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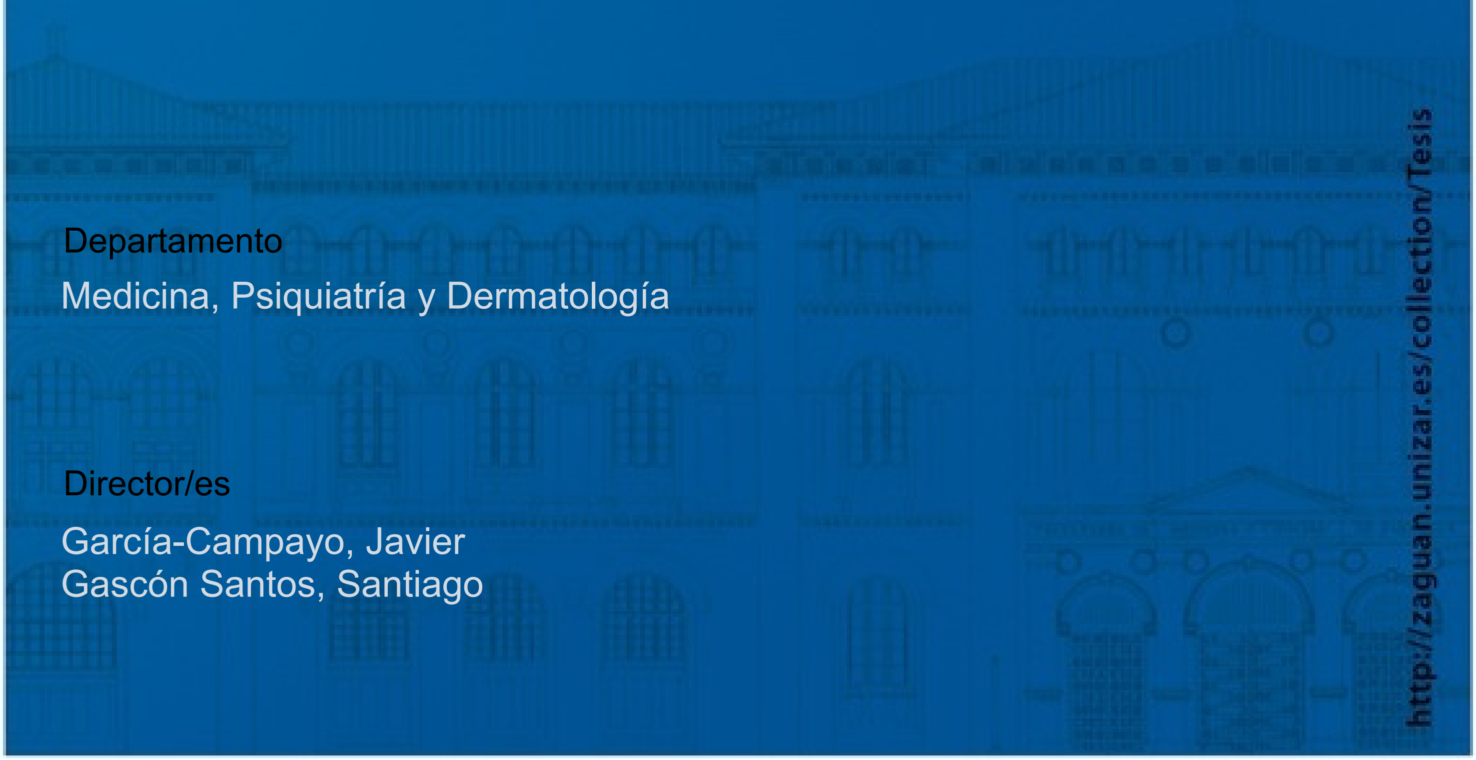
Baltasar Rodero Fernández

Affective and Cognitive Aspects in Fibromyalgia : The Roles of Catastrophizing and Acceptance



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Tesis Doctoral

AFFECTIVE AND COGNITIVE ASPECTS IN FIBROMYALGIA : THE ROLES OF CATASTROPHIZING AND ACCEPTANCE

Autor

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DEPARTAMENTO DE MEDICINA, PSIQUIATRÍA Y DERMATOLOGÍA

TESIS DOCTORAL

“ASPECTOS COGNITIVOS Y AFECTIVOS EN LA FIBROMIALGIA: INFLUENCIAS DEL CATASTROFISMO Y LA ACEPTACIÓN”

“AFFECTIVE AND COGNITIVE ASPECTS IN FIBROMYALGIA: THE ROLES OF CATASTROPHIZING AND ACCEPTANCE”

Autor: Baltasar Rodero Fernández

Directores: Prof. Javier García-Campayo
Prof. Santiago Gascón Santos

Zaragoza, 2012

A mis padres, a Rie

Esta Tesis Doctoral es un compendio de trabajos previamente publicados y consta de las siguientes publicaciones:

1. Rodero B, García J, Casanueva B, Sobradiel N. Imagined exposure as treatment of catastrophizing in fibromyalgia: a pilot study. Actas Esp Psiquiatr. 2008 Jul-Aug;36(4):223-6.
2. García Campayo J, Rodero B, Alda M, Sobradiel N, Montero J, Moreno S. Validation of the Spanish version of the Pain Catastrophizing Scale in fibromyalgia. Med Clin (Barc). 2008 Oct 18;131(13):487-92. Spanish.
3. Rodero B, Casanueva B, García-Campayo J, Roca M, Magallón R, del Hoyo YL. Stages of chronicity in fibromyalgia and pain catastrophising: a cross-sectional study. BMC Musculoskelet Disord. 2010 Oct 27;11:251.
4. Rodero B, García-Campayo J, Casanueva B, del Hoyo YL, Serrano-Blanco A, Luciano JV. Validation of the Spanish version of the Chronic Pain Acceptance Questionnaire (CPAQ) for the assessment of acceptance in fibromyalgia. Health Qual Life Outcomes. 2010 Apr 12;8:37.
5. Rodero B, Casanueva B, Luciano JV, Gili M, Serrano-Blanco A, García-Campayo J. Relationship between behavioural coping strategies and acceptance in patients with fibromyalgia syndrome: elucidating targets of interventions. BMC Musculoskelet Disord. 2011 Jun 29;12:143.

D. JAVIER GARCIA CAMPAYO, Profesor Asociado de Psiquiatría de la Facultad de Medicina de la Universidad de Zaragoza

CERTIFICA:

Que las investigaciones que se exponen en la Memoria "**Aspectos cognitivos y afectivos en la Fibromialgia: Influencias del Catastrofismo y la Aceptación***"* presentada por el Licenciado **Dº BALTASAR RODERO FERNÁNDEZ**, para aspirar al grado de Doctor en Medicina, han sido realizadas bajo mi dirección en todas las etapas, reflejando con toda fidelidad los resultados obtenidos. Tras haber revisado esta Memoria, la encuentro conforme para ser presentada, defendida en acto público, y juzgada en su momento por el Tribunal que al efecto se designe

Lo que firmo en Zaragoza, a 20 de marzo de 2012.

Fdo.: D. Javier Garcia Campayo

AUTORIZACIÓN DE PRESENTACIÓN DE TESIS DOCTORAL EN MODALIDAD DE COMPENDIO DE PUBLICACIONES

D. SANTIAGO GASCÓN SANTOS, Profesor Asociado de Psicología de la Universidad de Zaragoza

AUTORIZA

La presentación en la modalidad de compendio de publicaciones de la Tesis Doctoral titulada "**Aspectos cognitivos y afectivos en la Fibromialgia: Influencias del Catastrofismo y la Aceptación",** presentada por el Licenciado en Psicología **D° BALTASAR RODERO FERNÁNDEZ**, para optar al Grado de Doctor por la Universidad de Zaragoza, y certifica que ha sido realizada bajo su dirección.

Zaragoza, 20 de Marzo de 2012

Fdo. Santiago Gascón Santos

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Resumen

La fibromialgia es una enfermedad crónica, de causa actualmente desconocida, que se caracteriza por la presencia de dolor músculo-esquelético generalizado, asociado a una serie de puntos dolorosos específicos que nos ayudan a su diagnóstico (Wolfe et al., 1990). Con frecuencia se asocia con fatiga crónica, alteraciones del sueño, rigidez matutina, alteraciones del estado de ánimo (ansiedad y depresión), cefaleas, problemas en la menstruación, dolor temporomandibular y síndrome del intestino irritable. Esta enfermedad afecta a la esfera biológica, social y psicológica del paciente, llegando incluso a provocar invalidez en determinados casos (Wolfe et al., 1990).

La frecuencia de esta enfermedad se sitúa en torno al 2-3% de la población (Wolfe et al., 1995), por lo que en España se estima que el número de afectados se sitúa entre 800.000 y 1.200.000 individuos. De hecho, la prevalencia de la fibromialgia en las consultas de reumatología es del 12% (2,2% en hombres y 15,5% en mujeres) (Valverde et al., 2000). Debido a la alta prevalencia, el enorme impacto clínico que la enfermedad produce sobre el paciente a nivel de discapacidad y pérdida de calidad de vida y el elevado gasto sanitario que genera, la fibromialgia es uno de los principales problemas sanitarios de los países occidentales en la actualidad.

El dolor es el síntoma más frecuente e incapacitante en fibromialgia. El origen de la hiperalgesia en la fibromialgia es poco conocido. Se sospecha que existe una alteración en el funcionamiento de las estructuras neurobiológicas centrales. La neurofisiología del proceso doloroso ha presentando los últimos años un incremento de interés y diferentes métodos de neuroimagen, como el PET (Mountz et al., 1995), SPECT (Kwiatek et al., 2000), resonancia magnética funcional (García-Campayo et al., 2001) y más recientemente espectroscopia, difusión y tensor-difusión por resonancia magnética, identificando estructuras cerebrales que son activadas durante condiciones de dolor en pacientes y controles (Cook et al., 2004). Estas estructuras incluyen la corteza primaria y secundaria sensitivo-motora, la ínsula, el cíngulo anterior, tálamo, corteza prefrontal dorso-lateral y los ganglios basales. Estas regiones han sido denominadas “la matriz del dolor”, siendo activadas en respuesta a un estímulo doloroso.

El dolor se considera una experiencia compleja y subjetiva, en la que los aspectos afectivos y cognitivos son cruciales en el pronóstico del paciente. Aún en el presente, existe una gran investigación que continúa tratando de entender los factores claves psicológicos y conductuales que influyen de una manera relevante en el desarrollo y la perpetuación del dolor y en la incapacidad asociada éste. Los primeros trabajos se centraron en los factores de personalidad, ya que se pensó que estaban asociados con la intensidad y persistencia del dolor (Bulmer y Heilbronn, 1982; Gentry et al., 1974). Algunos factores propuestos fueron la evitación emocional, la excesiva preocupación por los síntomas somáticos o mostrar características asociadas con una “personalidad depresiva”, tales como el pesimismo. Las relaciones entre dolor y afecto continuó siendo un área primaria de investigación en laboratorio y estudios clínicos tratando de especificar objetivos para el tratamiento psicológico. La perspectiva cognitivo conductual, tuvo una gran importancia para alentar a la investigación e identificar los factores cognitivos concretos que correlacionaban de una manera positiva con la gravedad de dolor y la incapacidad (Turk et al., 1983). Entre los factores que han mostrado una gran evidencia empírica están los constructos de auto-eficacia (Litt, 1988), estilos de coping (Jensen, 1994), miedo-evitación (Vlaeyen y Linton, 2000; 2006), rendición (Tang et al., 2007), injusticia (Sullivan et al., 2008) o catastrofismo (Sullivan et al., 2001; Turner y Aaron, 2001). En la actualidad, otros constructos psicológicos complementarios han sido propuestos desde una perspectiva contextual cognitivo conductual; aceptación (McCracken et al., 2004), mindfulness (McCracken y Gauntlett-Gilbert, 2007), defusion (Masuda et al., 2009), acciones valiosas (McCracken y Yang, 2006) o flexibilidad psicológica (McCracken y Velleman, 2010).

Todos ellos han demostrado ser relevantes en el pronóstico de pacientes con dolor crónico pero son dos los que parecen más determinantes para prevenir la discapacidad y preservar la calidad de vida de los sujetos; el catastrofismo y la aceptación.

El catastrofismo es entendido en la actualidad como un conjunto de procesos cognitivos y emocionales que predisponen a que el dolor se convierta en crónico (leeuw et al., 2007; Buenaver et al., 2008) que están implicados en una mayor percepción en la experiencia del dolor (Sullivan et al., 2001) y que además son una importante variable mediadora para el resultado del tratamiento (Smmets et al., 2006). Los individuos que catastrofizan esperan lo peor sobre su problema de dolor, analizan pormenorizadamente los síntomas de su dolor y refieren una gran indefensión cuando se trata de controlar el dolor. Además, muestran unos pobres resultados en su afrontamiento del dolor en comparación con aquellos otros que no presentan esas ideas inadecuadas. Principalmente, el catastrofismo está relacionado de manera significativa con una mayor intensidad del dolor, una mayor sensibilidad, ánimo depresivo, procesos inflamatorios y discapacidad.

La escala utilizada para la medición del catastrofismo, es la Pain Catastrophizing Scale (PCS) (Sullivan et al., 1995), la cual presenta unas adecuadas propiedades psicométricas. Consta de tres subescalas; la magnificación, la rumiación y la indefensión. La rumiación se refiere a que el paciente no puede apartar de su mente el dolor, no puede dejar de pensar en él. La magnificación alude a la exageración de las propiedades amenazantes del estímulo doloroso, y la indefensión, a la estimación de la persona por no poder hacer nada para influir sobre el dolor.

Aunque los individuos alguna vez son dicotomizados como catastrofistas y no catastrofistas, la mayoría de la investigación entiende el catastrofismo como una variable continua que se distribuye normalmente (Sullivan et al., 2001). El catastrofismo también aparece como una variable continua en sujetos sanos y sin dolor; de hecho los sujetos sin dolor que muestran unas altas puntuaciones de catastrofismo, predicen el futuro desarrollo de dolor crónico y la demanda de servicios de la salud relacionados con el dolor (Picavet et al., 2002; Severeijns et al., 2004).

Un área rica de debate se ha fundamentado sobre si el catastrofismo está mejor conceptualizado como un rasgo estable y duradero, tal y como una dimensión de personalidad, o como una característica modificable con evidencias que sustentan ambos supuestos. Por un lado, varios estudios demostraron que el catastrofismo tiende a ser estable con el paso del tiempo tanto en población sana como en sujetos con dolor, mostrando una gran fiabilidad test-retest medido a lo largo de semanas o meses (Sullivan et al., 1995; Keefe et al., 1989). Por otro, están los que sugieren que el catastrofismo aunque parece desarrollarse pronto en la vida y poseer muchas características estables tipo rasgo (Bedard et al., 1997), es también sensible de ser reducidas por tratamientos cognitivo-conductuales (Smmets et al., 2006), indicando que podría ser sustancialmente modificable.

Entre las diversas líneas de investigación sugeridas para tratar de conocer los posibles mecanismos de acción la que tiene más peso hace referencia a que la expresividad del catastrofismo podría reflejar un enfoque común de afrontamiento del dolor (Sullivan et al., 2001). Dentro de este enfoque, se asume que los individuos, en su esfuerzo para afrontar el estrés, se marcan diferentes objetivos interpersonales (Sullivan et al., 2000). Se sugirió que los individuos más catastrofistas podrían exagerar sus respuestas ante el dolor para que alguien esté cerca de ellos, pedir ayuda u obtener respuestas empáticas de otros en su medio social. El modelo formulado, “The Communal Coping Model” (Sullivan et al., 2001; Thorn et al., 2004) representa un marcado punto de partida desde los tradicionales marcos cognitivos, posicionando que los esfuerzos de afrontamiento de los individuos que experimentan dolor no están necesariamente dirigidos al manejo del dolor. En su lugar, se sugiere que para los catastrofistas, la experiencia del dolor podría proporcionar el marco para la búsqueda de los objetivos interpersonales.

La Aceptación es uno de los constructos cognitivos más prometedores y mejor asentados en las terapias contextuales. Por lo general, los resultados hallados indican que las personas con una mayor aceptación del dolor refieren menor dolor, ansiedad, depresión, discapacidad y mayor nivel de actividad y mejor funcionamiento general (Vowles et al., 2007; McCracken y Eccleston, 2003; McCracken et al., 2005). Y lo que es más importante, el nivel de aceptación no estaba en función del dolor, es decir, las personas no presentaban más aceptación porque tuvieran menos dolor (Vowles et al., 2008a). Otros estudios muestran que los sujetos que presentan una mayor aceptación son los que menos uso hacen de los centros de salud, toman menos medicación y presentan una mejor calidad de vida (McCracken et al., 2004). Por último, parece también que la aceptación es una variable que se relaciona con una mejor adaptación a la respuesta del dolor, sin importar las influencias que pudieran tener variables tales como la depresión, la intensidad del dolor o la ansiedad, y con una predicción superior que las estrategias de afrontamiento ante variables como el dolor, la depresión, la incapacidad, la ansiedad o el funcionamiento físico y psíquico (McCracken y Eccleston, 2003).

Hasta la fecha, el Chronic Pain Acceptance Questionnaire (CPAQ) (McCracken et al., 2004) es el cuestionario utilizado para medir el nivel de aceptación en el dolor. Consta de 20 items, dos subescalas (a) implicación en las actividades (cumplir con mis actividades a pesar del dolor); (b) aceptación del dolor (reconocimiento de que la evitación y el control son métodos impracticables en mi adaptación al dolor crónico); y presenta unas condiciones de validez y fiabilidad apropiadas (Vowles et al., 2008b).

Una última matización haría referencia a cómo entender el concepto de aceptación. Pese a que los sujetos con dolor crónico a menudo se muestran inicialmente reticentes ante dicho término porque lo entienden como una “rendición” o algo que conduce a un sentimiento de desesperación (Viane et al., 2004), la aceptación no se concibe como resignación y tampoco se trata de sustituir el control por la ausencia de control. Más bien el control se aplicaría selectivamente a aquello que es controlable. Se trataría de la aceptación de lo que no se puede cambiar en base a actuar hacia aquello que les importa en su vida.

Pese a la relevancia que el catastrofismo y la aceptación parecen tener sobre el pronóstico del dolor crónico, sus respectivos cuestionarios no han sido validados en nuestro idioma y apenas han sido estudiados en la fibromialgia, uno de los trastornos de dolor crónico más frecuentes. Por tanto, validar en primera instancia sus cuestionarios y posteriormente conocer las influencias específicas del catastrofismo y la aceptación en la fibromialgia, nos permitirá dirigir los tratamientos psicológicos hacia los aspectos claves para mejorar la calidad de vida y el funcionamiento de pacientes con fibromialgia.

OBJETIVOS DEL ESTUDIO

Los objetivos principales serán los siguientes:

1. La validación en nuestro idioma, y para una muestra de pacientes diagnosticados de fibromialgia, de los principales cuestionarios para la medición del catastrofismo, *Pain Catastrophizing Scale (PCS)*, y de la aceptación del dolor crónico, *Chronic Pain Acceptance Questionnaire (CPAQ)*.

2. Analizar si el Tratamiento Cognitivo-Conductual es eficaz para la reducción del catastrofismo y observar si la aplicación de una técnica en exposición en imaginación influye en la mejoría de la rumiación.

