NEW EMPIRICAL EVIDENCE OF THE FACTOR STRUCTURE AND PSYCHOMETRIC PROPERTIES OF THE AVOIDANCE-ENDURANCE QUESTIONNAIRE (AEQ): ADAPTATION TO SPANISH PATIENTS WITH CHRONIC MUSCULOSKELETAL PAIN

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Complete List of Authors:	RUIZ-PÁRRAGA, GEMA; University of Málaga, Personality, Assessment and Psychological Treatment López-Martínez, Alicia; University of Málaga, Personality, Assessment and Psychological Treatment Rusu, Adina; Ruhr-University of Bochum, Medical Psychology and Medical Sociology Hasenbring, Monika; Ruhr-University of Bochum, Medical Psychology and Medical Sociology
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Authors names: Gema T. Ruiz-Párraga[a], Alicia E. López-Martínez[a], Adina C. Rusu[bc], Monika I. Hasenbring[b]

Institutional affiliations of all authors:

[a]Dpto. Personalidad, Evaluación y Tratamiento Psicológico. Universidad de Málaga (Spain).

[b]Dept. of Medical Psychology and Medical Sociology, Faculty of Medicine. Ruhr-University of Bochum (Germany).

[c]Dept. of Psychology, Royal Holloway. University of London, Egham, Surrey, United Kingdom

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Corresponding author: Gema T. Ruiz Párraga

Postal address: Facultad de Psicología. Universidad de Málaga. Campus de Teatinos s/n, 29071, Málaga (Spain).

Tel.: +34 952 13 66 97- Fax: +34 952 13 11 01

E-mail address: gtruizparraga@uma.es

Introduction

In recent years, a growing body of research has provided evidence of the impact of pain-related cognitive/affective and behavioral responses on the development and maintenance of chronic musculoskeletal pain (1,2,3). Catastrophizing, anxiety and pain-related fear have been identified as important mediators of pain and disability (4,5,6). The fear-avoidance model (FAM) (7) is a relevant theoretical approach, which postulates a pathway between these pain responses, physical disuse and chronic pain (8).

It is often assumed that patients with pain-related disability due to back pain will have reduced physical activity levels, but recent studies have provided results that challenge this assumption (9,10). There has also been growing evidence for a second, potentially opposite, pathway that might also lead to the development and maintenance of chronic pain. This alternative pathway is based on endurance-related responses (ER) and includes physical overuse or overload as the main mediators instead of physical disuse (11,12,13). The avoidance-endurance model (AEM) was constructed to address the issue of ER in the maintenance of pain besides fear-avoidance responses (FAR) (14); thought suppression (TS) represents a cognitive response that suppresses the perception of pain as well as the interruption of daily activities normal demanded by pain. Furthermore, pain-related endurance behavior despite severe pain — although often associated with a positive mood — has been suggested to lead to an overload of muscles, bones and discs, and hence an increase in pain. Patients resist the interruption of daily activities at the expense of an increase in pain. Moreover, research has found a negative association between endurance behavior and self-reported disability (15). Specifically, the AEM suggests specific sub-groupings of patients with homogenous patterns of pain responses and differential pain and disability outcomes. Fear-avoidance patients tend to show elevated emotional distress and avoidance following pain catastrophizing and fear. One group of endurance patients often responds with thought suppression, distress, and significant endurance behavior, while a second group responds with

endurance, more focused cognitive distraction, and positive mood despite pain. The AEM further suggests an adaptive group that achieves a healthy balance between avoidance and endurance.

Due to the relevance of FAR and ER responses in the chronic pain experience, it is important to identify these subgroups using an appropriate measure to develop treatments tailored to the different profiles in order to improve secondary and tertiary prevention in back and neck pain. Thus, Hasenbring and colleagues developed the Avoidance-Endurance Questionnaire (AEQ) (15). The AEQ is a self-report measure based on the AEM to assess FAR and ER distinguishing between affective, cognitive and behavioral responses. This questionnaire is composed of 10 affective items, 16 cognitive items, and 23 behavioral items. Affective and cognitive scales range from 0 (*never*) to 6 (*always*), and behavioral scales range from 0 (*never*) to 5 (*always*). Principal components analysis (PCA) revealed five AEQ-FAR scales named anxiety/depression (7 items), catastrophizing (3 items), helplessness/hopelessness (9 items), avoidance of social activities (6 items), avoidance of physical activities (5 items), and four AEQ-ER scales named positive mood (3 items), thought suppression (4 items), pain persistence behavior (7 items), and humor/distraction (5 items). All the scales have high internal consistency (Cronbach´s α ranging from .76 to .91). The FAR scales showed positive associations with pain, disability and other variables related to the pain experience, such as depression, anxiety and fear-avoidance beliefs (ranging between r = .26 and r = .58), whereas the ER scales showed negative associations with these variables (ranging between r = -.19 and r = -.48). The only exception was positive correlations between both FAR and ER and pain intensity (15).

