they can contribute decisively to preserve the physical condition and to promote the well-being, may constitute an effective complement to the biomedical treatment.^{5,6}

In an attempt to clarify the psychological factors linked both to pain and to its chronification arises the pain fear-avoidance model,⁷ which continues being updated with data from new studies.^{8,9} Among the premises of this model is

established that certain dispositional variables –such as neuroticism– linked to cognitive variables –such as catastrophism–, together with normalized maladaptive beliefs on pain, would be at the origin of the avoidance of movement. Thus, the lack of movement or disuse would increase both the risk of chronification of the pain of diverse origin and the associated disability.¹⁰⁻¹²

Beyond the variables proposed by the model fear-avoidance of pain, the relationship between pain and the state of mind has been solidly established also in the population that suffers from chronic diseases, including the rheumatic disorders.¹³⁻¹⁶ In addition, there are data indicating the capacity of certain social stressors, such as suffering rejection, either overtly or covertly, to influence the pain experience.¹⁷ In this way, is pointed not only the complex and subjective nature of the experience of pain, but the possibility of allowing to be influenced by certain type of events, not only by those purely biological and functional.

There are also proliferating lines of research that attempt to be more inclusive in terms of the nature of the variables studied by them. For example, Newth and DeLongis¹⁸ found, among people with rheumatoid arthritis, significant relationships between personality, states of mind, ways of coping, and their consequences in the daily perceived pain. The authors demonstrate that the pain is susceptible to be modified from the type of coping strategies that are brought into play, and that this election will be favored by the type of personality. Such results are in line with one of the latest reviews on personality and coping,¹⁹ considering, in addition, the mediating role that between both factors exert the context, the nature and the severity of the stressor, and even the age. More recently, with a research eagerness, the study of Esteve

and Ramírez-Maestre⁹ has been a pioneer in investigating a group of psychological variables coming from different approaches (resilience, anxiety sensitivity, experiential avoidance, fearful avoidance of pain, acceptance of pain, and adjustment to pain) in three samples of people with pain of different origin, each one of them treated in healthcare facilities with specific characteristics. The results support the model of fear-avoidance of pain, especially for one of its groups, the one of low back pain, interestingly showing how for each of the groups studied are erected different variables as responsible for the lack of psychological adjustment.

Therefore, as it has been stated, there is a group of data that link the pain with psychological and contextual variables, in addition to the personality; however, they still do not have a theory that integrates them, and can lead to the contextual behavioral science approach that will serve for this purpose.²⁰

The present study aims to investigate the relationship between the pain experienced by people with rheumatic diseases and their personality. Most of the existing studies on the role of personality in pain coping have been focused on the Big-Five model, which features a solid empirical evidence. Despite this, the results obtained with the Big-Five are not sufficiently specific, since it includes few personality factors and they are too broad.¹⁹ For this reason, in this work we chose to follow the Millon's model of normal personality.²¹ This author considers that personality is a distinctive style of adaptation to the environment, similar to the traditional notion of coping. Millon's model of personality, which is being followed here, has demonstrated to be suitable for its application in the study of health^{22,23} and pain.²⁴

Although the existing relationships between pain and personality could be numerous (e. g., that when somebody suffers pain, his personality changes; or, conversely, that when somebody has a particular personality, more pain is experienced, etc.), Arias López²⁴ has pointed out the "pathoplastic" model as the one that is best adapted to the data of the existing research between personality and pain. The essential of this approach is that it understands that the personality is capable to influence the course of the medical disorder, once it has been diagnosed. Likewise, this model also takes into account the interactions between the personality and other variables that are related to it, as well as situational factors and demographic data, to explain fully the adaptation of the individual

to the pain experienced. This approach is similar to other proposals existing in the scientific literature.^{8,19,20}

Then, it is proposed as a hypothesis that in the 2 samples of rheumatic diseases, pain can be predicted with a positive sign from some of the less adaptive dimensions of personality, as well as with a negative sign from the most adaptive dimensions.

Method

In order to investigate the proposed hypothesis, given the characteristics of the sample, it has been conducted an ex post facto study. Its design is cross-sectional to explore associations between variables, and the data have been taken at a single time. The same instruments have been used for all the participants of the clinical and control groups. The characteristics of both are detailed below.