3. Averiguar la relación entre el catastrofismo y la incapacidad de los pacientes en el desarrollo de la fibromialgia (desde su diagnóstico) y comprobar si alguno de los tres componentes del catastrofismo (rumiación, indefensión y magnificación) predice la incapacidad mejor que otros.

4. Comprobar si los componentes de la aceptación (aceptación del dolor y disposición a las actividades) muestran una predicción superior que otras estrategias de afrontamiento conductuales ante variables como la intensidad del dolor, el número de síntomas, impacto de la fibromialgia, el funcionamiento físico y social, vitalidad, salud general, depresión o ansiedad.

APORTACIONES DEL DOCTORANDO

1. La validación de dos de los cuestionarios más utilizados en todo el mundo, además, en una enfermedad tan prevalente como la fibromialgia, será de gran valor para supervisar la efectividad de los tratamientos.

2. Llevar a cabo el primer estudio de reducción del catastrofismo en población con fibromialgia. Asimismo, valorar la aportación de una técnica (exposición en imaginación) que parece prometedora para la reducción del pensamiento rumiativo.

3. Existen muchos estudios sobre factores de vulnerabilidad cognitivos asociados a la incapacidad de los pacientes. Esta investigación nos permitirá además conocer la vulnerabilidad debida a los factores contextuales.

4. Los resultados nos permitirán observar las diferencias entre los componentes de la aceptación (aceptación del dolor y disposición a las actividades) y otras estrategias de afrontamiento, y aclarar por tanto, los objetivos de intervención.

5. La identificación del peso específico y la validez predictiva de los componentes del catastrofismo y de la aceptación permitirá:

    a. Orientar el tratamiento psicológico hacia el desarrollo de los constructos más eficaces para mejorar la calidad de vida y la función de los pacientes con fibromialgia. Actualmente, los abordajes psicológicos en esta enfermedad se consideran los más eficaces y coste-efectivos

    b. Mejorar la investigación sobre la enfermedad al poder identificar los constructos psicológicos relevantes en la enfermedad y buscar mediante técnicas de neuroimagen las aéreas cerebrales que se relacionan con estos constructos.

METODOLOGÍA

- Diseño: se trata de un estudio multicéntrico, observacional y prospectivo.

- Sujetos del estudio: se seleccionará una muestra de N=250 pacientes diagnosticados de fibromialgia primaria según los criterios de la American College of Rheumatology (Wolfe et al., 1990) y deberán cumplir los siguientes criterios de inclusión y exclusión. Criterios de inclusión: 1.- Edad: 18-65 años. 2.- Discontinuación del tratamiento 7 días antes. 3.- Otorguen consentimiento informado. Criterios de exclusión: 1.- Edad <18 años o >65 años. 2.- Enfermedad médica o psiquiátrica u otras características que impidan exploración psicológica.

- Variables estudiadas:

    - Variables sociodemográficas y clínicas: Cuestionario diseñado para este estudio y que incluye las variables sociodemográficas habituales (sexo, edad, estado civil, nivel educativo, trabajo, incapacidad laboral), así como variables clínicas (antecedentes médicos y psiquiátricos familiares y personales, duración de la enfermedad, síntomas principales, comorbilidad médica, etc).

    - Constructos relacionados con el dolor:

        - Catastrofismo: Se mide con la la Pain Castrophizing Scale (PCS), una escala autoadministrada de 13 items con unas adecuadas propiedades psicométricas (Sullivan et al., 1995). Consta de tres subescalas; la magnificación, la rumiación y la indefensión.

        - Aceptación: La aceptación se relaciona con una mejor adaptación a la respuesta del dolor, sin importar la influencia de variables como la depresión, la intensidad del dolor o la ansiedad. Emplearemos el cuestionario existente para evaluar este constructo, el Chronic Pain Acceptance Questionnaire (CPAQ) (McCracken et al., 2004).

- Variables mediadoras:
    - Escala Analógica Visual del Dolor: El dolor es auto-reportado por el paciente en una escala analógica visual de 0 a 100 en la que 0 significa "ausencia de dolor" y 100 "el máximo dolor imaginable". La fiabilidad de estas analógicas ha sido ampliamente descrita (Sriwatanakul et al., 1983).
    - Fibromialgia Impact Questionnaire: El FIQ es un cuestionario auto-reportado de 10 ítems que mide el estado de salud de los pacientes con fibromialgia. El primer ítem se focaliza en la capacidad de los pacientes para realizar actividades físicas. Los dos siguientes requieren que el paciente indique el número de días de la semana anterior que se sintió bien y cuántos días de trabajo había perdido. Los otros siete restantes se refieren a la capacidad de trabajar, dolor, fatiga, cansancio matutino, rigidez, ansiedad y depresión, todos ellos medidos mediante escalas analógicas visuales. En este estudio hemos utilizado la versión española del FIQ (River y González, 2004).
    - El SF-36: escala de 36-items que mide 9 dominios de la salud incluida la función física, rol físico limitaciones, dolor corporal, salud general, vitalidad, funcionamiento social, limitaciones de rol emocional, la salud mental y el cambio en la salud. Puntajes más altos indican una mejor salud. El SF-36 se ha utilizado en numerosos estudios incluidos pacientes con fibromialgia. En este estudio hemos utilizado la versión española del SF-36 (Alonso et al., 1995).
    - Hospital Anxiety and Depression Scale (HADS): Es una escala autorreportada que detecta ansiedad y depresión en personas con enfermedades médicas. Comprende 14 ítems que se puntúan en una escala Likert de 4 puntos. Incluye dos subescalas: ansiedad y depresión, que se puntúan independientemente. La HADS ha sido validada en español (Tejero et al., 1986).
    - Inventario de Estrategias de Afrontamiento del Dolor Crónico CPCI-42. Evalúa diferentes tipos de estrategias de afrontamiento y está compuesto pos las siguientes escalas: evitación, descanso, ayuda, relajación, persistencia, ejercicio, apoyo y autoayuda. El CPCI-42 ha sido validado en español (García-Campayo et al., 2007).

- Análisis estadístico:
    - Objetivo 1: Validación de la escala de catastrofismo (PCS) y aceptación (CPAQ). En ambos casos, la validez de constructo se evaluará mediante un análisis factorial confirmatorio. La consistencia interna se evaluará mediante el coeficiente alfa de Cronbach y la fiabilidad test-retest mediante el coeficiente de correlación intraclase. Por último, la validez convergente se analizará mediante el coeficiente de correlación de Pearson.
    - Objetivo 2: Análisis pormenorizados de los efectos del catastrofismo y aceptación en pacientes con fibromialgia. Se calcularán medias y desviación estándar de cada una de las variables. Las posibles relaciones entre las variables sociodemográficas, las mediadoras y los constructos se evaluará mediante un análisis de correlación. Posteriormente, para valorar el peso específico de cada uno de los constructos se llevará a cabo un análisis de regresión.

CONCLUSIONES

1. **Proceso de validación:**

Las propiedades psicométricas de los dos cuestionarios validados, la escala de catastrofización ante el dolor (Pain Catastrophzing Scales; PCS) y el cuestionario de aceptación del dolor crónico (Chronic Pain Acceptance Questionnaire; CPAQ) resultaron adecuadas.

2. **Catastrofismo:**

2.1 El Tratamiento Cognitivo-Conductual parece adecuado para reducir la frecuencia de los pensamientos catastrofistas y la mejora en la calidad de vida de los pacientes. Además, la técnica de exposición en imaginación podría ser recomendable para aquellos pacientes caracterizados por una notable rumiación.

2.2 La influencia del catastrofismo en el funcionamiento general de los pacientes con fibromialgia es variable y depende del contexto en el que se dan los pensamientos catastrofistas (ej. tiempo desde el diagnóstico). Por tanto, esta cuestión debería ser tenida en cuenta para dirigir adecuadamente las intervenciones psicológicas

2.3 En concreto, el análisis de regresión mostró que era la subescala de rumiación la que mejor explicaba la discapacidad de los pacientes que habían sido diagnosticados de fibromialgia en un periodo menor a 2 años. En el grupo de pacientes que habían sido diagnosticados de fibromialgia en un periodo de entre 2 y 4 años, fueron las subescalas de magnificación e indefensión. Por último, la escala de indefensión fue el predictor más robusto en el grupo de pacientes que habían sido diagnosticados en un periodo mayor a 4 años.

2.4 En los tres estadios, el catastrofismo predijo mejor el funcionamiento global del paciente que la intensidad de dolor. Además, a pesar de que la discapacidad de los sujetos tendía a incrementarse con el tiempo, el indicador del catastrofismo se mantenía constante.

2.5 Estos resultados resaltan la importancia de una intervención temprana en pacientes con fibromialgia que pudiera prevenir patrones de afrontamiento desadaptados. Esto se traducirían una reducción de costes futuros tanto médicos como sociales.

2.6 La eficacia de los programas de tratamiento psicológico podrían mejorar sustancialmente si clasificáramos a los pacientes de fibromialgia según sus características conductuales y cognitivas y las intervenciones se dirigiesen específicamente a esas variables de riesgo.

3. Aceptación:

3.1 La aceptación del dolor crónico predijo mejor que las estrategias de afrontamiento conductuales la adaptación al dolor crónico.

3.2 Una mayor aceptación del dolor crónico en los pacientes con fibromialgia estuvo asociada con menor dolor, número de síntomas, ansiedad, depresión, discapacidad y mejor estado de salud general, vitalidad y funcionamiento tanto físico como social.

3.3 Nuestros resultados mostraron que la gran mayoría de estrategias de afrontamiento conductuales (ej; relajación, descanso, pedir ayuda) parecen conducir a mayor sufrimiento y un pobre funcionamiento. En cambio, los dos componentes de la aceptación mostraron tipos de de conducta que conducen a un menor sufrimiento y un mejor funcionamiento.

3.4 Las estrategias de afrontamiento conductuales que a menudo son objetivos de tratamientos psicológicos parecen no relacionarse con los resultados de la manera que se esperaban. Los componentes de aceptación parecen ofrecer mayor utilidad para guiar el tratamiento.

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Abstract

Fibromyalgia syndrome (FMS) is defined by the American College of Rheumatology as chronic (>3 months), widespread pain (axial plus upper and lower segment plus left and right sided pain) and tenderness in at least 11 of 18 tender points (Wolfe et al., 1990). Patients frequently describe sensations of fatigue, sleep disturbances, morning stiffness, symptoms associated with irritable bowel syndrome and affective distress, and the prognosis for symptomatic recovery is generally poor. When compared to patients with other chronic pain conditions, patients with FMS report higher levels of pain and functional disability and judge their quality of life as poorer (Burkhardt et al., 1993). Moreover, they make extensive use of health services, thus leading to high costs for medical and societal care (Penrod et al., 2004). The syndrome's pathology is not well understood, and to date, no treatment has proven effective in fully alleviating its symptoms.

There is an agreement about the prevalence of FMS being approximately 2 to 3% (Wolfe et al., 1995), which represents approximately between 800.000 and 1.200.000 individuals in Spain. Indeed the prevalence of FM at the Rheumatologist surgery is around 12% (2.2% in men and 15.5% in women) (Valverde et al., 2000). Therefore, it is not surprising that in recent years, FMS has acquired greater significance and has become a first-order public health problem. There are several reasons for justifying this situation: (a) its high level of prevalence in the general adult population, (b) insufficient knowledge of its cause and the mechanisms that produce it (decrease of the nociceptive perception threshold), (c) absence of a curative treatment, and (d) dissatisfaction of patients and professionals with current therapeutic approaches (Ruiz et al., 2007; Soriano et al., 2000; Tornero & Vidal, 1999).

Widespread pain, is the most frequent and incapacitating FMS symptom. The pathophysiology that produces pain and disability in fibromyalgia appears to involve a combination of central sensitization and nociceptive input. However there is no doubt nowadays that pain is a complex experience which involves several procedures. Indeed, pain has been defined by the International Association for the Study of Pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage". Taking into account this global definition, the biopsychosocial model of pain has been considered as an appropriate approach.

Biopsychosocial models describe the transition of acute to chronic pain, independent of a biomedical cause, as in FMS. In acute pain, three response systems are involved: behavioural reactions (eg, avoidance behaviour), cognitive reactions (eg, increased attention to bodily sensations and catastrophising) and physiological reactions (eg, an elevated autonomous arousal and muscle tension). All are appropriate adaptive short-term reactions to acute pain, but they become less functional and even detrimental when applied long term and in response to chronic pain (Flor et al., 1990).

Avoidance behaviour has been described as an important aspect contributing to the aggravation of pain. This behaviour is affected by classic and operant learning processes, and is a prominent factor of the fear–avoidance model (Vlaeyen et al., 1995). The key concept of the model is fear of pain following the sensation of acute pain—for example, pain experienced during or after a road accident. People may react to this pain-related fear with avoidance or withdrawal of activities in order to prevent or escape pain. Cognitions such as the expectation that an activity will lead to pain or an increase in pain may also trigger avoidance behavior (Sharp, 2001). Avoidance behaviour is easily reinforced by the belief that one has successfully prevented increments in pain. As long as activities are avoided, it is impossible to refute the belief that activity will lead to pain. Long-lasting avoidance of activities can lead to changes in the musculoskeletal system caused by physical deconditioning and impairments in muscle coordination, also called the disuse syndrome (Bortz, 1984) The resultant deficient physical condition may in turn exacerbate the pain problem. Physiological reactions to pain such as heightened muscular tension and increased autonomic arousal may also lead to higher levels of pain and functional disability in the long term (Flor et al., 1990). Furthermore, this autonomic arousal could be interpreted as evidence of physical harm and subsequently lead to more avoidance behavior (Norton, 2003).

This habitual pattern of physiological, behavioural and cognitive reactions to pain might be generalized to various other situations and areas independent of objective pathology and intensity of pain. Patients with high levels of avoidance behaviour have been shown to have a tendency to restrict their daily and social activities and withdraw from work, which will negatively affect long-term pain outcomes (Vlaeyen & Linton, 2000). Social factors, such as external reinforcements from the patient's social network, can further reinforce and maintain avoidance behaviour. In addition, avoidance may also include withdrawal from positive reinforcers such as leisure activities which in turn can exacerbate psychological distress and reduce their quality of life (Sharp, 2001). A vicious cycle has thus been established.

Therefore, the main object for the psychological approaches consists in identifying which are the crucial psychological processes or constructs which are responsible for the avoidance behavior. Preventing individuals from getting stuck in their fears, will drive us to better prognosis.

Two of the constructs that have shown to be relevant mediators in this area are catastrophizing and acceptance.

Catastrophizing refers to a combination of negative thoughts and expectations regarding pain, and research shows that it is a critically important variable in understanding the experience of pain in rheumatologic disorders as well as other chronic pain conditions. It is also an important target for both psychosocial and pharmacological treatment of pain due to its relevant influence in a negative prognosis (Sullivan et al., 2001). The construct of catastrophizing incorporates magnification of pain-related symptoms, rumination about pain, feelings of helplessness, and pessimism about pain-related outcomes and it is typically measured using a self-report inventory, the Pain Catastrophizing Scale (PCS) (Sullivan et el., 1995).

Although individuals are sometimes dichotomized as catastrophizers and noncatastrophizers, most research treats catastrophizing as a continuous, normally distributed variable (Sullivan et al., 2001). A rich area of debate has centered on whether catastrophizing is best conceptualized as a stable and enduring trait, such as a dimension of personality, or as a modifiable characteristic (Jensen et al., 2001; Smeets et al., 2006), with some evidence supporting both positions.

Catastrophizing has been correlated with adverse outcomes such as pain severity, pain sensitivity, depression and disability. Concerning hypothesized mechanisms of action, several alternatives has been proposed such as catastrophizing interferes with pain-coping and beneficial behaviors, increases attention to pain, amplifies pain processing in the CNS or catastrophizing has a maladaptive impact on the social environment.

However, the effects of catastrophic thoughts on patient functioning presumably rely not only on their content or frequency, but also on the experiences and current circumstances of the person having them. For example, behavior disruptions and suffering from catastrophic thoughts are more likely to occur when they overwhelm other potential influences on behavior and limit response choices, such as when they lead to exaggerated emotional responses and unnecessary avoidance. On the other hand, everyone, including those who suffer with chronic pain, has likely had the experience of having a catastrophic thought but dismissing it as unimportant or of no particular concern. Therefore, there is a need for analyses of the processes by which catastrophic thinking exerts its behavioral and emotional impact.

Emerging psychological theories discuss acceptance in relation to effects of the experience of aversive thoughts, moods, or sensations (Hayes, Strosahl, & Wilson, 1999). Acceptance entails having contact with painful or discouraging experiences without some of their added influences on behaviors, particularly influences that lead to unnecessary avoidance, limit participation in life, or impede the pursuit of important goals (Hayes et al., 1999; McCracken, 1998, 2005). With regard to chronic pain, this line of reasoning suggests that sensations of pain, even when intense, need not inhibit success at living a meaningful life, nor do they need to be fought against, ignored, suppressed, or conquered before success can occur.

The construct of acceptance of pain is based on two components (activities engagement and pain willingness) and it is typically measured using the Chronic Pain Acceptance Questionnaire (CPAQ) (McCracken et al., 2004b). Although the notion that it is possible to live with these difficult and distressing aspects of chronic pain is somewhat counterintuitive, there is increasing supportive evidence for acceptance of chronic pain. In clinical samples acceptance of pain is associated with less pain, distress, disability (McCracken, 1998; McCracken et al., 2004a), and greater psychological wellbeing (Viane et al., 2003). In treatment outcome studies acceptance-based methods are associated with improved emotional, psychosocial and physical functioning, and reduced healthcare use (Dahl et al., 2004;McCracken et al., 2005; Wicksell et al., 2007; Vowles et al., 2008).

The final goal of the Acceptance-based interventions is to prevent the experiential avoidance promoting the psychological flexibility through the use of diverse components such as acceptance, contact with the present moment, values-based action, committed action, self-as-context, and cognitive defusion (Hayes et al., 1999; Hayes et al., 2006). All of them, encourage clients to make willing contact with aversive psychological content altering the relationship between pain-related cognitions and overt behavior. As a result, the person is taught how to go ahead *having thoughts* and not being entangled in thoughts.

AIMS OF THE RESEARCH

1) To validate the Pain Catastrophizing Scale (PCS) and the Chronic Acceptance Questionnaire (CPAQ) into Spanish in an fibromyalgia sample.

2) Regarding Catastrophizing:

    a. To check the efficacious of a Cognitive-Behavioural intervention.
    b. To study the relationship between catastrophizing and dysfunction in relation to the development of fibromyalgia.
    c. To study how contextual factors associated with fibromyalgia might interact with catastrophizing in contributing to disability.

3) Regarding Acceptance of pain:

    a. To check if acceptance is better in predicting important aspects of patient wellbeing and functioning compared to behavioral coping strategies.
    b. To elucidate targets of intervention in fibromyalgia patients.

METODOLOGY

Design:

A multi-center, cross-sectional study.

Participants:

To be included in the study, patients were required to fulfill several inclusion criteria: (1) be between 18 and 65 years old; (2) be able to understand and read Spanish; (3) meet the American College of Rheumatology criteria for primary FMS; and (4) have been diagnosed by a Spanish National Health Service rheumatologist. Exclusion criteria included the following: (1) diagnosis of a severe Axis I psychiatric disorder (dementia, schizophrenia, paranoid disorder, or abuse of alcohol and/or drugs) or a severe Axis II disorder; and (2) refusal to participate.