In summary, the AEQ has proven to be a reliable and valid measure to assess patterns of fear-avoidance and endurance-related responses to pain. Both aspects seem to play a role in the maintenance of back pain and it would be of great interest to elucidate the conditions

under which both FAR and ER may contribute to the development of disability. For these reasons, both aspects should be assessed in patients suffering from different pain syndromes. However, although Spanish is the second most spoken language in the world, there is no Spanish version of the AEQ available. Therefore, the aims of this study were twofold: first, to analyze its factorial structure and psychometric properties; second, to validate the AEQ-SP by reporting further relevant pain-related variables, such as functional impairment, daily functioning and general anxiety — which were not investigated in the original study (15) — in a sample of Spanish patients diagnosed with chronic back and neck pain.

Methods

Participants and Procedures

The sample consisted of 150 chronic spinal pain patients, who were referred by physicians and physiotherapists from different pain clinics in Málaga (Spain). The patients' mean age was 48.27 years (SD = 13.30) and mean pain duration was 7.70 years (SD = 6.70). Sixty-two percent of the patients were female, 62% were married or cohabited, and 52.7% were employed. In total, 18.6%, 34.7%, and 46% had, respectively, a low (8 years of schooling), intermediate (10 years) or high (13 years) level of education. Demographic characteristics did not differ from those found in other chronic musculoskeletal pain populations (16).

Inclusion criteria were: age between 18 and 60 years; spinal pain of benign origin; six or more months duration; pain intensity 3 or above on the Numerical Rating Scale of Composite Index of 10 points (17); continuous or intermittent pain that appears 5 or more days a week; pain area: neck, mid-back, and lower back, including the sacral and coccygeal areas; and medical referral after completing the diagnostic criteria. Exclusion criteria were: severe injuries requiring immediate surgery; major psychiatric illness; the presence of other

chronic diseases involving disability; insufficient knowledge of the Spanish language; and concurrent involvement in a legal process for receiving a pension related to pain.

All patients filled out the questionnaires at their clinic, while waiting to be seen by their physicians. Prior to participation patients gave their written informed consent. Patients were aware that the information collected was confidential. The study protocol was approved by the Medical Ethics Committee of both the *Distrito Sanitario de Málaga* (Málaga City Health District) and the University of Málaga (Spain).

Measures

Demographic and pain history variables

Subjects completed a questionnaire assessing demographic and pain variables, including age, gender, employment status, marital status, educational level, as well as their medical history, including the circumstances of pain onset, diagnoses, medication and other medical treatment, medical consultations, and surgery related to pain.

Fear-avoidance and endurance-related responses to pain

To assess both FAR and ER, the AEQ (15) was used. The AEQ assesses fear-avoidance as well as endurance-related affective, cognitive and coping responses to pain. The forward-backward translation method was used to obtain the final Spanish version. First, the original version of the AEQ was translated into Spanish by two native Spanish speakers. Both were clinical psychologists familiar with the terminology of the area covered by the instrument, and had clinical experience with chronic pain patients. Thus, two Spanish versions were obtained, which were compared for inconsistencies. These inconsistencies were taken into account, and a new Spanish Version was produced based on the corrections. This Spanish version was then translated into German by a native speaker familiar with psychological terminology. This German translation was then compared to the original

German AEQ and checked for inconsistencies. The inconsistencies were then corrected in the final Spanish Version.

Pain intensity

According to the Numerical Rating Scale of Composite Index of 10 points (17) patients were asked to rate their lowest, medium, and strongest pain during the previous week, as well as their current pain, on a scale ranging from 0 (*Not at all*) to 10 (*Extremely painful*). The mean of these four scores was calculated to obtain the average pain intensity.

Functional disability

The Roland Morris Disability Questionnaire (RMDQ) (18) is a 24-item questionnaire that asks the respondent to rate the degree to which pain interferes with functioning in different areas of life. Ratings range from 0 (*no disability*) to 24 (*maximum disability*). The Spanish Version (19) shows suitable reliability ($\alpha = .84$) and validity.

Functional impairment and daily functioning

The Impairment and Functioning Inventory (IFI) (20) is composed of 37 items each referring to an activity related to one of the following areas: household, autonomy behaviours, leisure and social relationships. One advantage of the IFI is that it takes into account the distinguishing features of Spanish culture. The instrument gives an index of functioning, an index of impairment, and scores for each of these areas. The subscales and the global scales show suitable reliability ($\alpha = .84$ for functional status, and $\alpha = .85$ for functional impairment) and validity.

Depression

The Hospital Anxiety and Depression Scale (HADS) (21) is a 7-item scale designed to rate depression (HADS-D). Ratings range from 1 (*almost always*) to 4 (*almost never*). It was

developed with brevity in mind and excludes items which might reflect somatic complaints; thus, it could improve the measurement of anxiety and depression in pain patients. The Spanish Version (22) shows suitable reliability (α = .82) and validity.

Anxiety

Pain-related anxiety was assessed by the Pain Anxiety Symptoms Scale (PASS) (23), a 40-item self-report measure designed to assess anxiety and fear responses related to the experience of chronic or recurrent pain. Only the total score was used in this study. It is calculated by summing individual items. Previous research has verified the psychometric properties of the PASS (23,24,25). Due to the fact that a Spanish Version of the PASS has not been available up to now, the questionnaire was specifically translated (forward-backward method) into Spanish for this study. The internal consistency of this Spanish version based on the study sample data was α = .87.