Participants

The study includes a sample of 105 individuals of Spanish nationality belonging to two clinical groups and to one control group. Among the requirements for inclusion have been taken into account the age (between 18 and 65 years), the educational level, with compulsory education at least, and not having any psychological disorder. The compliance with this last criterion has been based on the information provided by each participant. As well, for the control group it has been required to be free of chronic medical conditions. In Table 1 are shown their main characteristics.

- *Arthritis group* (n = 35), made up of people with rheumatoid arthritis, among who 27 are women and 8 are men, data which are coincident with the higher prevalence of the disease in women.^{25,26}
- *Spondylitis group* (n = 20), made up of people diagnosed with ankylosing spondylitis, the majority of them are men (15 vs. 5 women); unlike the previous group, in this disease the higher prevalence occurs in males.^{27,28}
- *Control group* (n = 50), made up by people without a diagnosis of chronic medical illness or psychological disorder, according to the information provided by themselves. Yet, these

Table 1 – Characteristics of the Groups

Sample	Age	Years of diagnosis	Live accompanied	Have children	Years of study	Work status
Arthritis group (n = 35)	Range: 25-65 M _e : 49.00 SD: 10.40	Range: 1-33 M _e : 5.00 SD: 8.01	80%	74%	Between 8 and 11: 49% Between 12 and 16: 28% 17 or more: 23%	Active 45% Inactive 54%
Spondylitis group (n = 20)	Range: 24-64 M _e : 42.50 SD: 11.75	Range: 1-36 M _e : 11.00 SD: 12.40	80%	70%	Between 8 and 11: 40% Between 11 and 16: 45% 17 or more: 15%	Active 40% Inactive 60%
Control group (n = 50)	Range: 23-65 M _e : 40.00 SD: 10.49		88%	62%	Between 8 and 11: 15% Between 11 and 16: 32% 17 or more: 53%	Active 76% Inactive 24%

people could have some pain of different origin at the time of the evaluation. For this group, the distribution by gender is of 21 men and 29 women.

Instruments

- *Initial questionnaire* for the collection of socio-demographic and clinical data. Developed to record the information relating to age, gender, educational level (basic, secondary or university studies), working status (active or inactive), family situation, number of children and cohabitation. On the disease, it only has been gathered information relating to the diagnosis and the time elapsed with it.
- *Visual analogue scale* for measurement of pain (VAS). The person is asked to indicate the degree of pain that has come to feel in the last 7 days. The answer is located in a scale of 10 cm, where 0 means no pain and 10 represent the maximum pain imaginable. The use of this scale is widespread in the evaluation of pain in multiple circumstances and diseases, given its quick application and easy understanding. In addition, different committees of experts recommend its use for the evaluation of pain.²⁹
- The *Millon index of personality styles* (MIPS),³⁰ intended to assess the normal personality, consists of 180 questions with 2 alternative answers: T/F. They explore 3 areas of personality: motivational goals, cognitive modes and interpersonal relationships, organized in 24 bipolar scales according to their meaning, not statistically, since each scale is evaluated independently. The score given to each of them covers a range from 0 to 100. The model considers that a score equal to or greater than 50 indicates the possession of the style, and that the higher the score, the style is possessed to a greater degree.

Motivational Goals

They include the basic adaptive strategies with which people are oriented towards their objectives.

- *Expansion and preservation*: depending whether the priority is given to the pursuit of pleasure or the avoidance of pain; a high score in *expansion* indicates the tendency to rely on the future and the capacity to confront the difficulties with equanimity. Instead, a high score in *preservation* indicates the tendency to be attentive to the problems of the past, to focus on preserving and protecting life, and to be pessimistic.
- *Modification and adequacy*: the individuals with high scores in *modification* take charge of their lives actively, modifying the environment in order to achieve their purposes. Those who score high in *adequacy* have a more passive style of adaptation, they tend to leave in the hands of others the course of their lives and they adapt themselves to the circumstances.
- *Individuality and protection*: scoring high in *individuality* would distinguish those who make decisions by themselves and pursue their goals without resorting to the approval of others. They can be defined with adjectives such as independent, competitive and entrepreneurial. In contrast, those who score high in *protection* would be more oriented toward the others, highlighting their preference for establishing deep relationships and their ability to show intimacy and love.

Cognitive Modes

They focus on the processing of the information, i.e., the way in which people analyze the reality and extract information from the environment.