Primary outcomes:

- *Pain Catastrophizing Scale (PCS)*

The PCS is a 13-item scale designed to assess the catastrophizing cognitions of individuals by asking them to reflect on thoughts or feelings associated with current painful experiences (Sullivan et al., 1995). The PCS can be subdivided into three subscales: rumination, magnification and helplessness. Its validity and reliability have been previously reported. Our group was responsible for validating the Spanish version of this questionnaire (García-Campayo et al., 2008). There is no established "cut-off" point because pain catastrophizing is considered a personality trait distributed in a continuous way in the general population.

- *Chronic pain acceptance questionnaire (CPAQ)*

The CPAQ was originally a 34-item measure of acceptance of pain. All items of the CPAQ are rated on a 0 (never true) to 6 (always true) scale. Based on recent analyses the CPAQ has been shortened to 20 items and now yields scores for two subscales, derived from factor analysis: Activity Engagement and Pain Willingness (McCracken et al., 2004b). Following the scoring procedure, a single total score was calculated based on the nine reverse-keyed items measuring pain willingness and the other eleven items measuring activities engagement. The maximum possible total score is 120, with a higher score indicating better acceptance. The Spanish version of the CPAQ, has been validated by our team and achieves adequate reliability (Rodero et al., 2010).

Secondary outcomes

- *Demographic and Pain-Related Variables*

Each participant was interviewed and provided information about a number of demographic and pain-related variables including age, work status, time diagnosed with FMS, medications and other medical treatments.

- *Pain Visual Analogue Scale (PVAS)*

The PVAS was designed to allow a subjective assessment of pain. It consists of a 10 cm long straight line whose tips represent the limits of pain intensity ("No pain" to "maximum pain ever experienced"). The patients estimated the pain intensity experienced on the same day between 0 and 100. Previous studies have demonstrated PVAS to have adequate psychometric properties (Huskisson et al., 1993).

- *Fibromyalgia Impact Questionnaire (FIQ)*

The (FIQ) is a 10-item self-report questionnaire developed to measure the health status of fibromyalgia patients (Burckhardt et al., 1991). The first item focuses on patients' ability to perform physical activities. The next two items ask patients to circle the number of days in the past week that they felt good and how often they missed work. The remaining seven items concern the ability to work, pain, fatigue, morning tiredness, stiffness, anxiety, and depression and are measured with the visual analogue scale (VAS). This instrument has a translated and validated Spanish version (Rivera et al., 2004).

- *Physical symptoms*

The number of comorbid physical symptoms was obtained from a standardised symptom checklist (Casanueva, 2009). This self-report checklist instructs participants to indicate whether they experienced each of the 75 symptoms for at least 3 months over the past year. A score was obtained by totalling the affirmative responses to all 75 symptoms. Sample symptoms include dry eyes, shortness of breath, dizziness, irregular heartbeat, tingling in the extremities, urinary urgency, and coughing spells.

- *Medical Outcome Study Short Form 36 (SF-36)*

The Medical Outcome Study Short Form 36 (SF-36) is a 36-item instrument designed to measure general health status and health-related quality of life (Ware et al., 1992). One item assesses perceived change in health status, while 35 items examine eight generic domains in both physical and mental health. The eight domains include Physical Function, Physical Role, Bodily Pain, General Health,Vitality, Social Function, Emotional Role and Mental Health. Scores in each subscale range from 0 to 100 with higher scores indicating better health status. The Spanish version of SF-36 has been shown to be reliable with good construct validity (a = 0.78-0.96) (Alonso et al., 1995).

- *The Chronic Pain Coping Inventory - 42 (CPCI-42)*

The Chronic Pain Coping Inventory (CPCI) (Jensen et al., 1995) was originally a 65-item self-report questionnaire; based on recent analyses, it has been shortened to 42 items (Romano et al., 2003). It asks patients to rate the frequency of use of behavioural and cognitive strategies over the previous week. It has the same CPCI-65 strategies, which are grouped into the following eight subscales: Guarding, Resting, Asking for Assistance, Relaxation, Task Persistence, Exercise/Stretch, Seeking Social Support and Coping Self-Statements. This instrument was translated and validated into Spanish by our team. Reliability coefficients were adequate based on the current data (a = 0.65-0.82) and test-retest reliability (intraclass correlation coefficient 0.76) (García-Campayo et al., 2007).

- *Hospital Anxiety and Depression Scale (HADS)*

The HADS (Zigmound et al., 1983) is a self-report scale designed to screen for the presence of depression and anxiety disorders in medically ill patients. It comprises 14 items that are rated on a 4-point Likert-type scale, and it is appropriate for use in community and hospital settings. Two subscales assessed depression and anxiety independently (HADS-Dep and HADS-Anx, respectively).This has been validated in a Spanish sample (Tejero et al., 1986). HADS was selected for use in the present study as it is considered to be one of the best questionnaires for assessing depression and anxiety in patients with pain disorders.

Statistical analyses:

- *Spanish validation of the Pain Catastrophizing Scale (PCS) and the Chronic Pain Questionnaire (CPAQ)*

  Both followed the same steps. In order to determine the suitability of the data for principal components analysis, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity were calculated. The dimensionality of the scale and the questionnaire were inspected with a Principal Components Analysis (PCA) followed with oblique (direct oblimin) rotation to permit correlations among factors. The criterion validity was examined by calculating the correlations between the Spanish PCS and CPAQ scores and the other questionnaires, using Pearson's *r* correlation coefficient. We also examined the association among the questionnaires scores and the socio-demographic and clinical characteristics of the sample, applying correlational analyses for the association with continuous variables (age and pain duration) and non-parametric tests (Mann-Whitney or Kruskal–Wallis) for categorical data (gender, marital status, educational level, and work status). Internal consistency was determined using Cronbach's alpha and item-total correlation coefficients. Test-retest reliability, evaluated with the intraclass correlation coefficient, was assessed for the 1- to 2-week follow-up interval, during which time the patients did not change baseline treatment

- *Assessing the influences of the Catastrophizing and Acceptance in fibromyalgia patients*

  In the descriptive analysis of the samples, means and standard deviations were calculated for continuous variables (i.e., age and pain), and percentages were calculated for categorical variables (i.e., gender and treatment setting). Analysis of variance (ANOVA) was used to compare the different groups. Pearson correlations were used to assess the relationship between the two main psychological constructs (catastrophizing and acceptance) and other psychometric variables such as pain intensity, global functioning, anxiety and depression. Finally, a hierarchical regression analysis was performed to determine the effects of the catastrophizing and acceptance on fibromyalgia patients. All analyses were conducted with SPSS 15.

CONTRIBUTIONS OF PhD CANDIDATE

- The validation of two questionnaires used throughout the world, and furthermore in a disorder as prevalent as FMS, will be invaluable for monitoring the effectiveness of treatments.

- There are many studies on vulnerability factors associated with the disability of patients. This research will also allow us to know the vulnerability due to contextual factors.

- The results will further allow us to observe the differences between the components of acceptance (activities engagement and pain willingness) and other coping strategies, and thus clarify the intervention objectives.

- The identification of their unique contributions of processes and how these processes may interact to affect patient functioning will:

    - Improve research on FMS to be able to identify psychological constructs relevant to the disease

    - Guide psychological treatment to the development of more effective constructs to improve the quality of life and function of patients with fibromyalgia. Currently, psychological approaches in FMS are considered the most effective and cost-effective.

CONCLUSIONS

Validation process:

- Both psychometric properties of the Spanish validated versions of the Pain Catastrophzing Scales and the Chronic Pain Acceptance Questionnaire, are adequate.

Regarding Catastrophizing:

- The Cognitive-Bahavioral treatment is useful to decrease the catastrophizing scores.
- The influence of catastrophizing on global functioning in fibromyalgia patients is variable and dependent on the context (i.e., duration of diagnosis) in which the catastrophizing thoughts occur.
- Catastrophizing was a stronger predictor of global functioning than pain itself .

Regarding Acceptance:

- Acceptance of chronic pain predicted adjustment to chronic pain better than behavioural coping strategies in fibromyalgia patients.

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1.Introduction

Introduction

1. Fibromyalgia

In clinical practice the diagnosis of “fibromyalgia” is often given to individuals with chronic widespread pain for which no alternative cause can be identified. The 1990 classification criteria of the American College of Rheumatology (ACR) for fibromyalgia syndrome (FMS) combine chronic widespread pain (CWP), which indicates pain on both sides of the body, above and below the waist, and axial pain for at least 3 months, and tenderness on manual palpation in at least 11 out of 18 defined tender points (Wolfe et al., 1990). Most clinicians would recognize that FMS, in its typical manifestation, is accompanied by a combination of additional symptoms such as sleep disturbance, fatigue, and anxiety, and by other clinical manifestations such as depression, gastrointestinal symptoms, and headache. In addition, FMS is often associated with chronic fatigue syndrome, irritable bowel syndrome (IBS), irritable bladder syndrome or interstitial cystitis, and temporomandibular disorder (Claw, 2009). The common theme is that patients have chronic pain and other somatic symptoms, but without apparent tissue damage or inflammation.

The debate whether fibromyalgia is a rheumatological, psychiatric, somatoform, or neuroendocrine disorder, or no distinct clinical entity at all, is ongoing. However, the focus of fibromyalgia research has shifted to research on epidemiology, risk factors, and biomarkers, and to controlled trials testing drugs or other interventions in FMS. Furthermore, there is consensus that FMS is a heterogeneous condition and that subgroups may exist that have different pathophysiologies with different response characteristics to treatment (Turk et al., 1998) Heterogeneity has been confirmed, for example, based on sensory symptoms and comorbidities (Rehm et al., 2010) and on patterns of tender point responses (Wilson et al., 2009)

A review of 10 studies from different Western countries reported a prevalence of FMS according to the ACR criteria in the general adult population of between 0.7% and 3.3%, (Gran, 2003) with a prevalence in women between 1.0% and 4.9%, and in men between zero and 1.6%. It has been suggested that the male-female ratio reported in the literature may be biased, because most of the data come from tertiary care centers. In Spain, between 800.000 and 1.200.000 individuals are thought to be affected (Valverde et al., 2000).

Widespread musculoskeletal pain is the most frequent and incapacitating FMS symptom. The pain is typically diffuse or multifocal, and its intensity varies over time. Patients also may complain of morning stiffness and swelling of joints or limbs, resembling symptoms of rheumatoid arthritis (**Table 1**). Other frequently encountered symptoms are fatigue, reduced energy and drive, and disturbed sleep (Kranzler et al., 2002). Many patients complain of problems with concentration, attention, or memory. In fact, cognitive impairment was found in FMS patients in neuropsychological studies. Often, gastrointestinal symptoms and bladder disturbances are reported. FMS may present concomitantly with other disorders, which does not exclude the diagnosis. Commonly associated diseases are chronic autoimmune disorders such as rheumatoid arthritis or lupus erythematosus, and a variety of functional disorders such as IBS or palpitations. Patients with FMS seen in tertiary pain centers often give the physician elaborate descriptions of their complaints. It has been suggested that patients aim at controlling the dialogue by means of lengthy but vague descriptions of their somatic complaints, and the resulting difficult physician-patient interaction has been regarded as a diagnostic criterion (Kirsch and Bernardy, 2007). This difficult interaction pattern may lead to the finding that patients feel isolated from health care professionals and find it difficult to convince them that they have a real disease (Rodham et al., 2010).

Widespread pain	100%
Fatigue	96%
Disturbed sleep	86%
Joint pain	72%
Headaches	60%
Restless legs syndrome	56%
Numbness	52%
Problems with memory	46%
Stiffness	42%
Problems with concentration	41%
Restlessness	32%

Table 1. Frequency of Pain Complaints and Symptoms for Fibromyalgia Patients during the diagnosis.

The prevalence of FMS is increased in family members of patients suffering from FMS. For example, the frequency of FMS among the firstdegree relatives of patients was 6.4% (Arnold et al., 2004). There are findings indicating a role for polymorphisms of genes in the serotoninergic, dopaminergic, and catecholaminergic systems in the etiology of FMS. These polymorphisms all affect the metabolism or transport of monoamines, so they might lead to disturbed sensory processing and an altered stress response (Buskila, 2009). However, there are negative and positive findings regarding the associations between these polymorphisms and FMS. Thus, it is likely that the development of FMS is influenced by multiple genes, as in other complex genetic diseases (Bradley, 2009). Furthermore, the gene polymorphisms found are not specific for FMS, but have also been studied in other chronic pain syndromes, as well as in major depressive disorder. Rare missense variants of the familial Mediterranean fever gene increase the risk of FMS and are present in about 15% of FMS patients. These patients have high plasma levels of the proinflammatory cytokine IL-1ß (Feng et al., 2009), indicating that this subtype of FMS might be more closely related to rheumatoid disorders than other subtypes. Recently, there has been increased interest in resilience, or factors that protect against chronic disease. For example, non-affected relatives of FMS patients had a reduced frequency of the met/met genotype of the catechol-*O*-methyl transferase (*COMT*) gene, which may protect them from developing the disorder (Cohen et al., 2009).

Along with a certain genetic susceptibility, environmental factors may have a large impact in modulating the variance encountered, and external events may trigger the development of FMS. Such triggers consist of physical trauma, a regional myofascial pain syndrome, psychological distress or emotional trauma, or an acute illness (Bennett et al., 2007; Cakit et al., 2010). Some factors that have previously been thought to trigger FMS could be shown to be unrelated to the disorder, such as silicone breast implants or whiplash injury (Tishler et al., 2010). In women, the frequency of abuse correlates with the prevalence of FMS (Ruiz-Perez et al., 2009). Among psychosocial stressors, there is the highest evidence for those related to the workplace (Harkness et al., 2004). Certain lifestyle factors also seem to promote the occurrence of FMS. For example, overweight and obesity are associated with an increased risk of FMS, especially among women with low levels of physical exercise (Mork et al., 2010). In contrast, regular physical activity appears to promote a favorable long-term outcome of FMS (Dobkin et al., 2010).

A number of biological abnormalities have been described in FMS, with possible relevance to its pathophysiology. The major caveat is that in most of these studies no disease controls were investigated, such that the specificity of a certain finding for FMS cannot be determined. Furthermore, there are few longitudinal studies. The hypothalamus-pituitaryadrenal (HPA) axis has frequently been studied, with the hypothesis that patients with FMS have a reduced stress response and hypocortisolism. While there is no evidence for reduced baseline cortisol secretion in patients with FMS, different authors have variously found enhanced or reduced glucocorticoid sensitivity, and this issue remains open (Tanriverdi et al., 2007). There is some evidence for reduced sympathetic activity in patients with FMS under stress, and capillary microvascularization is altered. There is some support in the literature for an altered cytokine system in FMS, similar to the findings in major depression, but in most studies there were no correlations with the severity of symptoms (Menzies et al., 2010). In particular, anti-inflammatory cytokines were found to be decreased in patients with FMS, indicating that a reduction in these protective, anti-inflammatory mediators may be an additional risk factor for FMS (Üçeyler et al., 2006). Interestingly, cytokine profiles could be modified by multidisciplinary pain therapy (Wang et al., 2008).

Elevation of the neuropeptide substance P in the cerebrospinal fluid was one of the first biochemical findings in FMS (Reynolds et al., 1988) and was confirmed in later studies. However, substance P was also elevated in patients with osteoarthritis and in full-term pregnant women, and therefore high levels cannot be regarded a specific biomarker for FMS. Similarly, the neurotrophic factors brain-derived neurotrophic factor (BDNF) and nerve growth factor (NGF) were increased in cerebrospinal fluid from FMS patients, but also in persons with chronic migraine (Sarchielli et al., 2007).

Structural and functional imaging studies of the central nervous system have led to the concept that FMS is a disorder of central sensitization or a defective pain inhibitory system (Schweinhardt et al., 2008). The evidence of central augmentation in FMS has recently been reviewed (Williams and Claw, 2009). Functional brain-imaging studies reveal enhanced activation in pain related areas and thus corroborate the patients' reports of increased pain (Gracely et al., 2002). A recent study using mu-opioid-receptor positron emission tomography (PET) demonstrated reduced mu-opioid receptors in several pain-related brain regions (Harris et al., 2007). These results may indicate altered endogenous opioid analgesic activity in FMS and may explain why therapeutic opiates have so little efficacy in FMS patients.

As in other chronic pain conditions, studies have shown both increasesand decreases in regional gray matter density in FMS patients (for review see Schweinhardt et al., 2008). FMS patients had less total gray matter volume, less gray matter density, and an age-associated decrease in gray matter that was three times greater than in healthy controls, (Kuchinad et al., 2007), which led to the hypothesis of premature ageing in FMS. Regional gray matter density analyses revealed gray matter loss in regions associated with pain modulation or stress, such as the cingulate, insular, and medial frontal cortices, the parahippocampal gyri, the thalamus, and the amygdala. Increased gray matter in the left orbitofrontal cortex, left cerebellum, and bilateral striatum was also described (Burgmer et al., 2009; Schmidt-Wilcke et al., 2007). Again, this finding is more likely to be related to chronic pain as such than specifically to FMS, and the underlying cellular and molecular processes are unknown.

The aim of treating FMS is to decrease pain and the associated symptoms and to increase function and quality of life. Currently, FMS cannot be cured by any therapy, and overall treatment effects of single interventions are modest at best. A major goal in FMS research will be to better identify subgroups and to more clearly explain the pathophysiology of the syndrome so that individualized treatment can be developed and administered. Better outcome measures are needed to do justice to the complex array of symptoms in FMS (for review see Sommer, 2010).

2. **Chronic Pain and Fibromyalgia**

The International Association for the Study of Pain defines pain as follows: “Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (pp. 210-211, Merskey & Bogduk, 1994). This definition explicitly affirms that the pain experience has both a sensory and an emotional-evaluative component and acknowledges that pain may occur in the absence of physical pathology.

Pain is one of the most frequent reasons why patients visit a physician and at the same time it is one of the least understood symptoms. Chronic pain is, to a large degree, regarded as acute pain that has persisted. The most common treatments for pain in primary care centres are pain killers, physical therapy, and transcutaneous electrical nerve stimulation (TENS). Unfortunately, the scientific evidence supporting the effectiveness of these methods on pain relief or functioning of the patient is limited (Bigos, Bowyer, Braen et al., 1994). There is a need for new thinking.

a. Early Theories of Pain

Although any contemporary model of pain will include both physiological and psychological factors, early theories of pain were very different. Early civilizations offered a variety of explanations for pain and attributed it to such factors as religious influences of gods, the intrusion of magical fluids, the frustration of desires and deficiency or excess in the circulation of Qi (for review see Main, Sullivan and Watson, 2008)

The early Greeks gave more specific consideration to the nature of pain. Plato believed that the heart and liver were the centers for appreciation of all sensation, and that pain arose not only from peripheral sensation but as an emotional response in the soul, which resided in the heart. Aristotle believed that the brain had no direct function in sensory processes. There was even less understanding of pain from internal or visceral causes. It was frequently attributed to the influence of evil spirits or the gods.

Hippocrates considered that pain was a consequence of deficiencies or excesses in the flow of one of the four fluids, or humours (blood, phlegm, yellow bile or black bile). Galen, in contrast, clearly established the anatomy of the cranial and spinal nerves. He distinguished three types of nerve: 'soft' nerves, 'hard' nerves and pain nerves. He also considered that the centre of sensibility was the brain.