General anxiety was assessed by the HADS (Hospital Anxiety and Depression Scale) (21), which is a 7-item scale designed to rate anxiety (HADS-A). Ratings range from 1 (*almost always*) to 4 (*almost never*). The Spanish Version (22) shows suitable reliability (α = .81) and validity.

Fear-avoidance beliefs

The Fear-Avoidance Beliefs Questionnaire (FABQ) (26) is a 16-item self-report questionnaire focusing on patients´ beliefs about how physical activity (FABQ-activity) and work (FABQ-work) affect low back pain. Each item is answered on a 7-point Likert scale ranging from “strongly agree” to “strongly disagree”. The Spanish Version (27) shows high internal consistency (α = .93) and validity.

More specific cognitions regarding fear of movement/injury were assessed by the Spanish Version of the Tampa Scale for Kinesophobia (TSK-11) (28) that has been shown to be reliable and valid.

Data analysis

All analyses were performed using the SPSS statistical package, version 17.0 for Windows.

A series of analyses was performed to develop the Spanish Version of the AEQ, involving the following steps. First, in order to guarantee the validity of further analyses, normal distribution was evaluated and eighteen cases were identified as multivariate outliers based on elevated Mahalanobis distances (29) and these were therefore excluded from the analyses. Second, the Kaiser-Meyer-Olkin test (KMO) measure of sampling adequacy and the Bartlett test of Sphericity were used to determine items that were appropriate for Principal Components Analysis (PCA) (30). Third, the factor structure of the remaining AEQ items was calculated separately for the affective, cognitive and behavioural responses using three PCAs as suggested in the development of the original AEQ (14). For each PCA, examination of eigenvalues, plot scree test, and parallel analysis were used to determine the number of factors that were appropriate to interpret (31). As expected, low to moderate correlations between the factors were obtained, therefore subsequent oblique rotations (Promax) were used. Fourth, only items with factor loadings greater than 0.4 were used. The items should not show cross loading (i.e. a second loading greater than 0.35). Item-total statistics guided the removal of items that did not correlate with the overall score of the questionnaire. Finally, the PCAs were repeated. Fifth, internal consistency was calculated using Cronbach's alpha coefficients. Values of Cronbach´s $\alpha > 0.7$ were considered adequate (30,32). To examine the scale intercorrelations between the scales of the AEQ, a series of Pearson correlations were calculated. Concerning criterion-related validity, correlations were computed between the

AEQ scales and typical outcome variables (such as pain intensity and disability). Finally, correlations between AEQ scales and measures that are conceptually related to pain (functional impairment, daily functioning, depression, pain-related anxiety, general anxiety, and fear-avoidance beliefs) were inspected to examine construct validity.

Results

Factorial structure

For the remaining 10 affective items, the KMO measure of sampling adequacy was .60 and Bartlett's Test of Sphericity was significant ($\chi^2 = 806.76$; $p < 0.001$), indicating that the affective items were appropriate for PCA (30). A PCA yielded a three-factor solution, with eigenvalues exceeding one (3.03, 2.82 and 1.43, respectively). Together, these factors accounted for 73% of the total variance of the original items. Factor I (items 5, 8 and 9) accounted for 30.3% of the variance, Factor II (items 4 and 10) for 28.25% and Factor III (items 3, 6 and 7) for 14.2%. Inspection of the rotated solution did not show a clear distribution of items.

A second PCA forced to a two-factor solution yielded a clear distribution of items, which accounted for 58.54% of the total variance. Inspection of the rotated solution showed that Factor I (items 1, 2, 4, 5 and 8) comprised five items, of which three items referred to feelings of depression and two items (with negative loading) referred to positive mood. Factor II (items 3, 6, 7 and 9) was composed of four items, three items comprised feelings of anxiety and one item (with negative loadings) referred to positive mood. Item 10 ("…pessimistic/negativistic"), showed a double loading of more than .35 in both factors, and was therefore excluded. Although this two-factor solution differs from the original AEQ emotional scale, it represents a two-dimensional model as well: in the original AEQ study one factor was related to anxiety and depression and other one referred to positive mood.

Therefore, a third PCA analysis was conducted, without item 10 and forced to a two-factor solution. Inspection of the rotated solution again showed the same distribution of items. Results showed that the eigenvalues of the two factors were 3.00 and 2.29. Factor I (items 1, 2, 4, 5 and 8) accounted for 33.32% of the variance, and Factor II (items 3, 6, 7 and 9) accounted for 25.43%. Subsequent analyses to calculate the reliability of the resulting scales indicated that item 9 ("…as optimistic") had to be removed in order to reach adequate internal consistency in the second factor. For this reason, a fourth PCA without this item was conducted, forced once more to two-factor solution. This analysis yielded results indicating that the eigenvalues were 2.82 and 2.12 for Factor I and II, respectively. The first factor accounted for 35.30% of the total variance, whereas the second factor accounted for 26.50%. Inspection of the rotated solution again showed that Factor I was created by five items (items 1, 2, 4, 5 and 8), three of which comprised feelings of depression and the other two items (with negative loading) referring to positive mood. Factor II was composed of three items (items 3, 6 and 7) related to feeling of anxiety. In summary, the Spanish Version of the AEQ (AEQ-SP) affective scales included a Depression Scale (DS) and an Anxiety Scale (AS) and therefore consisted of 8 items (see Table 1).