- *Extraversion and introversion*: the individuals who score high in *introversion* prefer their own ideas and thoughts as a source of inspiration, they feel more comfortable alone. Instead, those who score high in *extraversion* seek the company of others because it implies a stimulus for them and provides them security on their ideas.
- *Sensation and intuition*: the high score in *sensation* denotes a preference for paying attention to the tangible and structured information, i.e., which is perceived through some of the 5 senses. Instead, a high score in *intuition* defines the tendency to focus on the intangible and ambiguous information.
- *Thought and feeling*: a high score in *thought* indicates the tendency to interpret the reality using the reason and the logic, in an impersonal way. The high score in *feeling* suggests giving more importance to the affectivity of the information, it implies to give much importance to the feelings in relation to the things.
- *Systematization and innovation*: individuals who score high in *systematization* would exhibit a conventional style when interpreting reality, integrating the new knowledge to their previous way of thinking. The high score in *innovation* characterizes the individuals who are open to create new cognitive structures to assimilate the reality.

Interpersonal Relationships

5 dimensions on the styles of relationship with others are collected.

Withdrawal and sociability: people who score high in *withdrawal* show little interest in social relationships and may be considered by others as boring and indifferent. The individuals who score high in *sociability* would like to be popular; they would have confidence in their abilities to influence the others and be liked by them.

Indecision and decision: the first scale would identify the individuals who show themselves inhibited and nervous in social contexts, those who want to be accepted and fear to be rejected, and for this reason they finally tend to isolate themselves. Instead, *decision* would identify those who feel more secure and socially competent. They could also show themselves ambitious and be considered as arrogant by others.

Discrepancy and conformity: a high score in *discrepancy* would distinguish those who have an independent style and possibly not in compliance with the social norms. Instead, those who score high in *conformity* will show themselves respectful with tradition and authority, being also predictable.

Submission and dominance: people with high scores in *submission* are characterized by giving more importance to the preferences of others than to their own, and can harm themselves. By this attitude, they would suffer more frustrations than gratifications. People who score high in *dominance* have the ability to lead others and become good leaders, although they also could show socially aggressive attitudes.

Discontent and acquiescence: the first scale would signal the individuals who feel unsatisfied and believe that they have been treated unfairly. Both their mood and their behavior would be oscillating, showing themselves friendly on some occasions and irritable in other. Those who score high in *acquiescence* would be characterized by being collaborative and friendly, tending to adapt their preferences to make them compatible with those of others.

The instrument also offers control indexes to detect possible inconsistencies when answering: positive impression, negative impression and consistency. Finally, the MIPS allows to obtain an overall score or adjustment index or degree of adaptation of the individual to his particular social environment.

The reliability and validity of the MIPS, in its Spanish adaptation for adults, show that the total average of the reliability data, the Cronbach's alpha index is 0.72, being the minimum value 0.63 and the maximum 0.82. Regarding its validity, the correlation matrix and the factor analysis confirm that the structure of the MIPS is appropriate, according to the typification studies with Spanish population.³⁰

Procedure

The data of the participants in this cross-sectional study have been collected in a single time by the same interviewer. The participants of the 3 groups answered the same questionnaires (initial questionnaire, VAS and MIPS). For the formation of the clinical groups we contacted the team of physicians and nurses of the Area of Rheumatology of the Torrecardenas Hospital Complex, in the City of Almería, and from the Hospital Comarcal de la Merced, in Osuna, Sevilla. For the control group was contacted the Center for Psychology Avenida de la Estación de Almería, and it was formed by people who attended a psychometric test to obtain or renew the driving licence.

First, the patients were provided with information about the study and the possibility to participate in a voluntary and anonymous way. Also, it was explained to them the inexistence of incentives in case that they decide to participate, although they were offered to know the result of their individual assessment.

Those who decided to participate were provided by the contact with the researcher and two ways to carry out the evaluation: self-applied or with the help of the interviewer, which was the option chosen by the majority (90%); for that it was scheduled an interview in the same healthcare facility where the information was offered. Then, prior informed consent, took place the evaluation interview with an average duration of 50 min. In the cases in which the participants decided to complete the questionnaires in a self-applied manner there was a high percentage of no return (95%). Finally, the data from 2 participants were not taken into account, because they did not reach the control indexes of the MIPS.