Nonetheless, Aristotle's theories had considerable influence. For a long time pain was still considered to be an emotion or sensation experienced in the heart or an effect possibly of the entry of evil spirits. The brain was thought to play no part in the experience of pain. Indeed, the controversy over whether pain should be regarded as a sensation or as an emotion has continued to the present day and has led to an overstated dichotomy between sensory and emotional factors. Descartes' new theory was, therefore, a massive leap in the understanding of the mechanism of pain, and drew significant criticism from his contemporaries at the time.

Descartes' explanation of pain (Descartes 1664) needs to be understood against the background of his philosophy. Descartes attempted to show that humans consisted of an earthly machine (*machine de terre)* inhabited by and governed by a rational soul (*ame raissonnable).* He tried to explain how blood, itself derived from food, gave rise to animal spirits by means of which the special earthly machine, the brain with its nerves, carried out the behests of the rational soul. The spirits dilated the brain, thus enabling it to receive the impressions of external objects, and flowed from the brain along the nerves into the muscles, thus enabling the nerves to serve as 'the organs of the external senses'. Animal spirits constituted a very subtle fluid amenable to the physical laws governing fluids, and the nerves were hollow tubes along which the spirits flowed in a wholly mechanical manner (Foster 1901). The nerves were not merely hollow tubes, but contained also delicate threads which spread all over the body from their origins at the internal surface of the brain and served as organs of sense. These threads were easily set in motion by the objects of the senses and at the same instant pulled upon the parts of the brain from which they originated.

> "…If for example the fire comes near the foot, the minute particles of this fire, which as you know have a great velocity, have the power to set in motion the spot of skin of the foot which they touch, and by this means pulling upon the delicate thread which is attached to the spot of the skin, they open up at the same instant the pore against which the delicate thread ends, just as pulling at one end of a rope one makes to strike at the same instant a bell which hangs on the other end…" (Descartes 1664, translated by Foster 1901, p. 265.).

As Foster points out, Descartes' theory required these nerves to have physical properties for which he had no evidence.

Descartes offered a dualistic view of mind and body. The body essentially was a machine whose workings could be explained by the laws of nature. The 'rational soul' was the 'conductor of the orchestra'. Descartes never really satisfactorily resolved the relationship between the two. There certainly does not seem to be any central 'processing' of the information, although it is consistent with the notion of summation.

b. The Medical/Pathological Model of Pain

In understanding pain mechanisms, there have been two major assumptions that have been inherited from Descartes: firstly that of a one-to-one relationship between the amount of damage (or nociception) and the pain experienced, and, secondly, the separation of mind and body.

The model of a one-to-one relationship between the amount of tissue damage and the amount of pain experienced has attractiveness, in that it seems to be consistent with the everyday experience of acute pain. It has to be remembered of course, that pain is first and foremost a biological warning signal. Pain is necessary to protect us from damage. The function of pain in alerting us to actual or potential tissue damage is extremely important. We are programmed to react rapidly to pain. Sudden pain produces an instinctive withdrawal response. We attend immediately to it. We attempt to escape from the source of pain and we try to protect the injured tissue from further damage. The pain is giving us important information about its source, nature and intensity. On occasions, such information may be of life-threatening importance. Avoidance of further painful experiences will necessarily avoid damage, aid healing and enable a return to the 'normal' state. The assumption that a higher level of pain is indicative of more serious physical damage is therefore useful, but an *accurate* appraisal of the pain is not necessary.

This model of pain demonstrates a direct relationship between stimulus and the amount of pain. It implies information travelling in one direction only, and does not allow for any modulation of the stimulus. This model implies that a small stimulus may not cause pain, a large stimulus will always cause pain and when pain is sensed there is always damage causing it. Stopping the stimulus is the *way* of stopping the pain. Cutting the wire is the only other alternative.

Four hundred years later, clinicians and patients alike continue to think of pain according to a Cartesian model. Pain is viewed as part of the 'mechanical' processes of the body, arising directly from injury or illness. First, pain is viewed as a signal of damage or the threat of damage, and pain is expected to be relieved once injury or illness has healed. Second, most patients have little understanding of the complexity of the neurophysiology and anatomy of nociceptive pathways and pain experience and indeed do not require such knowledge. Finally, the medical profession and allied disciplines will, to a large extent, have reinforced this model of pain and damage. Rest is usually prescribed for any painful injury, along with pain killers and other treatments. Certainly, patients are advised not to move something if it hurts. The message 'let the pain be your guide' is commonly given to patients recovering from an acute injury, reinforcing the notion of pain being a direct measure of tissue damage.

A legacy of the 'mind-body-split' has been the conceptualization of pain as being *either* physical *or* psychological. Patients' general defensiveness about considering anything from a psychological viewpoint has made contemporary pain management, which accepts an interaction between physical and psychological factors, difficult for patients to accept. (Some patients view discussions about 'non-physical' influences on pain with disbelief, suspicion and sometimes downright hostility.) This problem is highly susceptible in fibromyalgia where attribution to a psychological influence on the perception of pain by a professional may be taken by the patient as synonymous with an implication of some sort of mental illness, a suggestion that the pain is imaginary or even that the patient is malingering.

Thus, it is natural and logical, given our usual experiences of injury and disease, to look for a physical cause of pain and seek relief on that basis. This makes sense in cases of acute pain from fractures, tumors, bacterial infections, or dental disease. Unfortunately, in chronic pain the picture is more complex.

The search for a medical solution for chronic pain is not always fruitful. Perhaps 64% of "pain-free" people walking along a given street have some abnormality such as a "bulging disk," as determined by magnetic resonance imaging (MRI) of their lumbar spine (Jensen et al. 1994). This finding suggests that disk abnormalities do not necessarily cause pain, and so positive MRI findings may be merely incidental. Studies of neck pain demonstrate no differences in pain or disability between patients with or without evidence of cervical spine degeneration (Peterson et al. 2003). We also know that patients with disk herniation and radiculopathy can improve without surgical intervention. In one small study, 83% of cases achieved clinical improvement without surgery, and 78% of those cases showed resolution or improvement in the disk herniation on repeat computed tomography (CT) an average of 30.4 months later (Ellenberg et al. 1993).

When researchers investigate the wide range of potential predictors of patient functioning in the context of chronic pain, the results are fairly consistent. Psychological or behavioral factors predict functioning well, while physical or medical variables appear unhelpful (Grossi et al. 1999; Hunt et al. 2002; Schultz et al. 2002). When we look at the effects of treatment on patients' daily functioning, the same results are obtained. For surgical (e.g., Herno et al. 1999; Schade et al. 1999) and behavioral or interdisciplinary treatment (Fishbain et al. 1995; McCracken and Turk 2002), psychological variables such as depression and perceptions of work are the strongest predictors of treatment outcome. For example, Herno et al. (1999) showed that disability following surgery for lumbar spinal stenosis was unrelated to CT scan results with regard to degree of decompression, or to radiological results regarding spinal stability, but was best predicted by patient satisfaction with the results of surgery.

Our objection to this model is more functional than ontological. Clearly there are many cases where identifiable medical circumstances underly the sufferer's pain, and it would be absurd to state that there is never an identifiable organic cause of pain. Each case, of course, should be analyzed individually. Nonetheless, the search for a physical cause, for many patients, simply does not yield an understanding of their pain or provide a clear basis for effective treatment for either the patient or provider

c. Behavior Medicine: Traditional Cognitive Behavior Therapy

Behavior medicine was first presented in the 1970's as an application of behavior analysis for the treatment of unhealthy long-term symptoms in the genitourinary, gastrointestinal, cardiovascular, musculoskeletal, and nervous and respiratory systems. Treatment for traditional medical illnesses such as high blood pressure, torticollis, obesity, headache, pain, epilepsy and asthma were developed. At that time, behavioral medicine was applied as a complement to traditional medical / pathological model. Despite their superficial differences, this integration was not difficult. Behavior therapy interventions are executed at the level of the person/environment interaction, but their traditional aim and focus is quite similar to that of the medical model: control and management of the presenting symptoms.

The first wave of traditional behavior therapy, and the second wave (cognitive-behavior therapy or CBT) that followed both adopted the position that psychological suffering is anomalous, and that psychological health is inversely related to the number and intensity of psychological complaints (Hayes et al., 2006). Instead of the intrusion of some biological malfunction, infectious agent, or toxic insult, behavior therapists posit anomalous, pathogenic learning histories that generate negative thoughts, emotions, memories, bodily states and behavioral predispositions. These are the behavioral equivalents of tumors, viruses, and bacteria that must be excised in order for good psychological health to return. The CBT model of pain includes behavior, physiological and cognitive components that interact with each other. For example, the tissue damage that results from a fall off a horse may influence our thinking about horses and influence how we behave or avoid behaving around horses.

This is clearly a step forward, and the treatment options that this approach opens up are worthwhile. While there are physiological factors that predispose human beings to develop symptoms, such as pain, our best behavioral treatments focused on providing the individual with a new learning history that will reduce pain or pain related behavior in what have been pain-producing contexts. Central to this new learning history is systematic exposure to feared events such as fear of movement or an activity associated with pain. These applications of behavioral medicine are based both on behavioral principles (classical and operant conditioning) and in more recent times on cognitive concepts.

In more traditional behavioral approaches, the goal has been to reinforce productive behavior and to stop the negative reinforcement of avoidance behavior, while at the same time reducing the spread and function of stimuli that elicit pain experience through classical conditioning. Exposure based treatments provide an example. Reinforced exposure to previously avoided situations and movements that patients incorrectly believed to be causing pain is mounted with the goal of improving functioning in such areas as reducing limping, walking longer distances, and lifting heavier weights along with general rehabilitation goals such as better physical fitness and returning to work (Fordyce, 1976).

In CBT approaches the principles and targets of intervention have expanded to include changing negative feelings and thoughts as well more traditional behavioral goals such as reducing passive coping behavior (e.g., taking pills, resting) and increasing active coping behavior (e.g., exercising). There are usually elements of cognitive restructuring such as reframing dysfunctional thoughts, mental training for positive thinking, or the use of mental distraction. Stress management, time management, relaxation training, EMG biofeedback, social skills training, problem solving, activities of daily life training, and reduction of medication may all be included in these pain management programs, along with many other elements.

There are many RCT studies which have evaluated CBT as a treatment of chronic pain (Alaranta et al., 1994; Altmaier et al., 1992; Edinger, Wohlgemuth, Krystal & Rice, 2005; Flor & Birbaumer, 1993; Fordyce, Brockway, Bergman, & Spengler, 1986; Haldorsen, Kronholm, Skouen, & Ursin, 1998;Jensen & Bodin, 1998 Jensen, Nygren, & Lundin, 1994; Keller, Ehrhardt-Schmelzer, Herda, Schmid, & Basler, 1997; Kerns, Turk, Holzman, & Rudy, 1986; Lindstrom, Ohlund, Eek, Wallin, Peterson, Fordyce, et al., 1992; Lindstrom, Ohlund, Eek, Wallin, Peterson, & Nachemsom, 1992; Linton & Gotestam, 1984; Linton, Melin, & Sternlof, 1985; Moore & Chaney, 1985; Moore, Von Korff, Cherkin, Saunders & Lorig, 2000; Morley, Eccleston, & Williams, 1999; Newton-John, Spence, & Schotte, 1995; Nicholas, Wilson, & Goyen, 1991; Nicholas, Wilson, & Goyen, 1992; Peters & Large, 1990; Puder, 1988; Spence, 1989; Redondo et al., 2004; Spence, Sharp, Newton-John, & Champion, 1995; Thieme, Flor, Turk, 2006; Turner, 1996; Turner, Clancy, McQuade, &

Cardenas, 1990; Turner & Jensen, 1993; van Tulder, Koes, & Bouter, 1997; Vlaeyen et al., 1996; Von Korff, Moore, Lorig, Cherkin, Saunders, & Gonzalez, 1998; Wigers, Stiles, Vogel, 1996; Williams, Richardson & Nicholas, 1996). A recent meta-analysis about psychological treatments for fibromyalgia (Glombiewski et al., 2010) concluded that those groups of patients receiving CBT improved more compared to the waiting list control groups or groups that had participated in other forms of treatment.

▪ Catastrophizing

From the CBT perspective, researchers have consistently identified “catastrophizing” as a major clinical feature both in the chronic patient's symptom complex and also as a predictor of chronicity. Initially catastrophizing was conceptualised fairly specifically as a type of cognitive distortion (similar to the sorts of cognitive distortion found in depressed patients). According to Beck (1976), negative bias in information processing is maintained by general and systematic errors in logical appraisal. Catastrophizing, as originally defined, was, characterised by profoundly negative ruminations about one's present and future ability to cope, though often included in measures of coping strategies, it is probably best understood as a set of dysfunctional beliefs or appraisals (Jensen et al 1991). The tendency towards negative appraisal (or undue pessimism) has consistently been shown to be a better predictor of low pain tolerance, disability and depression than measures of disease activity or impairment, both at the time of testing and at long-term follow-up (e.g. Keefe et al 1989). It may be based upon mistaken beliefs about pain and outcome of treatment, but is most clearly associated with depression. The cognitive distortion is not, however, simply a facet of depression, for it has been shown to be a significant predictor of self-reported disability and work loss even when the influence of pain severity and depression has been taken into account (Burton et al 1995, Main & Waddell 1991).

The two most widely used self-report measures of catastrophizing are the catastrophizing subscale of the Coping Strategies Questionnaire (CSQ; Rosenstiel & Keefe 1983) and the Pain Catastrophizing Scale (PCS; Sullivan et al 1995). Both scales have been shown to have good psychometric properties and to be related to negative outcomes in response to acute and chronic pain experience (Rosenstiel & Keefe 1983, Sullivan et al 1995). An advantage of using the CSQ is that it includes six coping subscales in addition to the catastrophizing subscale. The catastrophizing subscale of the CSQ contains six items that are rated in relation to their frequency of occurrence on six-point scales with the endpoints (0) never and (5) almost always (Rosenstiel & Keefe 1983). The CSQ allows the clinician to examine a comprehensive profile of a patient's repertoire of adaptive and maladaptive cognitions associated with pain experience.

The PCS was developed specifically in order to assess catastrophic thinking associated with pain. The PCS yields subscale scores on three different dimensions of catastrophizing: rumination ('I can't stop thinking about how much it hurts') magnification ('I worry that something serious may happen') and helplessness ('There is nothing I can do to reduce the intensity of my pain'). The three-factor structure of the PCS has been replicated in clinical and non-clinical samples (Sullivan et al 1995, 2000, Osman et al 1997).

The PCS total score and subscale scores are computed as the algebraic sum of the ratings for each item. PCS items are rated in relation to their frequency of occurrence on five-point scales with the endpoints (0) never and (4) almost always. The PCS is a 13-item self-report measure that can be completed and scored in less than 5 minutes, and thus is easily amenable to inclusion in standard clinical practice.

Although individuals are sometimes dichotomized as catastrophizers and noncatastrophizers, most research treats catastrophizing as a continuous, normally distributed variable (Sullivan et al., 2001). Catastrophizing also exists on a continuum in healthy, pain-free individuals (Edwards et al., 2004); indeed, higher catastrophizing, assessed in pain-free adults, predicts the future development of chronic pain and pain-related health care utilization (Picavet et al., 2002; Severeijns et al., 2004). A rich area of debate has centered on whether catastrophizing is best conceptualized as a stable and enduring trait, such as a dimension of personality, or as a modifiable characteristic (Sullivan et al., 2001;Turner and Aaron, 2001), with some evidence supporting both positions. Several studies report a high test–retest stability of catastrophizing measured over time frames of up to a year in patients with rheumatoid arthritis and in other samples (Sullivan et al., 1995; Keefe et al., 1989). In contrast, catastrophizing often decreases when patients undergo cognitive-behavioral therapy (CBT; a set of psychologist-delivered interventions designed to facilitate the development of self-management skills, including regulating one's thoughts, emotions, and behaviors) (Jensen et al., 2001; Burns et al., 2003; Rodero et al., 2008; Alda et al., 2011), indicating that catastrophizing can be altered by treatment.

Catastrophizing is highly related to adverse outcomes **Figure 1**. Cross-sectionally, catastrophizing relates to higher pain severity, widespread pain and more emotional disturbance among individuals with fibromyalgia (Gracely et al., 2004; Viane et al., 2003; Hassett et al., 2000; Schochat et al., 2003; Rodero et al., 2010). In general, these associations persist even after statistically controlling for depression, anxiety, or neuroticism (Keefe et al., 2000; Affleck et al., 1992).

Catastrophizing also shows positive associations with sensivity to pain. Specifically, measures of pain-related catastrophizing are well-known to correlate moderately to highly with counts of tender points in both clinic samples of fibromyalgia patients and in population studies (Gracely et al., 2003).

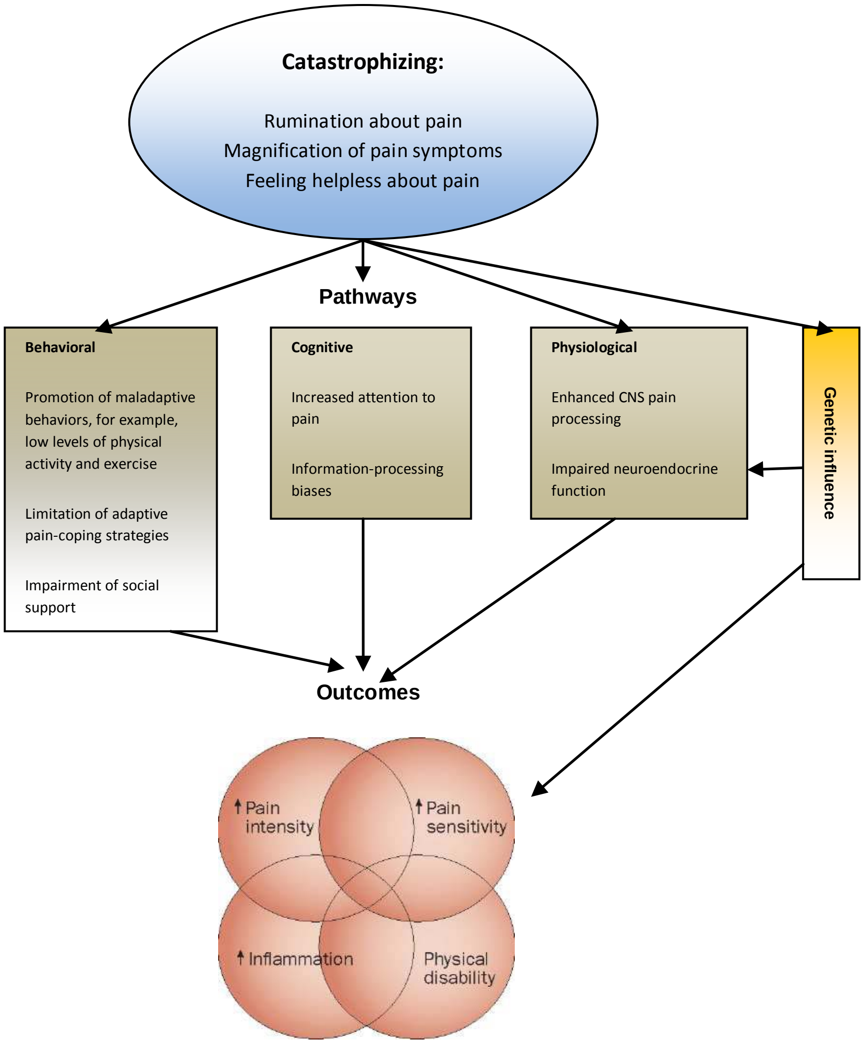

Figure 1. Influence of Catastrophizing on Pain Related-Outcomes. Model proposed by Edwards et al., 2011.