-Please insert Table 1 about here-

The results of the KMO test (.88) and Bartlett's Test of Sphericity ($\chi 2 = 2967.60$; $p < 0.001$) for the 16 cognitive items justified conducting the PCA, which yielded two factors with eigenvalues exceeding one (8.96 and 3.80, respectively). Together, these factors accounted for 79.4% of the total variance of the original items. Factor I accounted for 56% of the variance and Factor II for 23.5%. Inspection of the rotated solution showed that the first factor (items 4, 6, 7, 9, 10, 11, 12, 13, 15 and 16) was composed of all the catastrophizing items, three helplessness/hopelessness items, and three thought-suppression items. Factor II (items 1, 2, 3, 5, 8 and 14) comprised six helplessness/hopelessness items and one thought-

suppression item. These results differed from the three-factor solution of the original AEQ cognitive scales: catastrophizing, thought suppression and helplessness/hopelessness. In summary, the AEQ-SP cognitive scales includes two scales totaling 16 items: a catastrophizing scale (CS) and a helplessness/hopelessness scale (HHS) (see Table 2).

-Please insert table 2 about here-

The results of the KMO test on the 23 behavioral items (.78) and Bartlett's Test of Sphericity ($\chi 2 = 8266.41$; $p < 0.001$) justified conducting the PCA, which yielded five factors with eigenvalues exceeding one (7.22, 6.11, 5.10, 2.80 and 1.31, respectively). Together, this factor solution accounted for 97.95% of the total variance of the original items. Factor I accounted for 31.39% of the variance, Factor II for 26.55%, Factor III for 22.14%, Factor IV for 12.14% and Factor V for 5.73%. Inspection of the rotated solution showed that the first factor (items 2, 7, 8, 9, 10 and 21) was composed of items related to the avoidance of social and physical activities. Factor II (items 6, 12, 19, 22 and 23) comprised items related to pain persistence responses and distraction, and Factor III (items 4, 5, 15, 18 and 20) included the distraction items of the original AEQ behavioral endurance scale more related to patient's ability to ignore pain (e.g. item 15 "I tell myself: I don't have time for this"). Factor IV (items 3 and 16) included items related to humor and item 3 ("I take a rest") with negative loading. Factor V was only composed of item 13. Due to the fact that items 1, 4, 11, 14 and 17 showed multiple loading of more than .35, and that items 18 and 19 showed a double loading of more than .35, a second PCA without these items forced to a four-factor solution was conducted. The analysis yielded four factors that accounted for 92.06% of the total variance, and whose eigenvalues were 5.75, 4.66, 2.35 and 1.97, respectively. Factor I (items 2, 7, 8, 9, 10 and 21) accounted for 35.95% of the variance, Factor II (items 6, 12, 22 and 23) for 29.10%, Factor III (items 5, 15 and 20) for 14.70% and Factor IV (items 3, 13 and 16) accounted for 12.31%. Inspection of the rotated solution again showed that Factor I was composed of items related to

avoidance of social and physical activities, Factor II comprised items related to task persistence and distraction, Factor III was composed of items related to ignoring pain, and Factor IV included items related to humor and item 3 with a negative loading. Therefore, the resulting AEQ-SP behavioral scales were labeled as Avoidance of social and physical activities scale (ASPAS), Pain persistence/distraction scale (PPDS), Ignoring pain scale (IPS) and Humor scale (HS) (see Table 3).

-Please insert Table 3 about here-

Similar to the original AEQ scales, all the factors of the AEQ-SP showed low to moderate inter-scale correlations, with the exception of the DS, which showed a highly significant correlation with the ASPAS (r = .68). In particular, the lowest correlations were found between the affective, cognitive and behavioral scales. These results are shown in Table 4.

-Please insert Table 4 about here-

Reliability

In order to calculate the reliability of the resulting scales, internal consistency (Cronbach´s alpha) was tested. Table 5 shows the results of the internal consistency for all scales of the AEQ-SP. Internal consistency was above *r* = .83 for all scales except for Anxiety (AS; alpha = 0.76) and Humor (HS; alpha = 0.73).

-Please insert Table 5 about here-

Criterion-related validity

In order to compare the findings of the AEQ-SP with the results of a reference criterion, self-reported pain intensity and disability were used as criterion-related variables, as they are the most frequently used outcome variables in back pain studies (15,33,34). As it is

assumed that the FAR scales (DS, AS, CS, HHS and ASPAS) and the ER scales (PPDS, IPS and HS) indicate maladaptive responses to pain that lead to the maintenance of pain and promote the development of chronic pain problems, it was expected that both aspects would correlate with pain intensity; however, it was assumed that the FAR scales would be positively associated with disability, whereas ER scales would be negatively associated with this variable.