Tests Previous to the Analysis of the Results

First of all is performed the Levene's test in order to verify that the descriptive variables age and time with the diagnosis

fulfill the assumption of homoscedasticity. This is the case for the age [$F(2, 102) = 1.01, p = 0.404$], but not for the time elapsed since the diagnosis [$F(2, 102) = 10.77, p = 0.000$]. Subsequently is completed the same Levene's test for the measures of pain and personality, obtaining a negative result for the pain [$F(2, 102) = 3.33, p = 0.040$], while for the personality variables the assumption of equality of error variances is fulfilled (Table 2).

Then we were interested to know if there are statistically significant differences between the studied variables and in some descriptive variables, since if they exist it would be convenient to control their effects when performing the regression equations. For this purpose is performed the analysis of variance (ANOVA), finding statistically significant differences between the groups in terms of age [$F(2, 102) = 2.57, p = 0.040$]; however, such differences disappeared when the Bonferroni correction was made. As well, no significant differences in the time with the diagnosis were found.

As for the distribution of the sex variable, the Chi-square test confirms which is observed at a glance [$\chi^2(8) = 24.16, p = 0.002$], that is, the unequal proportion of men and women between the groups; which, as already indicated, is characteristic of each of the studied diseases. Finally, the distribution of the groups is also unequal for the level of studies [$\chi^2(8) = 20.18, p = 0.010$].

Analysis of the Data

The data were analyzed using the SPSS 17 statistic package for Windows. As it has been indicated, in the preliminary tests, the assumption of homoscedasticity of the error variances was proven by means of Levene's test; and the equality of distribution of certain socio-demographic variables in the groups through ANOVA and Chi-square tests.

As for the variable pain, it stands out that the ANOVA analysis only indicated a statistical difference between the arthritis group and the control group [$F(2, 102) = 5.19, p = 0.007$]. Subsequently, three linear regression equations aimed to determine the influence of the personality styles on pain were conducted in each of the groups that participated in the design, controlling socio-demographic variables that could affect the results. In concrete terms, it was decided to control the effects of two variables: age and time with the diagnosis, which although they did not show significant differences between the groups, is true that the broad range covered by both could exert certain difference in the results. For these reasons, the regression analyses were developed by steps. For the groups of arthritis and spondylitis were entered, in the first step, the age of the participants, and in the second step, the time with the diagnosis. In the control group only was controlled the effect of age, since they did not have any diagnosis. For the last step, through a method of successive steps, were left the personality variables that could be significant in the face to predict the pain. According to this method, the probability of F to enter was ≤ 0.05 and to get out from $F \leq 0.100$. With these premises, the following equations were obtained: for the arthritis group [$F(4, 34) = 4.909, p = 0.004$], for the spondylitis group [$F(3, 19) = 9.203, p = 0.001$], while for the control group it was not significant [$F(2, 49) = 3.041, p = 0.057$].

Table 2 – Descriptive Data and Verification of the Assumption of Homoscedasticity in the Scores of Age, Time Since Diagnosis and Personality