Hyperalgesia (that is, increased sensitivity to pain) is a central characteristic of fibromyalgia. Catastrophizing and depression are linked with patients' hyperalgesic responses (Lee et al., 2009), as they are associated with lower threshold and tolerance for thermal, electrical, and pressure pain among patients with fibromyalgia (Geisser et al., 2003; Campbell et al., 2010a). Interestingly also, a measure of catastrophizing that was collected during the actual assessment of pain responses was generally more predictive of hyperalgesia than a general questionnaire that measured patient recall of catastrophizing in day-to-day life (Campbell et al., 2010b). This finding highlights the value of assessing situation-specific indices of catastrophizing and emotional distress.

In general, catastrophizing is strongly associated with measures of negative affect (Sullivan et al., 2001). Multiple investigators have documented positive associations between catastrophizing and depressive symptoms in fibromyalgia (Gracely et al., 2004; Hassett et al., 2000; Geisser et al., 2003). Prospective studies have documented the association of high catastrophizing at baseline with increases in depressive symptoms over periods of up to 1 year in patients with fibromyalgia (Covic et al., 2003). It is likely that this relationship might in the future clarify why catastrophizing is also correlated with memory decrements (Jorge et al., 2009). Finally, it has been reported that catastrophizing and depression, especially when they co-occurred, were strongly related to the likelihood of recent suicidal ideation among patients with chronic musculoskeletal pain (Edwards et al., 2006). Of note, pain intensity was not predictive of suicidal ideation in this study, suggesting that cognitive and emotional factors, rather than symptom severity, could be the principal contributors to the increased risk of suicide among patients with persistent pain. Taken together, these findings suggest that in the context of chronic pain, catastrophizing may contribute to depressed mood on a short- and long-term basis.

Disability is another adverse outcome related to catastrophizing. Occupational, recreational, and functional disability are common among patients with rheumatic disease, and pain is often cited as the primary reason for disability (Woolf and Pfleger, 2003). Psychosocial processes are important contributors to disability in the context of persistent pain, and catastrophizing is strongly associated with self-reported physical limitations, a reduced likelihood of returning to work, and impaired performance on tests of physical function (Gauthier et al., 2006; Evers et al., 2003; Goubert et al., 2004).

Finally, catastrophizing seems to also be related to enhanced inflammatory disease activity. Perceptions of helplessness have been linked to increased systemic inflammation (Evers et al., 2003) - for example, as measured by levels of high-sensitivity C-reactive protein [CRP] (Dessein et al., 2004) - and early mortality (Keysor et al., 2004). Recent work also evaluated associations between catastrophizing and systemic levels of proinflammatory cytokines. In a sample of healthy adults, those who exhibited the most catastrophizing during a session of quantitative sensory testing also showed the highest elevations in interleukin (IL)-6 in the 60 min following the evaluation (Edwards et al., 2008).

There have been several hypothesized Pathways of Action but further studies are needed to clarify these associations. The pathways suggested have been classified as behavioral, cognitive and physiological pathways:

Behavioral pathways

Limiting health-improving behaviors: Catastrophizing and depression reduce the likelihood of exercise and other health-promoting behaviors among patients with chronic pain. Helplessness specifically correlates with less-effective use of medication (Neame and Hammond, 2005) and decreased performance of positive health behavior such as exercise (Castaneda et al., 1998); these are plausible pathways by which psychosocial distress could enhance disease, amplify pain, and promote mortality. Finally, sleep is another class of health behavior that contributes to the hyperalgesia in patients with rheumatoid arthritis (Lee et el., 2009), osteoarthritis (Smith et al., 2009), and widespread (fibromyalgia-like) pain (Gupta et al., 2007), this is likely to constitute one of the pathways by which depression and catastrophizing contribute to deleterious pain-related outcomes in patients with rheumatic disease.

Interfering with adaptive pain-coping mechanisms: Negative cognitive and affective processes such as perceived helplessness and pessimism (for example, "There is nothing I can do to reduce the pain") can prevent high-catastrophizers from employing potentially effective pain-coping strategies (such as distraction), which prevents them from realizing the potential benefits of those coping techniques (Quartana et al., 2009). Even when individuals who demonstrate high levels of catastrophizing do use coping strategies such as distraction, they are less efficient in reducing pain (Campbell et al., 2010a).

Impairing social interactions: Social forces can shape a range of health-related outcomes, and pain is no exception. A considerable amount of research also suggests that catastrophizing can exert profound effects on patients' social environments: some researchers have postulated that catastrophizing might serve a communicative function with the goal of attracting social support (Lackner et al., 2004). In support of this hypothesis, patients who report high levels of catastrophizing tend to report the most solicitous responses from their social environment, and to demonstrate an insecure adult attachment style (McWilliams and Asmundson, 2007).

Cognitive pathways

High levels of catastrophizing may produce biases related to information-processing and attention to pain that can lead individuals to selectively and intensely attend to pain-related stimuli (Quartana et al., 2009). Those who catastrophize about pain experience more difficulty in controlling or suppressing pain-related thoughts than do non-catastrophizers; the former individuals also ruminate more about their pain sensations, and anticipation of pain disrupts their performance of cognitive and physical tasks to a greater degree (Quartana et al., 2009). In a recent study, pain catastrophizing was associated with reduced cognitive- task performance during the administration of painful stimuli (Vancleef and Peters, 2006). Similarly, fibromyalgia patients with severe depression (mean Beck Depression Inventory score of 26) showed information-processing biases that included a tendency to selectively focus on negative illness-related words to the exclusion of pleasant words, and a tendency to ruminate about the meaning of pain-related words (Sitges et al., 2007). Collectively, the results of these studies suggest that individuals who exhibit high levels of depressive symptoms or who frequently catastrophize about pain are most likely to anticipate pain, to interpret ambiguous signals as being related to pain, to attend to pain-related visual cues, and to experience interference of pain with other cognitive activities.

Physiological pathways

Alterations in CNS pain processing: Incoming signals in the CNS are subject to modulation (both facilitation and inhibition) at a variety of sites. One of the mechanisms by which catastrophizing is thought to influence the experience of pain is by promoting sensitization and/or by interfering with endogenous pain inhibition in the CNS (Campbell and Edwards, 2009), a hypothesis that can be readily investigated using noninvasive functional neuroimaging methods such as functional MRI (fMRI). Among patients with fibromyalgia, for example, those who catastrophized most showed the greatest extent of activation in pain-processing brain areas such as the anterior cingulated, the dorsolateral prefrontal cortex and the periaqueductal gray during the administration of calibrated noxious stimuli (Gracely et al., 2004; Burgmer et al., 2011). Taken together, these functional neuroimaging studies highlight the roles of negative cognitive and emotional processes in amplifying transmission of pain-related signals in the cortex. Interestingly, structural neuroimaging studies are increasingly revealing that patients with chronic low back pain, fibromyalgia, and other chronically painful conditions exhibit loss of gray and white matter in certain brain regions associated with pain processing (Buckalew et al., 2008; Lutz et al., 2008).

Hypothalamic-pituitary-adrenal axis dysfunction: Recent studies have evaluated the links between neuroendocrine dysfunction, pain, and psychosocial processes in patients with rheumatic diseases. Among patients with chronic back pain, those with the highest levels of catastrophizing and depression showed a flattened (or blunted) diurnal rhythm of endogenous glucocorticoids (cortisol) (Johansson et al., 2008), which, in previous studies, was identified as a prospective risk factor for adverse pain outcomes such as the development of widespread pain complaints (McBeth et al., 2007). Moreover, numerous reports have linked fibromyalgia symptoms with dysfunction in the hypothalamic-pituitary-adrenal (HPA) axis (Riva et al., 2010), and a large prospective study reported that altered circadian patterns of cortisol secretion (including a blunted cortisol response upon awakening) were risk factors for the development of chronic widespread pain (McBeth et al., 2007). The HPA abnormalities observed in fibromyalgia are strongly related to psychosocial factors, especially symptoms of depression, which have consistently been correlated with hypocortisolism (Gur et al., 2004a; Gur et al., 2004b). Indeed, recent fibromyalgia studies suggest that emotional distress, rather than pain, is the primary driver of HPA axis dysfunction (Wingenfeld et al., 2010).

Genetic influences: Several studies hint at a potential genetic underpinning for some of the overlap between pain, depression and catastrophizing. Recent work has focused on the gene coding for catechol-O-methyltransferase (COMT), an enzyme that degrades catecholamines (which in turn affect the functioning of endogenous opioid systems). To date, certain *COMT* genotypes have been associated with widespread pain (Cohen et al., 2009), depression (Fijal et al., 2010), and enhanced sensitivity to pain (Diatchenko et al., 2005). A daily diary study in patients with fibromyalgia reported a significant interaction between *COMT* genotype and pain fluctuations, such that individuals with the 'high pain sensitivity' genotype experienced a greater decline in positive emotion on days when pain was elevated than did individuals with other *COMT* genotypes.

In conclusion, the literature on catastrophizing in the rheumatic diseases strongly implicates this factor as having a profound long-term influence on the shaping of pain responses and pain outcomes. To date, abundant evidence suggests that pain catastrophizing can serve as a prospective marker of risk for negative pain-related endpoints including severe physical disability, disease progression, and non-improvement following surgical or psychological interventions. Further research in this area should help tailor psychological interventions to individual characteristics, and it seems likely that catastrophizing will be an important factor to consider in the selection of individualized treatments (see Edwards et al., 2011 for a review).

d. Acceptance and Commitment Therapy (ACT) Model.

Studies from within a broad CBT framework have made a large contribution to our understanding and management of chronic pain over the past 20 years. This remains the popular approach today and has not been the target of much systematic criticism (Turk and Okifuji 2002). However, some limitations include the following: many chronic pain sufferers do not benefit from treatment to any discernible degree; we cannot reliably predict who will benefit and who will not; treatment programs are unique, making direct comparisons impossible; maintenance of treatment gains is a continuing challenge; and more important, specific mechanisms of treatment remain unknown. Of the several challenges that face cognitive-behavioral approaches today, the issue of treatment mechanism is, arguably, the most specific and important for the future. Within cognitive-behavioral therapy a central role is given to method aimed at change in the form or frequency of particular thoughts and beliefs, which leads to other changes in patient behavior. Some data from outside pain management indicate that this model may be limited. For example, Longmore and Worrel (2007) concluded a recent review about CBT outcomes pointing out that ”…there is little empirical support for the role of cognitive change as causal in symptomatic improvements achieved in CBT..”.

In this context, a number of therapies, under the name of the Third Wave of therapies, have been developed: Dialectical Behavior Therapy (DBT; Linehan, 1993), Functional Analytic Psychotherapy (FAP; Kohlenberg & Tsai, 1991), Integrative Behavioral Couples Therapy (IBCT; Jacobson & Christensen, 1996), and Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002), among several others (e.g., Martell, 2001; McCullough, 2000). Acceptance and Commitment Therapy (ACT, Hayes, Strosahl, & Wilson, 1999) also pertains to this group.

A major theme put forward in the ACT model (Hayes, Strosahl, & Wilson, 1999; Hayes & Wilson, 1993, 1994; Hayes, Wilson, Gilford, Follette, & Strosahl, 1996; Luciano & Hayes, 2001) is that attempts to control negatively evaluated aspects of experience may, in some contexts, actually increase suffering. In ACT, clients are asked to examine whether attempts at control have had beneficial effects *over the long term.* Instead of alleviating or controlling the "problem" (which is usually conceptualized as the presence of aversive private experience), the client learns in ACT to accept private experiences and focus instead on long-term meaningful goals.

From an ACT perspective the process of allowing symptoms to "get into the driver seat" is both logical and pathological. Popular culture embraces the notion that positive emotions, cognitions, and bodily states cause good behavior and negative emotions, cognitions, and bodily states cause bad behavior. We expend enormous effort in our schools and workplaces teaching people to feel more confident, to have higher self-esteem, to be cheerful and optimistic and to avoid pain. From the time we are little children we are taught that we can and should control negative aspects of experience. We are taught that we have the to go through life without pain and stress and that we, in fact should steer clear of these feelings.

Others who have looked at pain from a medical-social-historical perspective have reached the same conclusion (Johannisson, 1997; Allen and Waddell, 1989; Waddell, 1991). Our negative reactions to pain are not purely instinctive - they are culturally imposed. They suggest that our attitude towards pain changed with the introduction of painkillers. The definition of anesthesia means literally to "not feel." But prior to the 17th century where painkillers did not exist yet, pain was accepted as an unavoidable part of life. It is not that pain itself has increased - rather our willingness to accept pain that has decreased. Ironically, they suggest that the seed of this shift is treatment itself: *when pain was unavoidable, humans accepted, tolerated, and lived with integrated pain but when pain became avoidable it became, naked and unbearable* (Johannisson, 1997; Waddell, 1991). This suggests that intolerance of pain is a modern phenomena created by the spread of commercially available painkillers.

From an ACT point of view all of this is quite normal, and indeed is build into human cognition itself. Social institutions that used to resist these processes, particularly spiritual and religious traditions, have been greatly weakened in their ability to restrain what is quite logical. ACT is based on comprehensive theory of language and cognition called Relational Frame Theory (RFT: Hayes, Barnes-Holmes, & Roche, 2001). There about 70 studies supporting the tenants of RFT, which in its simplest form states human language is based on the learned ability to arbitrarily relate events. The simplest verbal problem solving situation requires that the person relate words to objects and events ("here is the problem and the objects I have to solve it"), to relate now to then ("if I do this, then that will happen"), and to relate comparatively ("if that happens it would be better than my current situation").

What happens when this repertoire is brought to bear on negative feelings or thoughts? Comparatively and evaluatively, they are undesirable. It is "better" to feel good than bad. Temporally, now can be related to better “thens” ("I used to feel better than I do now. I need to feel better again in the future"), and action can be taken on this basis (“if I rest more, I will feel better"). From an RFT perspective it is not possible to have verbal problem solving repertoire without having the ability to focus this repertoire on feelings and thoughts. When one does so, experiential avoidance is the result. Experiential avoidance is the attempt to alter the form, frequency, or situational sensitivity of private events (e.g., thoughts, emotions, memories, bodily sensations), even when attempts to do so cause behavioral harm.

Verbal problem solving strategies work very well with external objects ("if a plant the seeds now I will have food later") which is why the weak, frail creatures called human beings have taken over the planet. These same strategies often work horribly when applied to historically produced private experiences. Verbal rules that specify private events to be avoided generally contain the verbal seeds of these very events. For example, trying deliberately to avoid thoughts of pain is likely to be unsuccessful because the rule being followed will a) remind the person of these very thoughts, and b) may contain memories, worries, or verbalized consequences that are themselves painful. Furthermore, avoiding pain makes pain and possible signs of pain more, not less, behaviorally relevant. In addition, the actions taken to avoid pain may produce patterns of action that are narrow, rigid, and less valued.

Experiental avoidance predicts poorer long-term outcomes in a wide variety of psychological problems (Hayes et al., 1996). Examples include depression (Bruder-Mattson, & Hovanitz, 1990; DeGenova, Patton, Jurich, & MacDermid, 1994), survivors of child sexual abuse (Leitenberg, Greenwald, & Cado, 1992; Polusny & Follette, 1995), other traumatic events (Foa & Riggs, 1995), alcoholism (Cooper, Russell, Skinner, Frone, & Mudar, 1992; Moser & Annis, 1996), and many others. The experimental literature is fairly clear that avoidance and suppression of private events tends to increase their frequency and impact in normal populations as well (Purdon, 1999). Wegner in his studies of thought suppression (e.g., Clark, Ball, & Pape, 1991; Gold & Wegner, 1995; Wegner, Schneider, Carter, & White, 1987; Wegner, Schneider, Knutson, & McMahon, 1991) have shown that attempts to suppress thoughts result in immediate suppression, but later rebound from the thoughts to even higher levels. Higher levels of the aversive thought may set the stage for yet another round of suppression and subsequent rebound. This sort of self-amplifying loop bears striking similarity to the sort of catastrophic thinking that some cognitive interventions seek to stop. Gold and Wegner (1995) call this an "ironic process"- where attempts to reduce some cognition actually facilitate its propagation.

ACT claims that experiential avoidance is built into the normal functions of essential forms of human language (e.g., problem solving), and is then expanded by cultural forces. If this is true, it requires that less typical functions of human language must be developed, since it would be unwise to attack essential forms of behavior. From an ACT perspective, “Psychological Flexibility” is the main target. Psychological Flexibility is a process based in the interaction of cognition and direct environmental contingencies that allows a person´s behaviour to persist or change in line with their long term goals and values (Hayes et al., 2006). This is done in five ways: acceptance, defusion, contact with the present moment, self-as-context, and values. These processes have all been extensively discussed in the ACT literature (Hayes et al., 2004; 2006; Cheung et al., 2008; Mason et al., 2008; McCracken, 1998; McCracken et al., 2007; McCracken and Thompson, 2009; McCracken and Velleman, 2010; McCracken and Vowles, 2008; McCracken and Yang, 2006; Nicholas and Asghari, 2006; Rodero et al., 2010; Rodero et al., in press; Strosahl, Hayes, Wilson, & Gifford, 2004; Viane et al., 2003; Wilson & Blackledge, 2000; Wilson, Hayes, Gregg, & Zettle, 2001; Wilson & Luciano, 2002). Let us briefly look at one of each component:

Acceptance: From an ACT perspective, negative cognition, emotion, and bodily states may, but need not, produce bad behavioral outcomes. In ACT the natural experiential avoidance agenda built into human language is challenged on the basis of workability, with the goal of bringing literal language under better contextual control. Instead of avoidance and control, ACT teaches patients how to accept and embrace private experience in the service of chosen values.

Defusion: Involves learning to see thinking as an ongoing process, and rather than treating its products as a window on reality, to view them as fallible tools to get things done. The same verbal relations that are useful in solving external problems may be unhelpful in "solving" the emotional and cognitive results of our history and current situation. In scores of ways, ACT provides contexts in which language and thought is looked at rather than looked from - in hopes that patients can both use literal language when it is helpful to do so and to simply be mindful of the process when it is not.

Contact the present moment: Contacting the present moment as a conscious person provides some restraint on the usual process in which thoughts pull us into the past or future. Life always occurs here and now. Learning to contact the here and now gives patients a way to begin to let go off the struggle with one's own insides since, like all "problem solving" this struggle is based on the idea that one must be somewhere else other than here to begin to live.

Self as context: It is helpful to support the client, as they learn defusion and acceptance techniques, in finding a safe, humane place from which exposure can be done. Mindfulness and acceptance lead naturally to a transcendent sense of self (self as context) as the client starts to disidentify themselves with their own thoughts and feelings. The purpose is to establish a sense of the client as distinct from the psychological content that is being struggled with. Normal humans are conscious, verbal beings. By connecting with that sense of continuity of consciousness it is more possible to open to feared events, without a sense of imminent self- destruction.