The results of the bivariate correlations showed that all the FAR scales and the PPDS (ER scale) were positively related to pain intensity, although these correlations were moderate (between r = .26 and r = .55). On the other hand, the IPS and the HS (ER scales) were negatively associated with pain intensity (r = -.30 and r = -.13, respectively). Regarding functional disability, moderate correlations were obtained for both the FAR and ER scales. In the case of FAR scales, correlations range from .25 to .58, with positive values. The ER scales were negatively associated with functional disability (between r = -.25 and r = -.38).

-Please insert Table 6 about here-

Content validity

All the AEQ-SP scales showed significant associations in the expected direction. There were moderate to high correlations between most of the emotional, cognitive and behavioural scales and the pain-related variables considered in the analysis (functional disability, functional impairment, daily functioning, depression, pain-related anxiety, general anxiety, and fear-avoidance beliefs as measured FABQ-activity, FABQ-work, and TSK) with positive correlations for the FAR scales and negative for the ER scales (see Table 6). In addition, moderate correlations were observed between both the FAR and ER scales and daily functioning. The FAR scales were negatively associated with daily functioning (between r = -

.23 and r = -.57), whereas the ER scales were positively correlated with daily functioning (between r = .21 and r = .36).

Discussion

The goal of this study was to analyze the factorial structure and psychometric properties of the Spanish version of the Avoidance-Endurance Questionnaire (AEQ) (15) using data from a sample of Spanish patients with chronic back and neck pain. The results obtained using PCA with oblique rotation indicated that the proposed scales were largely supported. Nevertheless, the factor structure of the original AEQ could not be exactly replicated. Thus, the Depression scale (DS) and Anxiety scale (AS) were independent. Despite large studies indicating an association between anxiety, depression and the occurrence of back pain (i.e. (35,36)), the differentiation of anxiety and depression in patients with chronic back and neck pain has been supported by extensive research in this area (39,40). Recently, some studies have found that certain pain conditions (e.g. back pain) are more strongly associated with several anxiety disorders than with depression (37,38,39,40).

On the other hand, all the positive mood items, with the exception of item 9 — which was removed as it decreased reliability — were the inverse of items on the DS. This observation can be supported by the Dynamic Model of Affect (DMA) (41), which proposes that the association between positive and negative affects differs depending on the information that is being processed. However, under conditions of uncertainty (including pain and stress), the affect also becomes strongly inversely related (41). Supporting this hypothesis, Watson and colleagues (42) found that opposite affects were uncorrelated in healthy students, whereas highly negative correlations were reported in chronic pain patients (43,44). In fact, Hasenbring and colleagues (15), during the development of the original AEQ, found highly negative correlations between the Anxiety-Depression scale and the Positive Mood scale (r = -.70).

The cognitive items were distributed on the Catastrophizing scale (CS) and the Helplessness/Hopelessness scale (HHS). The CS included three items which were considered as helplessness/hopelessness in the original AEQ. This result could be explained in the light of Sullivan and colleagues' (45) conceptualization of catastrophizing as an exaggerated negative orientation toward noxious stimuli. Moreover, these authors proposed three dimensions of catastrophizing: rumination, magnification, and helplessness. Thus, in this frequently used conceptualization, helplessness/hopelessness is considered a dimension of catastrophizing. This aspect may explain why some helplessness/hopelessness items have been understood by patients in the same way as catastrophizing items. Nevertheless, the high internal consistency of the CS and HHS (α = .96 and α = .95, respectively), as well as the moderate corre2lation between them (r = .36), supports differentiating these scales in line with the original AEQ. This differentiation is mainly theoretically based on the idea that thoughts of helplessness/hopelessness more specifically reflect the secondary appraisal of coping abilities (46,47,48). Additionally, the thought-suppression items of the original AEQ were distributed between the CS and HHS. In this sense, some studies suggest that efforts to suppress thoughts actually increase the probability that the target of thought suppression will intrude into awareness (49). Thus, Wegner´s ironic process theory of mental control (50) addresses why efforts to suppress thought are generally unsuccessful. When the intention to suppress is terminated or compromised by competing demands on cognitive resources, monitoring processes increase the likelihood that catastrophizing or helplessness/hopelessness thoughts will intrude into consciousness. In fact, Sullivan and colleagues (49) examined the effects of thought suppression and catastrophizing in an experimental pain procedure on subsequent pain experience. The results showed that both cognitive processes had the same effects on the pain experience, that is, they both increased pain.