Variables	Mean and SD			F	gl1-gl2	p
	Arthritis group	Spondylitis group	Control group			
Age	47,97 (10,40)	48,65 (11,75)	42,14 (10,49)	1,01	2-102	0,404
Time with the diagnosis	7,42 (8,01)	14,07 (12,40)	0	10,77	2-102	0,000
Expansion	67,88 (21,41)	70,35 (21,36)	75,42 (19,45)	0,262	4-155	0,902
Preservation	41,08 (23,93)	42,35 (20,83)	29,62 (20,52)	0,136	4-155	0,969
Modification	53,51 (23,88)	59,25 (23,70)	60,54 (23,20)	0,190	4-155	0,943
Adequacy	55,17 (22,04)	44,15 (22,02)	45,92 (24,21)	0,298	4-155	0,879
Individuality	52,20 (24,18)	52,00 (24,44)	51,24 (23,32)	0,103	4-155	0,981
Protection	73,42 (18,07)	68,65 (22,57)	67,82 (20,90)	0,922	4-155	0,453
Extraversion	60,54 (22,39)	61,75 (19,91)	64,78 (23,49)	0,724	4-155	0,577
Introversion	47,80 (20,47)	43,30 (17,77)	39,52 (20,12)	0,059	4-155	0,994
Sensation	67,34 (24,30)	69,75 (26,82)	56,66 (25,30)	0,309	4-155	0,872
Intuition	44,97 (23,11)	39,85 (23,45)	47,34 (25,36)	1,41	4-155	0,232
Thought	41,85 (20,48)	49,60 (26,40)	37,60 (20,71)	1,30	4-155	0,270
Feeling	72,85 (17,85)	64,20 (21,19)	66,12 (20,40)	1,43	4-155	0,225
Systematization	59,94 (18,17)	56,15 (22,79)	59,06 (22,40)	0,855	4-155	0,493
Innovation	46,71 (20,60)	47,30 (18,86)	46,46 (24,58)	1,21	4-155	0,307
Social withdrawal	51,51 (25,62)	49,05 (25,02)	42,40 (26,22)	0,047	4-155	0,996
Sociability	55,05 (25,44)	58,55 (24,81)	62,44 (22,80)	0,196	4-155	0,940
Indecision	40,25 (25,03)	40,90 (24,90)	35,04 (22,37)	0,113	4-155	0,978
Decision	56,08 (24,72)	55,40 (28,21)	60,14 (24,83)	0,501	4-155	0,735
Discrepancy	37,71 (16,96)	43,20 (25,50)	38,70 (20,72)	1,82	4-155	0,126
Conformism	69,14 (21,38)	64,25 (25,60)	65,85 (23,27)	0,579	4-155	0,679
Submission	40,74 (23,86)	41,60 (22,56)	36,52 (24,49)	1,15	4-155	0,332
Dominance	47,60 (27,55)	54,90 (23,09)	48,44 (24,11)	0,793	4-155	0,531
Dissatisfaction	43,48 (25,41)	43,50 (27,83)	37,10 (23,58)	0,405	4-155	0,805
Acquiescence	68,25 (19,08)	65,35 (22,65)	65,20 (23,33)	0,354	4-155	0,841
Positive impression	4,59 (2,01)	3,95 (1,73)	4,46 (2,17)	0,537	4-155	0,708
Negative impression	3,80 (2,60)	4,35 (2,87)	2,80 (2,21)	0,954	4-155	0,435
Consistency	3,54 (0,88)	3,55 (0,60)	3,54 (0,99)	2,19	4-155	0,072
Adjustment index	47,94 (13,56)	48,00 (13,92)	53,04 (12,77)	0,156	4-155	0,960

Results

Firstly, as can be seen in Table 3, the clinical groups have very similar values and correspond with a pain of mild to moderate intensity. The lowest values, as might be expected, belong to the control group.

In Table 4 is shown a summary of the regression models and, as it can be seen, for the arthritis group were included

the extraversion and thought variables, explaining the 31.5% of the variance of pain. For the spondylitis group, the variable negative impression reached to predict the 56.4% of the variance in pain.

In their applied side, these data come to indicate that the patients with a diagnosis of arthritis will refer less pain if they are turned outwards and not intend to understand life and its current situation in purely logical terms. On the other hand, the pain referred by the patients with spondylitis is related with giving an unfavorable image of themselves. Although, as discussed below, we understand that in the case of individuals with chronic diseases this factor alludes to a real deterioration of their overall well-being and quality of life.

Discussion

A first general aspect that can be highlighted is that the personality characteristics that predict pain are different for each group, as mentioned in the study of Esteve and Ramírez-Maestre.⁹ In this case, the two scales that predict the pain in the arthritis group correspond to cognitive styles. Therefore, it could be stated that for this group the manner of reasoning

Table 3 – Differences in pain in Patients With Rheumatoid Arthritis, Ankylosing Spondylitis and the Control Group

Sample	n	M	SD	Confidence interval of 95%
Arthritis group	35	3.75 ^a	2.88	(2.93-4.58)
Spondylitis group	20	3.70	2.45	(2.61-4.79)
Control group	50	2.19 ^a	2.10	(1.50-2.87)

^a The values that are shown with the same letter are statistically different from each other, applying the equation of Tamhane.

Table 4 – Prediction of Pain in the Arthritis and Spondylitis Groups

Sample	Factors	Corrected R2	β	t	p
Arthritis group	Age	0.315	-0.209	-1.18	0.247
	Time with the diagnosis		-0.165	-1.04	0.306
	Extraversion		-0.443	-3.02	0.005
	Thought		0.444	2.67	0.012
Spondylitis group	Age	0.564	0.267	1.38	0.185
	Time with the diagnosis		0.374	1.96	0.067
	Negative impression		0.759	4.74	0.000
For this prediction of the criterion variable pain, the variables age and time with the diagnosis have been controlled, taking as independent variables the values of the MIPS.					

and analyzing the reality outweighs the way they relate to other people or towards their goals.