Values: The most important process of all is values, since values provide the motivation to make change. When a person gets stuck in a chronic symptom such as pain by yielding to the problem and beginning to struggle with it, it is not just that symptoms occupy a larger and larger portion of that person's life - it is that valued and meaningful actions occupy less and less. As the avoidance agenda grows, the person loses flexibility and life quality and the individual's activities and thoughts become organized around prevention of pain or short-term symptom alleviation. Fighting the symptoms overshadows other valued directions and activities. Like a lighthouse in a storm, values provide a way forward toward a more meaningful and vital life, and help the person see how far off course experiential avoidance and cognitive fusion has taken them.

The components of an ACT functional analysis of chronic pain are shown in **Figure 2** and **Figure 3**. In the context of initial pain and stress, the client has fused with pain related thoughts and used experiential avoidance strategies as a dominant form of pain-related coping. These processes have been strengthened by such factors as initial negative reinforcement but a reduction in pain or stress (due to avoidance) and social / verbal support (e.g., support for being right; having a coherent explanation). As these verbal regulatory processes have dominated, the person has lost effective contact with the vitality the present moment affords, and they have become more entangled with their story about themselves and their life. Meanwhile, a valued life is put on hold, often so completely that the person is not really clear about what they want in their lives. This entire package is resulting in more rigidity and a loss of vitality, which further increases negative thoughts and feelings, leading to still more avoidance and fusion, and still less values based action. A self-amplifying loop emerges as the person slides into chronic pain syndrome.

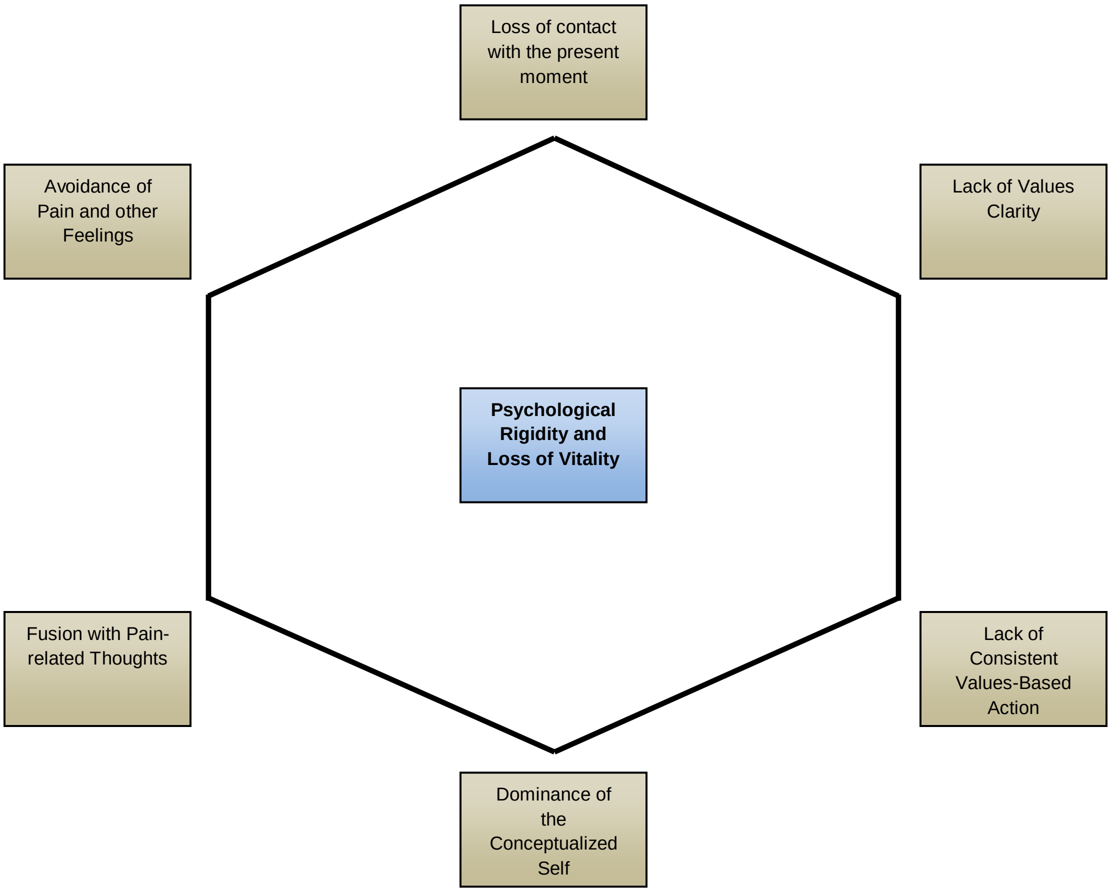

Figure 2. A model of an ACT formulation of chronic pain Dahl et al., 2005.

This analysis shares some features with a traditional CBT functional analysis. Situational antecedents and consequences are still relevant; thoughts and feelings are still relevant; and so on. What is different is that the form of difficult content is not a focus of the analysis. Thoughts are not parsed into rational or irrational varieties. Pain or stress is not presumed to be something that must be diminished. Instead, the key issue is one of function, and the analysis and the treatment components tied to it are centered on creating more flexible forms of responding linked to the larger life values of importance to the client.

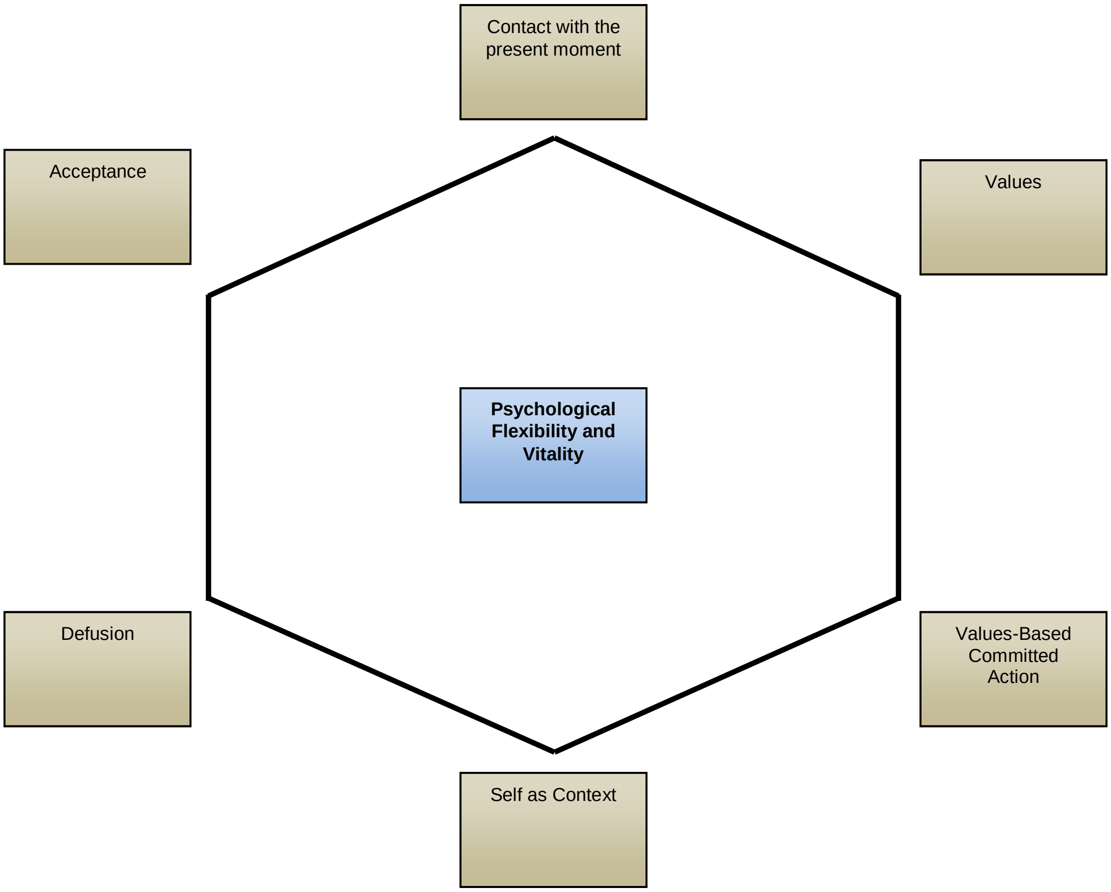

Figure 3. An ACT model of intervention for chronic pain Dahl et al., 2005.

- **Acceptance**

Medical conditions such as chronic pain and stress fit readily info an experiential avoidance perspective. Because of some of the special properties of language, we avoid thoughts of an aversive event such as pain or stress, very much as we avoid the aversive event itself. For example, if we ask the reader to think about having their teeth drilled, they will likely resist that thought, even though there are no drills present in their environment. Any event related to that thought will also begin to be avoided. If pain and stress are associated with work, work activities or the working place, all of these will tend to be avoided - both in thought and in action. A serious pain problem and diagnosis is not something that is easy to hear or to think about. A permanent pain diagnosis is worse news still. However, an unwillingness to remain mindful of the pain/stress symptoms can have serious consequences. If an individual is unwilling to think about their pain and feelings of stress, consider all of the events that might be associated with these symptoms that would also need to be avoided such as doctors, medication, symptoms, work-events, work activities, and physical movement that precipitate the pain/stress reactions. In principle, all of the procedures that could be used to manage pain and stress will all serve to bring the concept of pain into the psychological present.

If the ACT and RFT view of this process is accurate, what is needed in behavioral medicine is both the procedures that could help the patient to manage their medical condition and skills to cope with psychological reactions to having that condition through values, acceptance, defusion, and contact with the present as a conscious person. That combination is beginning to receive support in other areas of behavioral medicine such as diabetes management (Gregg, 2007), anxiety (Forsyth et al., 2008), depression (Strosahl and Robinson, 2008), anorexia (Heffner and Eifert, 2004), epilepsy (Lundgren et al., 2004), obesity (Lillis, 2008), tinnitus (Westin et al., 2011), insomnia (Lundh, 2005), and cancer and terminal illness (Feros et al., 2011).

We now know that experiential avoidance is one of the most powerful predictors of chronic pain (Wicksell et al., 2008; 2009). The original ACT measure of experiential avoidance, Acceptance and Action Questionnaire (Hayes, Nelson and Jarret, 1987) was modified to apply to chronic pain (Geiser, 1992), and developed in a series of studies by McCracken and his colleagues (McCracken, 1998; McCracken, Vowles, & Eccleston, 2004). Work with the resulting Chronic Pain Acceptance Questionnaire (CPAQ) shows that there are two primary aspects of the pain acceptance concept: a) willingness to experience pain and b) engaging in important life activities regardless of pain (McCracken et al., 2004). Pain acceptance of pain is associated with reports of lower pain intensity, less pain-related anxiety and avoidance, less depression, less physical and psychosocial disability, more daily uptime, and better work status. A relatively low correlation between acceptance and pain intensity showed that acceptance is not simply a function of having a low level of pain. Acceptance of pain predicts better adjustment on measures of patient function better than perceived pain intensity, and that continues to be true even when pain intensity is factored out. Interestingly, in a 2011 study from our group, it reported that acceptance of pain was not only associated with less pain, symptoms, disability, anxiety, and depression but also with better general health, vitality and physical and social functioning (Rodero et al., 2011).

From the pathology-oriented perspective described earlier, removal of pathology is supposed to free the individual to pursue whatever life direction they might take. From an ACT perspective, it is more powerful to move toward this behavioral end more directly. The struggle to avoid or reduce pain is not necessary in to that end, indeed this struggle often intensifies the centrality of pain and interferes with a life that is lived persistently in the pursuit of one's values. ACT is aimed squarely at helping clients to relinquish this struggle in order to live a life in pursuit of their most deeply held values. So far this approach is showing promising results (for review see Dahl, Wilson, Luciano and Hayes, 2005). Even surprisingly short ACT interventions (e.g., four hours) can make significant differences in terms of sick listing, health care and medication utilization and quality of life for individuals suffering from chronic stress and pain symptoms (Dahl, Wilson and Nilsson, 2004).

In conclusion, research and clinical developments over the past 20 years are beginning to shed new light on thoughts, sensations, emotions, their role in influencing behavior, and the particular ways in which private experiences contribute to human suffering (e.g. Hayes et al., 2001). This has led to different approaches to treating a broad array of behavior problems, approaches that incorporate a partnership of acceptance and change. We have defined acceptance of chronic pain as an active willingness to engage in meaningful activities in life regardless of pain-related sensations, thoughts, and other related feelings that might otherwise hinder that engagement. It is about *not* engaging in unnecessary struggles with private experiences, struggles that often intensify the aversiveness of those experiences and enhance their life disrupting influences.

What is novel about this approach is that it is not simply a new psychological variable but a description of a different set of processes of pain and suffering. This approach is fully situated within the broader empirical tradition of the behavioral and cognitive therapies. Indeed, the American Society of Clinical Psychology (APA’s Division 12) has recently listed ACT as having “strong research support” for the treatment of chronic pain. They reached the next conclusion: "There is substantial basic research supporting ACT's fundamental processes, and preliminary evidence regarding their mediational role in ACT outcomes. As of late 2011, there are at least 11 clinical trials, including several that are randomized and controlled, demonstrating that ACT improves some outcomes in heterogeneous chronic pain samples, particularly functioning and mood, although pain severity may be less affected. ACT is superior to wait-list or no treatment, and thus far demonstrates outcomes for chronic pain that are comparable to CBT (Dahl and Lundgren, 2006; Dahl, Wilson and Nilsson, 2004; Dahl et al., 2005; Hayes, 2005; Luoma, Hayes and Walser, 2007; McCracken, Vowles and Eccleston, 2005; McCracken, 2005; Vowles and McCracken 2008; Vowles and Thompson 2011; Wetherell et al., 2011; Wicksell et al., 2008; Wicksell et al., 2009)". The examination of its potential merits is already underway.

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2. Aims of the Research

1) To validate the Pain Catastrophizing Scale (PCS) and the Chronic Acceptance Questionnaire (CPAQ) into Spanish in a fibromyalgia sample and assess their associations and correlations with several sociodemographic and outcomes measures.

2) Regarding Catastrophizing:

    a. A rich area of debate has centered on whether catastrophizing is best conceptualized as a stable and enduring trait, such as a dimension of personality, or as a modifiable characteristic. Therefore, more research related to catastrophizing treatment is necessary to confirm whether it can be altered by treatment. Furthermore, it is unclear if rumination is the most important component and if imagined exposure might be a useful technique to reduce the rumination score.

    b. It has been proposed that the development of fibromyalgia involves an interaction between the experience of pain and catastrophizing, but it is unclear when and how this cognitive construct first becomes important. Consequently, there is a need to study the relationship between catastrophizing and dysfunction in relation to the development of fibromyalgia. We use cross-sectional comparisons where different stages of chronicity provide a proxy for the development process.

    c. It is also unclear whether the three components of catastrophizing (rumination, magnification, and helplessness) contribute equally to the prediction of dysfunction in fibromyalgia or whether certain components are more predictive than others. Information concerning the relative importance of the components of catastrophizing could help treatment providers to tailor interventions to facilitate positive outcomes.

3) Regarding Acceptance of pain:

   a. It has been established that the coping behavioural strategies are valuable in predicting important aspects of patient wellbeing and functioning. However, it is expected that acceptance of pain measures, accounted for even more variance in the outcomes scores. Therefore, acceptance will show a greater utility in comparison with the behavioural coping strategies.

   b. The findings will also permit us to observe differences between acceptance and behavioural strategies and to elucidate the targets of intervention in fibromyalgia patients.

3. Publications

3.1 SEPARATA DEL ARTÍCULO

Imagined exposure as treatment of catastrophizing in fibromyalgia: a pilot study.

Rodero B, García J, Casanueva B, Sobradiel N.

Publicado en: Actas Esp Psiquiatr. 2008 Jul-Aug;36(4):223-6.

Clinical notes

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Imagined exposure as treatment of catastrophizing in fibromyalgia: a pilot study

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Introduction. We want to assess the effectiveness of a new approach (imagined exposure) for the Cognitive Behavioural Treatment (CBT) in fibromyalgia.

Study design. Quasi-experimental design of a temporary nature in a single group with pre and post and with/without treatment.

Subjects and methods. Fibromyalgia patients, who met the American College of Rheumatology's criteria for FM. In this study eight people took part, seven females and one male, selected from fibromyalgia Cantabria Association. The CBT consisted of 11 group sessions and lasted 15 weeks. All patients were evaluated before and after the program. The data were based on the following scales: visual-analog scale (VAS) for pain intensity, the Fibromyalgia Impact Questionnaire (FIQ), the Pain Catastrophizing Scale (PCS) and the Hospital Anxiety and Depression Scale (HADS).

Results. Despite finding improvements in every variable, no significant differences were found between pre and postreatment in VAS, HADS and FIQ. However, after treatment, significant differences were found in PCS ($p < 0.05$), and its three subscales. Moreover, rate decrease in rumination was higher after imagined exposure.

Conclusion. These results suggest that CBT is effective either in catastrophizing decreasing or in rumination. Imagined exposure may enhance the results in particular cases. Further studies with larger samples are needed to confirm these results.

Key words:
Pain. Catastrophizing. Rumination. Cognitive-behavioural therapy.

Actas Esp Psiquiatr 2008;36(4):223-226

Exposición en imaginación como tratamiento del catastrofismo en fibromialgia: un estudio piloto

Introducción. Se requiere determinar la eficacia de un nuevo componente (exposición en imaginación) dentro de un tratamiento cognitivo-conductual (TCC) en el dolor crónico.

Diseño. Diseño cuasi-experimental, de serie temporal, de un solo grupo. Con medida pretratamiento y postratamiento con y sin tratamiento.

Pacientes y método. Un grupo de pacientes ($n = 8$) (siete mujeres y un hombre) con fibromialgia diagnosticados según los criterios del American College of Rheumatology (ACR). El TCC consistió en 11 sesiones de grupo y tuvo una duración de 15 semanas. Los pacientes fueron valorados al inicio y al final del programa. Se estudiaron las siguientes variables: la escala analógica visual (EAV), el nivel de catastrofismo y rumiación (PCS), el Cuestionario de Impacto de Fibromialgia (FIQ) y la sintomatología ansioso-depresiva (HADS).

Resultados. Aunque se encontraron mejoras en todas las variables, no se evidenciaron diferencias estadísticamente significativas en la EAV, el FIQ ni en la HADS. Sí se evidenciaron diferencias estadísticamente significativas en el PCS ($p < 0,05$) y en sus tres subescalas. Además el descenso en la puntuación de la rumiación con la exposición en imaginación fue superior.

Conclusiones. El TCC es un tratamiento eficaz tanto para el descenso del catastrofismo como de la rumiación. La técnica de exposición en imaginación pudiera potenciar en determinados casos esos resultados. Se necesitan estudios con muestras más amplias para corroborar estos resultados.

Palabras clave:
Dolor. Catastrofismo. Rumiación. Tratamiento cognitivo-conductual.