Regarding the behavioral items, these formed four scales after seven items were removed (1, 4, 11, 14, 17, 18 and 19) due to their double or multiple loading greater than .35

on two or more scales. The resulting four scales were: 1) the Avoidance of Social and Physical Activities scale (ASPAS), referring to social and physical activities that were avoided by patients without differentiation between either type of activity; 2) the Pain Persistence and Distraction scale (PPDS), referring to pain persistence behaviors understood as an attempt by patients to distract themselves. This assumption would be supported by the cognitive theory of dual task processing (51), which postulated how a phenomenon can occur in two different processes: an implicit (automatic) unconscious process, and an explicit (controlled) conscious process; 3) the Ignoring Pain scale (IPS) composed of the distraction items of the original AEQ, which are related to the tendency to minimize the meaning of a pain experience despite severe pain. Thus, ignoring pain is conceptually similar to distraction but focuses more on blocking out the pain as well as on the perception of regarding pain as controllable (52). Moreover, ignoring pain seems to be more frequently related to patients with longer pain durations (53). With regard to distraction, it should be noted that distraction may be more useful for the management of acute pain than chronic pain (54); and 4) Humor (HS) which, in this sample, was a separate factor in addition to distraction and ignoring pain, perhaps because humor involved cognitive, emotional, behavioral, psychophysiological, and social aspects which are not necessarily implicit in the mere ability to distract oneself or ignore pain. Specifically, humor is defined as "that quality of action, speech, or writing which excites amusement…" (55).

Briefly, the results of the Spanish version of the AEQ revealed five fear-avoidance scales named the Depression scale (DS), Anxiety scale (AS), Catastrophizing scale (CS), Helplessness/Hopelessness scale (HHS), and Avoidance of Social and Physical Activities scale (ASPAS), and three endurance-related responses scales: Pain Persistence Behavior and Distraction scale (PPDS), Ignoring Pain scale (IPS), and Humor scale (HS). The analyses of internal consistency showed a high Cronbach´s α for all the scales of the Spanish-AEQ version (AEQ-SP). All the scales of the AEQ-SP showed low to moderate inter-scale

correlations, except for the DS scale, which showed a high correlation with the ASPAS (r = .68). Consistent with this result, some studies have found a relationship between the avoidance of activities and a depressed mood in back-pain patients (56). Moreover, the Fear-Avoidance Model of Pain postulated by Vlaeyen and Linton (7) points out several routes by which fear of pain may lead to disability. Regarding one of these routes, the model suggests that catastrophizing and activity avoidance can lead to disuse, disability, and depression, thereby creating a vicious circle. This means that physical inactivity, when maintained over a long period, has a detrimental impact on the cardiovascular and musculoskeletal system, and might lead to a "disuse syndrome" which may further aggravate the problem of pain. In addition, it also means avoiding the withdrawal of essential enhancers which might increase mood disturbances such as irritability, frustration and depression.

The analysis of criteria and content validity provide further evidence for differentiating between the FAR and ER scales, which is consistent with the AEM (14) and the results of the original AEQ. All the FAR scales were positively related to pain intensity, functional disability, functional impairment, depression, pain-related anxiety, general anxiety, and fear-avoidance beliefs. These results are very similar to those obtained in the development of the original AEQ. In this study daily functioning was also assessed and the results showed that all the FAR scales were negatively related to daily functioning. These data are consistent with the AEM and are similar to previous results on the relationship between FAR, pain, and functional disability (7,57). In addition, the various pathways proposed in the Fear-avoidance model of pain were also supported by the positive associations between the DS, AS, CS, and ASPAS.

Concerning the ER scales, the AEM suggests a positive association between ER and pain intensity. The current findings support this postulate for the PPDS. However, the IPS and HS were negatively related to pain intensity. These results are consistent with studies

investigating the relationship between these variables and pain; they suggest that ignoring pain and using humour to manage it are associated with lower pain ratings (54). Moreover, increases in the use of these strategies in patients, as seen following multidisciplinary treatment (58), are consistent with the cognitive-behavioral formulation that considers these strategies as generally adaptive and that they contribute to the patient´s perception that pain is controllable, therefore leading to reports of less pain intensity. It is probable that the IPS and HS include characteristics from the adaptive responses groups. As expected, and in line with the AEM, most of the ER scales were negatively related to functional disability, functional impairment, depression, pain-related anxiety, general anxiety, and fear-avoidance beliefs, and positively related to daily functioning. However, in contrast to the original AEQ, in this study neither specific affective (positive mood despite pain) scales nor cognitive (thought suppression) scales were obtained for ER. In fact, the items of these scales were distributed on the Affective and Cognitive FAR scales. In this Spanish sample of chronic back and neck pain patients, pain-related endurance-behaviour despite severe pain seems to be more related to lower scores in emotional distress (depression and anxiety) and negative thoughts (catastrophizing and helplessness/hopelessness) rather than, for example, a special positive mood despite pain. These results may be due to the sample characteristics given that the most recent and most extensive survey regarding pain-experience conducted in Europe (16) showed that Spanish patients tend to report more pain intensity, as well as more pain duration compared to other European citizens. Consistent with these findings, Spain has the highest rate of depression among patients with chronic pain in Europe.

This study has a number of limitations that should be noted. The most relevant is that the sample only consisted of chronic pain patients. Therefore, the findings of the exploratory factor analysis must be taken with caution and should be replicated in a larger sample with different pain patients (acute, sub-chronic, and chronic). Second, a larger sample would also allow a confirmatory factor analysis to be conducted. Third, regarding diagnoses, the original

AEQ was developed with a sample of patients suffering from low-back pain alone. However, in this study, the sample consisted of patients with a diagnosis of spinal pain. Fourth, given the cross-sectional design, no predictions could be made regarding the predictive power of the FAR and ER scales regarding long-term adjustment to pain. Five, self-report measures alone were used in this study. Future research should explore the types of activities that are avoided by patients by employing physical performance tests. Finally, the study did not control for the possible influence of pain interventions (e.g., medication, physiotherapy, activity-related instructions).