As has been seen above, in the sample of arthritis *extraversion* and *thought* are linked with different signs: the higher *extraversion* less pain and, on the other hand, the greater *thought* more pain. Therefore, these data only allow the partial confirmation of the hypothesis. Firstly, the role of the *extraversion* in this study is consistent with its theoretical significance. Thus, whereas *extraversion* refers to the preference for external sources of information, the attention would be focused to a greater extent outside oneself and to a lesser extent towards the body sensations (such as pain). This data would support the consideration that from the contextual approaches is made, of an excessive reflectivity, understanding it as detrimental and as the basis of the majority of psychological problems.³¹ Under this perspective is suggested that an effective intervention would break the tendency to be self-centered and take an active an external role, despite the symptoms that might be present, in line with it what was proposed by Hayes et al.³²

It should be highlighted that the suggested behavioral activation would not be of whichever type, but of one that entails a value or significance for the individual and in which this person would feel affectively involved. In the same sense, the scale *thought* that has been linked to the presence of pain would be added to this interpretation. As it will be recalled, the cognitive style «thought» has to do with the preference for the objective and rational information, while its opposite, the cognitive style «feeling», refers to an affective interpretation of reality. According to the data obtained, it appears that when an individual is turned outwards and, at the same time, is related in an affective manner to reality, being emotionally involved, usually refers less pain than when he stays with high levels of introversion or relates to reality in a rational and non-affective manner.

Then, for the spondylitis group the *negative impression* index is signaled to explain the variance in pain in a very high percentage. There are studies that identify this index as a marker of maladjustment^{33,34}; therefore, in line with them, the result of the spondylitis group supports the starting hypothesis. In the MIPS, *negative impression* was designed to detect if in the responses of the evaluated individuals there is an attempt to give a worse image of themselves. But it should be taken into account that, in certain cases, this

index may be signaling a reality, for example, an adverse vital situation or low self-esteem.³³

Finally, the results for the control group have not allowed to establish a significant prediction model. In this way, is suggested the low preponderance that the personality would have in this non-clinical group when predicting pain. And, on the contrary, support is offered to the influence of personality in the experience of pain among people with diseases in which this symptom is present.

We will mention that this cross-sectional study has several limitations. Firstly, it is recalled that the results of this type of design only yield relationships between data; therefore, the conclusions reached should not expect causal explanations. Secondly, as for the characteristics of the clinical groups studied, even though both include rheumatic diseases with equivalent levels of pain and comparable socio-demographic characteristics, the same distribution in terms of the variable sex is not found. Such distribution is marked by the characteristics of the disease, and thus has been reflected in the formation of the groups, and may influence differently the obtained results. Since the literature indicates that both the personality³⁰ and the perception of pain are influenced by the sex,³⁵ future studies with larger samples should explore the effect of this variable. Likewise, since both diseases are chronic and degenerative, it would be worth studying the effect of the passage of time and the evolution of the disease on the perception of pain. For this purpose, it would be advisable the selection of samples larger than those presented here, as well as a cohort or longitudinal design. A final variable that should be considered is the level of studies, given that in the sample presented the groups differ in terms of their educational level.

The possible applications of these results would include the encouragement of certain types of coping guided by the medical diagnosis of each patient. For example, in the case of individuals with rheumatoid arthritis the intervention objectives could be centered on encouraging the person to focus on what is important for his life, regardless of suffering pain or not. While in the case of ankylosing spondylitis, it would be possible to intervene in order to achieve a healthy self-esteem. This specificity in the disease-dependent coping is consistent with some recent results.⁹ However, it would be necessary to conduct experimental and cohort studies that allow to confirm these initial results.

Ethical Disclosures

Protection of people and animals. The authors declare that no experiments were performed on human beings or animals for this research.

Data confidentiality. The authors state that patient data do not appear in this article.

Right to privacy and informed consent. The authors state that patient data do not appear in this article.

Conflict of Interest

The authors declare that they have no conflict of interest.

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