INTRODUCTION

According to the current cognitive-behavioral models, one of the most relevant mediating variables in chronic pain (CP) is catastrophism (C)[1]. For most individuals, pain is interpreted as unwanted and unpleasant, but not as catastrophic or terrible. On the contrary, for a minority of the subjects, the experience of pain would have a catastrophic interpretation and would lead to fear (of pain or of re-in-

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jury) and towards a vicious circle of fear-avoidance that would limit activities and cause incapacity and pain. Catastrophism refers to a combination of negative thoughts and expectations regarding pain1 that positively correlates with greater intensity of the pain, emotional malaise, muscle and joint weakness, incapacity, and worse results from the treatment[2]. C is made up of three dimensions: magnification, rumination and helplessness[3]. Rumination refers to the fact that the patient cannot get the idea out of his/her head, cannot stop thinking about the pain; magnification, the exaggeration of the threatening properties of the painful stimulus and helplessness refers to the estimation that the person has of not being able to do anything to influence the pain. Of these three components, that which has the most consistent relationship with pain intensity is rumination[4]. That is, the recurrent character of these thoughts plus their negative aspect is that which is associated to greater pain and worse functioning.

The thought-stopping technique has long been used in the treatment of emotional disorders in which there is ruminations, obsessions or worries (such as Post-traumatic Stress Disorder, Obsessive-Compulsive Disorder or Generalized Anxiety Disorder). Currently, it is known that even though thought stopping can be effective in the short term, this technique seems to have a negative long term impact in this type of thinking, since these thoughts are accompanied by greater emotional malaise[4-6]. Another cognitive technique proposed as treatment has been distraction. The results obtained are similar to those of thought stopping so that it is currently considered that this technique does not provide much help for patients with chronic pain[7]. On the contrary, one of the techniques that has been shown to be most effective for the treatment of ruminations is imagined exposure[8]. This consists in exposing the patient to the feared stimuli in a hierarchical way to activate all the feared areas (memory, emotion, cognition) without permitting avoidance or escape (neutralization, suppression, distraction) until the anxiety level is reduced. The results support the effectiveness of this technique for a true suppression of the undesired thought. Although it is considered that the ruminations do not seem to be as intense in CP as in other emotional disorders as, for example, generalized anxiety disorder[8], this technique could be of great utility in patients with excessive ruminations. Thus, the objective that we propose in this pilot study is to check if the imagined exposure can reduce rumination in patients with CP, specifically in fibromyalgia. In addition, it is hypothesized that when rumination is reduced, C and pain intensity is also decreased.

METHOD

Design

Quasi-experimental design, temporal series, of a single group, with pre- and post measurements, with and without treatment.

Participants

The sample is made up of 8 adult persons, 7 women and 1 man who met the American College of Rheumatology criteria for fibromyalgia. The patients participating in this pilot study were obtained from the Cantabria Association of fibromyalgia which is a reference site for the Regional Community of Cantabria (approximately 550,000 inhabitants).

Evaluation tests

Fibromyalgia was diagnosed with the clinical interview according to the diagnostic criteria. The interview was conducted by a Rheumatologist with wide clinical experience. The tests used were:

- *Visual analogue scale (VAS).* On a 10 cm. long straight line whose tips represent the limits of pain intensity (none-unbearable). The patients estimated the pain intensity experienced on the same day and in the last week between 0-10.
- *Fibromyalgia Impact Questionnaire (FIQ)*[9]. This evaluates the current condition of women with fibromyalgia syndrome. The FIQ is a self-administered instrument made up of 10 items that measure physical impairment, work functioning, depression, anxiety, sleep, pain, stiffness, fatigue and well-being. This instrument has adequate reliability and validity, which justifies its use in the clinical practice and in research.
- *Hospital Anxiety and Depression (HADS)*[10]. This is aimed at evaluating anxiety and depression without confusing the somatic symptoms characteristic of depression and anxiety with the medical disease of the patient. This self-administered questionnaire consists in 14 items, and is made up of two subscales of 7 items, one aimed at evaluating depression and the other anxiety.
- *Pain Catastrophizing Scale (PCS)*[3]. It was used to measure catastrophist thinking regarding the pain. It is a scale made up of 13 items and three subscales: magnification, rumination and helplessness. The score used is a Likert scale from 0 to 4 points. This instrument has been validated in Spanish by our team[11].

Procedure

Evaluation

The evaluation measures were those of pre-treatment and post-treatment, except for C that was also measured two months prior to the intervention. All the scales are self-administered by the patient.

Treatment

Different studies and meta-analyses have indicated the great clinical utility and low cost of cognitive-behavioral treatments (CBT) for CP[12]. The manual proposed by Thorn[13] was used for the treatment. This is a 10 session CBT to which we added one "«extra» session.

Session 1: the connection between stress and pain. Session 2: identification of automated thoughts. Session 3: evaluation of automated thoughts. Session 4: questioning the automatic thoughts and constructing alternatives. Session 5: nuclear beliefs. Session 6: nuclear beliefs on the pain. Session 7: changing the coping. Session 8: coping with ruminations-obsessions-worrying. Session 9: expressive writing. Session 10: assertive communication. Session 11: final session.

The session added corresponds to number 8, after beginning with the coping section. This is especially directed at the subjects who show high rumination and consists in instructing the patients to write a story about the worse possible scenario imaginable for the future based on their greatest fear, stressing those aspects that would generate the greatest emotional malaise (How do you see yourself in this situation? What do you think?, How do you feel?, etc.). The story is recorded on a tape for subsequent presentation to the patient. It is then recommended to them that they should listen to this story between 30 and 60 minutes (enough time for them to become habituated) until said story no longer causes anxiety (in general between 10 and 15 sessions of exposure)[13].

Statistics

Means and standard errors of mean, T test for comparison of two dependent samples and contrast for the significance of the Pearson correlation between two quantitative variables were obtained.

RESULTS

A total of 8 patients finally participated in the study, 2 of whom were lost to follow-up. There were no statistically significant differences of the two patients who dropped out in relationship with the total of the participants in the study regarding the demographic variables analyzed. All the patients were women except for one. Mean age was 50.5 years. Almost all had a basic educational level-primary education or similar (57 %). Only one patient had university studies. A high proportion of the cases were married or living with their mate and were housewives or early retired. Manifestation time they had been suffering pain was a mean of 14.5 years. Table 1 summaries the results of the variables studied, including the 2 subjects who did not participate in the Imagined exposure. The Last Observation Carried Forward (LOCF) method was used. It should be stated that although the pre and post-treatment score improves in all the variables, significant differences were only found in PCS catastrophism ($p<0.05$) and in its three subscales. The difference in the VAS intensity of pain ($p=0.079$) was not significant, although it was close to significance level $a=0.05$. It is relevant to mention that neither C nor any of its subscales (especially rumination) correlated with pain intensity. Another relevant piece of data is the stability of the C score if there is no intervention. There are no significant differences between the pre-treatment measurement and that conducted 2 months before subject selection ($p=0.416$). Finally, in relationship to the two subjects who did not participate in the imagined exposure, it can be stated that the direct scores obtained in the rumination subscale for these (23 %) were different from the rest of the subjects if the Imagined Exposure was performed and that they obtained a mean of 38 % in the decrease of their scores. The mean difference in the group without exposure was 1.5 ($p=0.656$). However, in the group that did perform exposure, the mean difference was 4 points although significant differences were not obtained ($p=0.120$). This result may suggest that significance would be found in this tendency with a larger sample.

Table 1 **Summary of the treatment efficacy results**

	Pretreatment	Postreatment	Grade of pretreatment-postreatment significance
PCS			
Total	25.33 ± 3.54	16 ± 3.60	$p=0.018$
Magnification	5.12 ± 1.46	3.16 ± 0.87	$p=0.050$
Rumination	7.66 ± 0.99	4.5 ± 1.17	$p=0.032$
Helplessness	11.37 ± 1.46	8.33 ± 1.66	$p=0.007$
VAS	12.12 ± 1.23	9.66 ± 1.38	$p=0.079$
FIQ	50.12 ± 5.09	40.16 ± 5.09	$p=0.116$
HADS depression	8.5 ± 1.45	6.83 ± 1.24	$p=0.119$
HADS anxiety	9.12 ± 1.21	9 ± 2.06	$p=0.702$

PCS: Pain Catastrophizing Scale; VAS: Visual Analogue Scale of Pain; FIQ: Fibromyalgia Impact Questionnaire; HADS: Hospital Anxiety and Depression.

DISCUSSION

This is the first study on the application of an imagined exposure technique for chronic pain. We have studied if the incorporation of this new component (imagined exposure) into a treatment program that has already been shown to be effective in successive occasions[13] would improve the therapeutic effect by reducing rumination or if a similar result would be produced. The most important limitation of this research, that is justified as it is a pilot study, is its small sample size. Our results are in line with previous studies that demonstrate that catastrophizing correlates with reductions in depressive symptoms and in pain behaviors as well as with improvements in pain intensity[14]. One of the treatments has been effective in reducing C of the CBT, with decreases of up to 40% in the PCS[14]. Although we have not been able to demonstrate it in our study, rumination seems to be the subscale of C that would best correlate with pain[4]. To improve treatment of rumination, we used the imagined exposure technique of irrational fears. Perhaps patients diagnosed of fibromyalgia are not the best sample to use as a test of the imagined exposure. In generally these are cases in whom most of the patients are elderly subjects (50.5 years), in whom the years of evolution of their pain has existed for many years (14.5 years) and who have high psychiatric comorbidity.

The CBT is shown to be beneficial «per se» for the treatment of rumination. In fact, two subjects who did not participate in the specific exposure session (as they had a lower cultural level and understanding difficulties) also decreased their rumination, although 15% less than the subjects who did participate in it. On the other hand, imagined exposure showed the greatest success in a young woman with university education and with high score in rumination (above the 70 percentile). After the exposure, the patient reported some less frequent, intense and long-lasting ruminations that were also accompanied by an objective improvement in the VAS and in the FIQ. Thus, it does not seem to be advisable to propose imagined exposure to patients with lower educational level or with poor cognitive level. On the other hand, this technique could be very helpful, especially in those patients with a high score in rumination (above the 70 percentile), with a middle-high education level and who have a very intense irrational fear[15]. In any event, the existence of new studies that confirm these preliminary findings and that approach another type of patients other than those with FM is necessary.

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3.2 SEPARATA DEL ARTÍCULO

Validation of the Spanish version of the Pain Catastrophizing Scale in fibromyalgia.

García Campayo J, Rodero B, Alda M, Sobradiel N, Montero J, Moreno S.

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ORIGINALES

Validación de la versión española de la escala de la catastrofización ante el dolor (Pain Catastrophizing Scale) en la fibromialgia

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Fundamento y objetivo: **La catastrofización ante el dolor se considera un factor pronóstico importante en el dolor crónico en general y en la fibromialgia en particular. No hay versiones españolas validadas de ninguna de las escalas desarrolladas para medirla. El objetivo de este estudio ha sido validar la versión española de la Pain Catastrophizing Scale (PCS), una de las escalas más utilizadas para medir este constructo.**

Pacientes y método: **Se ha realizado un estudio multicétrico, observacional y prospectivo en pacientes con fibromialgia clínicamente estables e inestables. Se evaluaron la estructura factorial, la validez convergente, la fiabilidad (consistencia interna y estabilidad temporal) y la sensibilidad al cambio de la escala.**

Resultados: **Se incluyó a 230 pacientes con fibromialgia de 12 centros de atención primaria de Zaragoza. La escala presentó la misma estructura factorial de 3 factores descritos en el estudio original (rumiación, magnificación y desesperanza), así como una adecuada consistencia interna (alfa de Cronbach = 0,79), fiabilidad test-retest (coeficiente de correlación intraclase = 0,84) y sensibilidad al cambio (tamaño del efecto $\geq$ 2).**

Conclusiones: **La versión española de la PCS muestra adecuadas propiedades psicométricas, similares a las de la escala original, por lo que su uso estaría indicado en la práctica asistencial y la investigación clínica en pacientes españoles con fibromialgia.**

Palabras clave: Fibromialgia. Catastrofización. Dolor. Validación.

Validation of the Spanish version of the Pain Catastrophizing Scale in fibromyalgia

Background and objective: **Pain catastrophization is considered an important risk factor for pain in general and, specifically, for fibromyalgia. There are no validated Spanish versions of any of the questionnaires developed to assess pain catastrophization. The aim of this study was to validate the Spanish version of the Pain Catastrophization Scale (PCS), one of the most used questionnaires to assess pain catastrophization.**

Patients and method: **A prospective, observational and multicentre study was carried out in clinically stable and unstable patients with fibromyalgia. Factorial structure, convergent validity, reliability (internal consistency and test-retest) and sensitivity to change were assessed.**

results: **Two hundred and thirty patients from 12 primary care health centres were included. The Spanish version of the PCS showed the same 3-factor structure (rumination, magnification and helplessness) described in the original study. It also showed appropriate internal consistency (Cronbach alpha = 0.79), test-retest reliability (intraclass correlation coefficient = 0.84) and sensitivity to change (effect size $\geq$ 2).**

Conclusions: **The Spanish version of the PCS shows appropriate psychometric properties, similar to the English original scale. Therefore, PCS could be useful for clinical practice and research in Spanish patients with fibromyalgia.**

Key words: Fibromyalgia. Catastrophization. Pain. Validation.

La fibromialgia es una enfermedad crónica, de causa desconocida, que se caracteriza por la presencia de dolor musculoesquelético generalizado, asociado a una serie de puntos dolorosos específicos que permiten realizar el diagnóstico. Con frecuencia se asocia a fatiga, alteraciones del sueño y rigidez matutina[1]. Además de por su elevada prevalencia, la fibromialgia se caracteriza por producir una importante discapacidad y por la eficacia limitada del tratamiento[2].

La función del constructo «catastrofización ante el dolor» (CAD) en la modulación de las respuestas dolorosas ha recibido una considerable atención en los últimos años[3]. Se ha demostrado una relación coherente entre la catastrofización y las reacciones de malestar ante estímulos dolorosos[3]. Aunque los criterios definitorios de CAD no se han descrito explícitamente, existe un consenso general en que incluye una orientación negativa y exagerada hacia los estímulos dolorosos. No está clara la etiología de la CAD. Se ha demostrado que es crucial en su desarrollo un modelo de apego inseguro[4], así como la sensibilidad ante la ansiedad[5]. Algunas de las consecuencias que se han asociado a la CAD son dolor más intenso[6], incremento de las conductas ante el dolor[7], mayor consumo de analgésicos[8], disminución de las actividades diarias[3], incapacidad laboral[9], peor pronóstico[10] e ideación suicida[11].

En pacientes con fibromialgia la CAD parece ser un factor de riesgo asociado tanto con la existencia de dolor generalizado[12] como con la disminución del umbral del dolor[13]. Cuando se los compara con personas que presentan enfermedades que cursan con dolor crónico, como la artritis reumatoide, los pacientes con fibromialgia obtienen puntuaciones significativamente más altas en la CAD. Otro estudio[14] indica que la CAD, independientemente del grado de depresión, está significativamente asociada con un incremento de la actividad en las áreas ce-

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rebrales relacionadas con la anticipación del dolor (córtex frontal medial, cerebelo), con la atención al dolor (córtex cingulado dorsal anterior, córtex prefrontal dorsolateral), con aspectos emocionales del dolor (cláustrum, íntimamente conectado con la amígdala) y con el control motor.

Una de las escalas más utilizadas para medir el constructo CAD es la Pain Catastrophizing Scale (PCS)[9,11], un cuestionario autoadministrado, cuya validez y fiabilidad se han descrito previamente[6]. La PCS se desarrolló mediante 4 estudios. En el primero se seleccionaron los ítems del cuestionario en una muestra de estudiantes de psicología, mediante un análisis de componentes principales. En el segundo se analizó la validez de constructo estudiando los grados de catastrofización medidos por el cuestionario cuando el individuo introduce un brazo en un recipiente con agua congelada. También se realizó en estudiantes de psicología. El tercero evaluó la validez del cuestionario en una muestra clínica: pacientes que iban a realizarse un estudio electromiográfico. El cuarto y último estudio analizó la relación entre CAD y otros constructos como depresión, ansiedad o miedo al dolor, que también podrían predecir la respuesta al dolor[6]. El constructo CAD, pese a su importancia, apenas se ha estudiado en los pacientes con fibromialgia[15], uno de los trastornos de dolor crónico más frecuentes. Por otra parte, la PCS no está validada en español.

El objetivo de este estudio ha sido, pues, validar la versión española de la PCS, es decir, examinar su estructura factorial, validez convergente, fiabilidad (consistencia interna y estabilidad temporal) y sensibilidad al cambio de la escala en pacientes con fibromialgia.

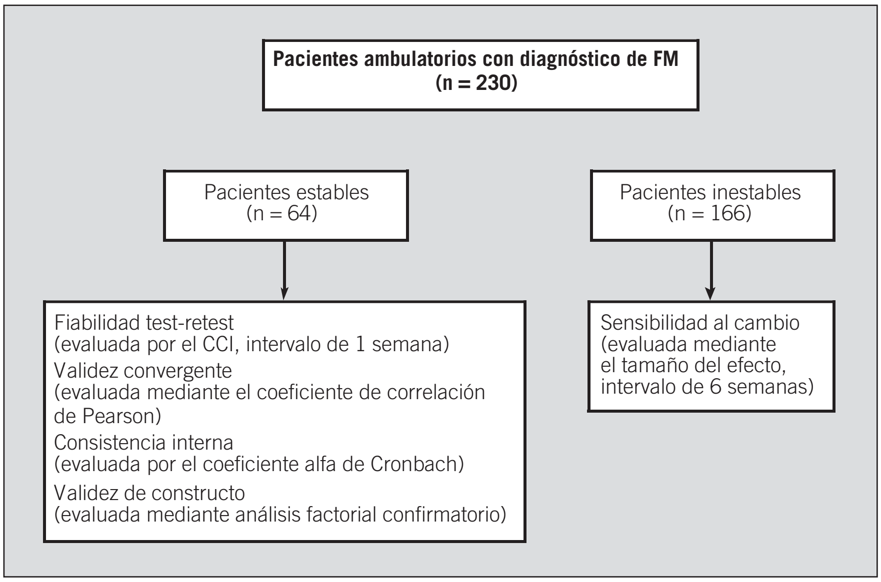

Fig. 1. Diagrama del estudio. CCI: coeficiente de correlación intraclase; FM: fibromialgia.

Pacientes y método

Diseño

Se ha realizado un estudio observacional, prospectivo y multicéntrico, con un período de seguimiento de una a 6 semanas, en pacientes de ambos sexos, de entre 18 y 65 años de edad, diagnosticados de fibromialgia, que cumplían los criterios del Colegio Americano de Reumatología[16]. Se seleccionaron de forma consecutiva en 12 centros de atención primaria de Zaragoza, durante el año 2006, entre los pacientes que acudían a consulta y dieron su consentimiento para participar en el estudio.

En la visita inicial se clasificó a los pacientes en estables (los que no habían mostrado cambios clínicos relevantes en los últimos 3 meses) e inestables (los que sí habían presentado en dicho período). Se citó a los pacientes estables para una visita de seguimiento en el plazo de una semana a fin de evaluar la fiabilidad test-retest, mientras que a los pacientes inestables se les evaluó a las 6 semanas de la visita de inclusión, después de recibir el tratamiento adecuado, con objeto de evaluar la sensibilidad al cambio de la escala. La representación esquemática del estudio se resume en la figura 1.

Este estudio forma parte de una amplia investigación sobre las características psicológicas y la efectividad del tratamiento psiquiátrico en pacientes con fibromialgia[17,18]. El estudio fue aprobado por el Comité Ético de Investigación Clínica de Aragón y sigue las normas éticas de la Declaración de Helsinki de 1975, con la revisión de octubre de 2000. Todos los pacientes firmaron un consentimiento informado antes de su inclusión en el estudio.