Despite these limitations, the results of this study have shown that the Spanish version of the AEQ (AEQ-SP) is a valid, reliable and useful tool for the identification of fear-avoidance and endurance-related responses to pain in Spanish chronic back and neck pain patients. This instrument should help clinicians to identify patients at a high risk of chronicity and to develop treatments tailored to the different profiles in order to improve secondary and tertiary prevention in back and neck pain.

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Table 1. Final factor solution with factor loadings for the affective items, mean and standard desviation (SD) for each item.

	Spanish translated items/ original items Affective scales	Factor I Depression	Factor II Anxiety	Mean	SD
1.	… bajo de ánimo/ down	**0.77**	-0.09	3.77	1.25
2.	… igual de contento/ happy, anyway	**-0.87**	-0.28	1.73	0.96
4.	… triste, deprimido/ sad, blue	**0.66**	0.13	2.99	1.88
5.	… alegre, de buen humor/ cheerful, in good mood	**-0.71**	-0.18	2.55	1.10
8.	… vulnerable, sensible/ vulnerable, sensitive	**0.67**	0.15	3.95	1.55
3.	… ansioso/a, tenso/a/ anxious, tense	-0.20	**0.85**	3.14	1.70
6.	… vacilante, cauteloso/ hesitant, wary	0.14	**0.72**	3.19	1.66
7.	… nervioso, inquieto/ nervous, uneasy	0.02	**0.87**	3.30	1.77
Explained variance (%)		35.3%	26.5%		

Table 2. Final factor solution with factor loadings for the cognitive items, mean and standard desviation (SD) for each item.

Spanish translated items/ original items Cognitive scales	Factor I Catastrophizing	Factor II Help/hopelessness	Mean	SD
4. No tendré un tumor, ¿no?/ I can't have a tumor, can I?	**0.92**	0.01	1.34	1.19
6. Pronto no seré capaz de resistirlo más/ I will not be able to endure it any longer	**0.85**	0.12	2.45	1.25
7. Me pregunto si tendré la misma enfermedad grave que…/ I wonder if I have the same serious illness as…	**0.95**	-0.15	1.03	0.95
9. ¡Ya nada me ayuda!/ Nothing helps anymore!	**0.71**	0.29	1.22	0.98
10. ¡Venga, contrólate!/ Pull yourself together!	**0.74**	0.27	1.42	1.15
11. La vida no merece la pena con un dolor como este/ Life is hardly worth living with pain like this	**0.96**	0.23	1.07	0.94
12. ¿Qué voy hacer si empeora otra vez?/ Whatever will I do if it gets worse again?	**0.62**	0.30	2.55	1.20
13. ¡No seas tan exagerado!/ Don't make such a fuss!	**0.89**	-0.08	1.26	1.13
15. Esto no es una enfermedad grave ¿no?/ It is not a serious illness, is it?	**0.97**	0.15	2.08	1.70
16. Es importante que ahora no pierda el control/ It is important not to let myself go now	**0.89**	0.04	1.26	1.01
1. ¿Por qué tengo que aguantar esta pesada carga?/ Why do I have to bear this heavy burden?	-0.04	**0.97**	2.11	1.30
2. Parece que el dolor nunca se va a calmar/ It seems the pain will never ease up	0.03	**0.95**	2.31	1.43

Final factor solution for the cognitive items (*continue*)

3. Este maldito dolor lo estropea todo/ This damn pain spoils everything	-0.16	**0.96**	2.08	1.42
5. Es importante que ahora resista que no pierda mis fuerzas/ It is important for me now to hold on!	0.01	**0.84**	2.04	1.12
8. ¡Ay, esto no se va a mejorar!/ Oh, it is not going to get any better	0.29	**0.67**	1.57	0.88
14. ¿Cuánto tiempo tendré que aguantarme con este dolor?/ How long do I have to put up with pain like this?	-0.15	**0.98**	2.11	1.48
Explained variance (%)	56%	23.5%		

Table 3. Final factor solution with factor loadings for the behavioral items, mean and standard deviation (SD) for each item.

Spanish translated items Behavioral scales	Factor I Avoidance of social and physical activities	Factor II Pain persistence and distraction	Factor III Ignoring pain	Factor IV Humor	Mean	SD
2. Evito visitar a mis amigos/ I avoid visiting my friends	**0.98**	0.05	0.16	-0.09	3.27	1.41
7. Cancelo mis citas privadas/ I cancel private appointments	**0.99**	0.16	0.07	0.09	3.47	1.45
8. Cancelo una visita a un evento/ I cancel a visit to an event	**0.96**	0.11	0.08	-0.19	3.36	1.55
9. Evito realizar actividades físicas agotadoras/ I avoid physical strenuous activities	**0.89**	0.19	-0.12	-0.25	4.22	1.98
10.Evito hacer deporte/ I avoid doing sports	**0.84**	0.19	-0.04	-0.16	3.92	1.39
21.Evito la compañía de la gente/ I avoid other people's company	**0.96**	0.16	0.09	-0.08	2.34	1.44
6. Aprieto los dientes/ I clench my teeth	-0.05	**0.96**	0.10	-0.04	2.99	1.38
12.Mantengo mis citas aunque no me sienta con fuerzas para ir/ I keep my appointments, even I don't feel up to it	0.13	**0.99**	-0.12	0.07	2.36	1.98
22.Me distraigo con actividades físicas/ I distract with physical activity	0.08	**0.96**	-0.13	0.13	2.45	1.09
23.Me distraigo haciendo pequeñas tareas en casa/ I distract doing little Jobs at home	0.16	**0.99**	-0.10	0.03	1.99	1.04
5. Trato de no prestar atención/ I try not to take any notice of it	0.01	-0.06	**0.97**	0.08	3.14	1.30

Final factor solution for the behavioral items (*continue*)

15. Me digo a mi mismo:"¡Ahora no tengo tiempo para esto!"/ I tell myself: "I don't have time for this right now!"	0.07	-0.08	**0.95**	-0.07	2.97	1.28
20. Cedo a otros las actividades más agotadoras/ I hand over strenuous activities	0.24	-0.35	**0.76**	0.19	1.93	1.04
3. Descanso/ I take a rest	-0.13	-0.08	-0.14	**-0.95**	4.30	1.99
13.Me río igual, con ganas/ I laugh heartily anyway	-0.20	-0.03	-0.05	**0.53**	0.53	0.83
16.Me lo tomo con risa/ I take it with a laugh	-0.16	0.14	0.01	**0.90**	0.64	0.95
Explained variance (%)	36%	29.1%	14.7%	12.31%		

Table 4. Intercorrelations of the AEO-SP scales.

AEQ-SP Scales	1	2	3	4	5	6	7
Fear-avoidance scales							
1. Depression scale (DS)							
2. Anxiety scale (AS)	.37*						
3. Catastrophizing scale (CS)	.46*	.35*					
4. Help/hopelessness scale (HHS)	.44*	.34*	.36				
5. Avoidance of social and physical activities scale (ASPAS)	.68*	.40*	.59*	.53*			
Endurance scales							
6. Pain persistance and distraction (PPDS)	-.18*	-.40*	-.23*	-.21*	-.06		
7. Ignoring pain scale (IPS)	-.13	-.21*	-.09	-.10	-.35*	-.20*	
8. Humor scale (HS)	-.15	-.29*	-.05	-.03	-.24*	-.12	.14

*p < .005

Table 5. Scales, number of items and internal consistency (Cronbach´sα) of the AEQ-SP

AEQ-SP		
	α	Number of items
Fear-avoidance scales		
1. Depression scale (DS)	.83	5
2. Anxiety scale (AS)	.76	3
3. Catastrophizing scale (CS)	.96	10
4. Help/hopelessness (HHS)	.95	6
5. Avoidance of social and physical activities scale (ASPAS)	.95	6
Endurance scales		
6. Pain persistence and distraction scale (PPDS)	.98	4
7. Ignoring pain scale (IPS)	.93	3
8. Humor (HS)	.73	3

Table 6. Bivariate correlations between the AEQ-SP scales and the pain-related variables used for validation.

AEQ-SP Scales	Pain-related variables									
								Fear-avoidance beliefs		
	Pain intensity	Functional dissability	Functional impairment	Daily functioning	Depression	General anxiety	Pain-related anxiety	TSK	FABQ-activity	FABQ-work
Fear-avoidance scales										
1. Depression scale(DS)	.36*	.38*	.41*	-.38*	.56*	.40*	.41*	.20*	.33*	.38*
2. Anxiety scale (AS)	.26*	.25*	.30*	-.23*	.25*	.54*	.33*	.47*	.24*	.18*
3. Catastrophizing scale (CS)	.26*	.46*	.49*	-.38*	.47*	.60*	.40*	.17*	.32*	.35*
4. Help/hopelessness scale (HHS)	.29*	.41*	.33*	-.38*	.59*	.30*	.36*	.20*	.30*	.44*
5. Avoidance of social and physical activities scale (ASPAS)	.55*	.58*	.53*	-.57*	.78*	.54*	.53*	.18*	.39*	.42*
Endurance scales										
6. Pain persistance and distraction (PPDS)	.35*	-.36*	-.32*	.33*	-.06	-.34*	-.36*	-.28*	-.33*	-.36*
7. Ignoring pain scale (IPS)	-.30*	-.38*	-.33*	.36*	-.35*	-.14	-.33*	-.54*	-.16	-.17*
8. Humor scale (HS)	-.13	-.25*	-.27*	.21*	-.24*	-.12	-.45*	-.34*	-.04	-.21*

Note: TSK, Tampa Kinesiophobia Scale; FABQ-activity, Fear-avoidance Beliefs Questionnaire (activity scale); FABQ-work, Fear-avoidance Beliefs Questionnaire (work scale).

* Bivariate correlations that remained significant after Bonferroni adjustment ($p < .005$).