Muestra

El tamaño muestral (n = 230) para realizar el análisis factorial confirmatorio se calculó sobre la base de la razón recomendada[19] de 10-15/1 entre el número de sujetos y el número de ítems del cuestionario (13 ítems). Los tamaños muestrales mínimos para la realización de los otros cálculos (validez, fiabilidad y sensibilidad al cambio) eran muy inferiores a este número[20].

Escala de evaluación objeto del estudio

La PCS es una escala autoadministrada de 13 ítems y una de las más utilizadas para valorar el constructo CAD. Comprende 3 dimensiones: *a)* rumiación; *b)* magnificación, y *c)* desesperanza. Se obtuvo el permiso para traducir y validar la PCS de los autores originales[6]. Dos nativos hispanohablantes, conocedores de los objetivos de la PCS, tradujeron por primera vez el cuestionario al español. Posteriormente, 2 nativos angloparlantes, no familiarizados con el instrumento, realizaron una retrotraducción del español al inglés. Cualquier discrepancia entre las traducciones tanto española como inglesa se resolvió por acuerdo. Un tercer experto, nativo angloparlante, consideró equivalentes la versión original inglesa y la retrotraducción. La versión española final (recogida junto a la original inglesa en el anexo I) se juzgó una traducción adecuada de la original inglesa y fue aprobada por los autores del cuestionario[6]. El intervalo teórico del instrumento se sitúa entre 13 y 62, indicando las puntuaciones bajas escasa catastrofización, y los valores altos, elevada catastrofización.

Otros instrumentos de medida

Fibromyalgia Impact Questionnaire (FIQ). El FIQ, un cuestionario autoadministrado de 10 ítems, mide el estado de salud de los pacientes con fibromialgia[21]. El primer ítem se centra en la capacidad de los pacientes para realizar actividades físicas. En los 2 siguientes, el paciente ha de indicar el número de días de la semana anterior que se sintió bien y cuántos días de trabajo había perdido. Los 7 restantes se refieren a la capacidad de trabajar, al dolor, la fatiga, el cansancio matutino, la rigidez, la ansiedad y depresión, todos ellos medidos mediante escalas analógicas visuales. En este estudio hemos utilizado la versión española del FIQ, que ha sido traducida y validada[22]. El intervalo teórico del instrumento se sitúa entre 0 (mínimo impacto de la enfermedad) y 100 (máximo impacto).

Hospital Anxiety and Depression Scale (HADS). La HADS[23] es una escala autoadministrada que mide la ansiedad y depresión en pacientes con enfermedades somáticas. Se compone de 14 ítems, que se valoran mediante una escala tipo Likert de 0 a 3 puntos, y ha demostrado su idoneidad en la comunidad y en entornos hospitalarios. Consta de 2 subescalas, HADS-Dep y HADS-Ans, de 7 ítems cada una, que valoran de forma independiente la depresión y la ansiedad. El intervalo teórico de ambas subescalas es de 0 (nula ansiedad o depresión) a 21 (máxima ansiedad o depresión). La HADS está validada en población española[24]. Se eligió la HADS porque se considera uno de los mejores instrumentos para evaluar la depresión y ansiedad en pacientes con enfermedades médicas concomitantes como la fibromialgia[24].

Fear Avoidance Belief Questionnaire (FABQ). El FABQ es un instrumento de evaluación que mide los pensamientos de evitación del miedo[25]. Se compone de 16 ítems, que incluyen 2 subescalas: evitación del miedo de los pensamientos sobre el trabajo (FAB-Work) y evitación del miedo de los pensamientos sobre la actividad física (FAB-Phys). El paciente tiene que puntuar cada aseveración de 0 (totalmente en desacuerdo) a 6 (totalmente de acuerdo). El intervalo de puntuaciones va de 0 a 96, reflejando los valores altos un mayor grado de pensamientos de evitación del miedo y los bajos, la ausencia de estas cogniciones. El FABQ está traducido al español y validado[26].

EuroQol-5D (EQ-5D). Es un instrumento estandarizado que mide resultados de salud y es aplicable a una amplia gama de enfermedades y tratamientos. Proporciona un perfil descriptivo y simple, así como un índice único del estado de salud. El EQ-5D se concibió originalmente para complementar a otros instrumentos, como el 36-ítem Short-Form Health Status Survey (SF-36), el Nottingham Health Profile (NHP) u otros cuestionarios específicos de ciertas enfermedades, pero se está empleando cada vez más de forma aislada. El EQ-5D combina el sistema descriptivo del EuroQol y una escala analógica visual (EuroQol VAS). La EuroQol VAS mide el estado de salud autoevaluado en una escala analógica visual de 0 (mínima calidad de vida) a 100 (máxima calidad)[27]. El EQ-5D abarca 5 dimensiones de salud: movilidad, autocuidado, actividades habituales, dolor/incomodidad y ansiedad/depresión. Cada dimensión se evalúa en 3 categorías (sin problemas; problemas moderados; problemas extremos). La evaluación consiste en medir cada uno de los 5 dominios en una de los 3 categorías. En este estudio utilizamos la versión española validada del EQ-5D[28].

Pain Visual Analogue Scale (PVAS). La PVAS se concibió para ofrecer una valoración amplia y comprensible, a la vez que subjetiva, de las dimensiones del dolor.

Una escala visual analógica es una línea recta, ya sea vertical u horizontal, cuya longitud representa el continuum de la experiencia dolorosa. Se compone de una línea horizontal de 10 cm, con líneas perpendiculares en los extremos, que representan los límites extremos del constructo dolor que se está midiendo. Los puntos de anclaje en cada extremo se caracterizan por una expresión verbal breve del tipo «nada» o «sin dolor» en un extremo, e «insoportable» en el otro. Los descriptores verbales se acompañan generalmente de un número (p. ej., «nada» puede estar acompañado de 0 e «insoportable», de 100). La validez y fiabilidad del PVAS se han demostrado en estudios previos[29].

Análisis estadístico

La validez de constructo de la PCS se evaluó mediante un análisis factorial confirmatorio[30]. El modelo inicial se basó en el modelo de 3 factores obtenidos de análisis factoriales exploratorios previos[6,15]. Así, se supuso inicialmente que cada una de las 13 variables analizadas estaba relacionada con uno y sólo uno de los 3 factores descritos, incluyendo las 13 variables en el factor en el que mostraban un mayor carga factorial cuando se realizó un análisis factorial exploratorio con rotación varimax. Como estadígrafos de ajuste se emplearon los habituales: *a)* χ^2/grados de libertad, que se recomienda sea inferior a 3; *b)* índice de ajuste comparativo, que se recomienda que sea superior a 0,90; y *c)* RMSEA (*root-mean-square error of approximation*) igual o inferior a 0,08[30].

La consistencia interna se evaluó mediante el coeficiente alfa de Cronbach, utilizando todos los valores (pacientes estables e inestables) de la primera entrevista. Se considera adecuado, según criterios habitualmente utilizados, cuando es superior a 0,7[20].

La fiabilidad test-retest se evaluó, sólo en el grupo de pacientes estables, mediante el coeficiente de correlación intraclase. La validez convergente de la PCS se analizó mediante el coeficiente de correlación de Pearson, tras confirmar gráficamente que su asociación era lineal con las medidas del estado de salud según el paciente (evaluado con el FIQ), depresión y ansiedad (medidas con la HADS), calidad de vida (valorada con el EQ-5D), dolor (evaluado mediante la PVAS) y pensamientos de evitación hacia el dolor (medidos mediante el FABQ). Para evaluar la sensibilidad al cambio se comparó, en el grupo de pacientes inestables, la puntuación media de la primera y segunda visitas. Para el tamaño del efecto del cambio sintomático se calculó la diferencia de medias mediante la prueba de la t de Student para muestras emparejadas, utilizando también la correlación entre las puntuaciones de la primera y la segunda visitas. Se considera pequeño un tamaño del efecto con valores del tamaño del efecto de 0,2; moderado con valores de 0,5, y grande con valores de 0,8 y superiores[20]. Los valores se expresan como medias y desviaciones estándar. Todos los tests se realizaron con 2 colas. Una probabilidad de 0,05 se consideró estadísticamente significativa. Todos los análisis estadísticos se realizaron con el programa SPSS, versión 14 (SPSS Inc., Chicago, Illinois, EE.UU.), excepto el análisis factorial confirmatorio, que se efectuó con el programa LISREL, versión 8.30 (Scientific Software International, Inc., Lincolnwood, Illinois, EE.UU.).

Resultados

Descripción de la muestra

De los 235 potenciales participantes, 3 (1,3%) declinaron participar y hubo que eliminar a otros 2 (0,8%) porque rellenaron de forma incompleta los cuestionarios. Así pues, la muestra final (tabla 1) constó de 230 pacientes (64 estables y 166 inestables), con edades comprendidas entre 23 y 64 años, y edad media (desviación estándar) de 47,3 (7,2) años. Un total de 195 eran mujeres (84,7%) y 35 varones (15,2%), todos ellos descritos a sí mismos como de etnia blanca europea. Habían presentado fibromialgia durante 8,9 años de media (extremos: 1-22 años; mediana: 6 años) y 110 (47,8%) recibían una pensión de invalidez.

Análisis factorial confirmatorio de la versión española de la escala

Se realizó un análisis factorial confirmatorio de la versión española de la PCS que arrojó una solución factorial de 3 componentes con valores propios mayores de 1. Las cargas factoriales de los diferentes ítems, así como los estadígrafos de ajuste, se muestran en la tabla 2. No se excluyó ningún ítem del análisis debido a una correlación débil (r < 0,30) ítem-escala.

TABLA 1

Características sociodemográficas de la muestra

Variables	Pacientes estables (n = 64)	Pacientes inestables (n = 166)
Edad media (años)*	47,2 (7,0)	47,4 (7,3)
Sexo		
Varones	11 (17,1%)	24 (14,4%)
Mujeres	53 (82,9%)	142 (85,6%)
Nivel de educación		
Sin estudios	0 (0%)	1 (0,6%)
Estudios primarios	41 (64%)	95 (57,2%)
Estudios secundarios	20 (31,3%)	63 (37,9%)
Estudios universitarios	3 (4,7%)	7 (4,2%)
Situación laboral		
Trabaja fuera de casa	12 (18,7%)	30 (18%)
Parado	3 (4,6%)	9 (5,4%)
Jubilado	0 (0%)	1 (0,6%)
Incapacidad laboral/invalidez permanente	32 (50%)	78 (46,9%)
Ama de casa	17 (26,5%)	48 (28,9%)
Diagnóstico DSM-IV		
Trastorno depresivo mayor	15 (23,4%)	33 (19,8%)
Trastorno distímico	8 (12,5%)	15 (9%)
Trastorno adaptativo	4 (6,2%)	7 (4,2%)
Trastorno de ansiedad	7 (10,9%)	18 (10,8%)
Tiempo de evolución del trastorno		
< 2 años	7 (10,9%)	18 (10,8%)
De 1 a < 5 años	26 (40,6%)	61 (36,7%)
> 5 años	31 (48,4%)	87 (52,4%)

DSM-IV: Manual Diagnóstico y Estadístico de los Trastornos Mentales, cuarta edición.
*Media (desviación estándar).

TABLA 2

Patrón matricial de la Pain Catastrophizing Scale (n = 230)

Ítems	Componentes			Correlación ítem-escala
	1	2	3	
Rumiación (variancia explicada: 39%)				
8. Deseo desesperadamente que desaparezca el dolor	0,78	0,06	0,18	0,61
9. No puedo apartar el dolor de mi mente	0,82	0,03	0,10	0,68
10. No dejo de pensar en lo mucho que me duele	0,71	0,01	0,15	0,67
11. No dejo de pensar en lo mucho que deseo que desaparezca el dolor	0,74	0,02	0,01	0,70
Magnificación (variancia explicada: 11%)				
6. Temo que el dolor empeore	0,18	0,88	0,09	0,45
7. No dejo de pensar en otras situaciones en las que experimento dolor	0,04	0,72	0,03	0,31
13. Me pregunto si me puede pasar algo grave	0,11	0,69	0,10	0,38
Desesperanza (variancia explicada: 10%)				
1. Estoy preocupado todo el tiempo pensando en si el dolor desaparecerá	0,08	0,10	0,84	0,41
2. Siento que ya no puedo más	0,15	0,11	0,81	0,47
3. Es terrible y pienso que esto nunca va a mejorar	0,03	0,14	0,79	0,50
4. Es horrible y siento que esto es más fuerte que yo	0,28	0,02	0,81	0,57
5. Siento que no puedo soportarlo más	0,31	0,03	0,68	0,52
12. No hay nada que pueda hacer para aliviar la intensidad del dolor	0,24	0,21	0,76	0,49

Componentes: 1, rumiación; 2, magnificación; 3, desesperanza. Estadígrafos de ajuste: χ^2/grados de libertad = 3,0; RMSEA (*root-mean-square error of approximation*) = 0,08; índice de ajuste comparativo = 0,91.

TABLA 3

Medias, desviación estándar, medianas e intervalos de la Pain Catastrophizing Scale y de los otros cuestionarios utilizados en el estudio

	Media	DE	Mediana	Intervalo
PCS total	24,42	11,18	25,0	13-52
Rumiación	7,51	3,74	7,0	4-16
Magnificación	5,73	2,93	5,0	3-12
Desesperanza	11,64	5,97	12,0	6-24
FIQ	65,54	9,46	62	41-98
HADS-Dep	9,28	4,31	9	3-18
HADS-Ans	6,42	3,03	7	2-12
EQ-5D (escala analógica visual)	39,21	16,93	41	21-89
FABQ	72,21	11,32	73	10-95
PVAS	67,54	12,23	70	25-95

DE: desviación estándar; EQ-5D: EuroQol-5D; FABQ: Fear Avoidance Belief Questionnaire; FIQ: Fibromyalgia Impact Questionnaire; HADS: Hospital Anxiety and Depression Scale; PCS: Pain Catastrophizing Scale; PVAS: Pain Visual Analogue Scale.

TABLA 4

Correlación de la Pain Catastrophizing Scale con medidas del estado de salud, dolor, depresión, ansiedad y calidad de vida

	FIQ	PVAS	HADS-Dep	HADS-Ans	FABQ	EQ-5D
Subescalas						
Rumiación	0,49^{a}	0,35^{b}	0,44^{a}	0,27^{b}	0,68^{a}	–0,43^{a}
Magnificación	0,43^{a}	0,33^{b}	0,40^{a}	0,26^{b}	0,64^{a}	–0,40^{a}
Desesperanza	0,44^{a}	0,30^{b}	0,41^{a}	0,29^{b}	0,66^{a}	–0,40^{a}
PCS global	0,45^{a}	0,32^{b}	0,42^{a}	0,28^{b}	0,66^{a}	–0,41^{a}

^{a}p < 0,01. ^{b}p < 0,05.
EQ-5D: EuroQol-5D; FABQ: Fear Avoidance Belief Questionnaire; FIQ: Fibromyalgia Impact Questionnaire; HADS: Hospital Anxiety and Depression Scale; HADS-Ans: subescala de ansiedad de la HADS; HADS-Dep: subescala de depresión de la HADS; PVAS: Pain Visual Analogue Scale; PCS: Pain Catastrophizing Scale.

TABLA 5

Fiabilidad de la versión española de la Pain Catastrophizing Scale

Propiedades	Subescalas			
	PCS total	Rumiación	Magnificación	Desesperanza
Consistencia interna (n = 230)				
Alfa de Cronbach	0,79	0,82	0,74	0,80
Fiabilidad test-retest (n = 64)	0,84	0,86	0,82	0,83
Puntuación media (DE) test	25,42 (12,12)	7,44 (4,03)	5,76 (2,84)	12,34 (6,85)
Puntuación media (DE) retest	24,93 (11,95)	7,52 (4,11)	5,49 (2,67)	11,93 (6,68)
CCI	0,94	0,93	0,93	0,95

CCI: coeficiente de correlación intraclase; DE: desviación estándar; PCS: Pain Catastrophizing Scale.

TABLA 6

Sensibilidad al cambio de la versión española de la Pain Catastrophizing Scale (n = 166)

Propiedades	Subescalas			
	PCS total	Rumiación	Magnificación	Desesperanza
Puntuación basal media (DE)	25,42 (12,12)	7,44 (4,03)	5,76 (2,84)	12,34 (6,85)
Puntuación a las 6 semanas, media (DE)	13,12 (8,30)	3,86 (1,96)	2,82 (1,41)	6,24 (3,75)
Diferencia test-retest, media (DE)	12,30 (6,91)*	3,58 (2,15)*	2,82 (1,56)*	6,1(3,59)*
Correlación entre puntuaciones basales y a las 6 semanas	0,28	0,30	0,29	0,26
Tamaño del efecto (IC del 95%)	2,2 (1,7-2,7)	2,1 (1,6-2,6)	2,3 (1,7-2,8)	2,1 (1,7-2,7)

*p < 0,01.
DE: desviación estándar; IC: intervalo de confianza; PCS: Pain Catastrophizing Scale.

Análisis estadístico descriptivo

En la tabla 3 se presentan las medias, desviaciones estándar, medianas y extremos de la escala PCS y de las otras medidas utilizadas en el estudio. Los valores de la PCS no se encontraban distribuidos normalmente. Como puede verse, la muestra comprende a pacientes con fibromialgia que presentaban una relativa discapacidad, elevados niveles de dolor, evitación de éste y depresión, así como una pobre calidad de vida y un grado relativamente bajo de ansiedad.

Validez convergente

Medimos la relación entre la PCS y el grado autopercibido de salud de los pacientes con fibromialgia (medido con el FIQ), depresión y ansiedad (valoradas con la HADS), dolor (evaluado con la PVAS), miedo al dolor (con el FABQ) y calidad de vida (con el EQ-5D). Se esperaba que todas estas medidas se correlacionaran con la CAD del paciente. Calculamos los coeficientes de correlación de Pearson, que se resumen en la tabla 4. La PCS global y sus subescalas se correlacionaron positivamente con todas las demás medidas, excepto con la calidad de vida, que, como era previsible, se correlacionó de forma inversa. La PCS muestra la máxima correlación con el miedo al dolor (FABQ), seguido por el estado de salud (FIQ), calidad de vida (EQ-5D) y depresión (HADS-Dep), y las correlaciones más débiles con la ansiedad (HADS-Ans) y el dolor (PVAS).

Consistencia interna

En la tabla 5 se muestra la consistencia interna (coeficiente alfa de Cronbach, con el intervalo de confianza del 95%) de la PCS. Tanto para la PCS global como para las 3 subescalas los valores del alfa de Cronbach fueron mayores de 0,70.

Fiabilidad test-retest

La fiabilidad test-retest se evaluó, sólo en los pacientes estables (n = 64), una semana después de la evaluación basal (tabla 5). Tanto el coeficiente de la PCS total como los de las 3 subescalas fueron mayores de 0,70.

Sensibilidad al cambio

Se evaluó sólo en los pacientes inestables (n = 166), al cabo de 6 semanas de la evaluación basal, mediante el cálculo del tamaño del efecto, a partir de las diferencias de las medias y de los coeficientes de correlación, entre ambas observaciones (tabla 6). El cambio experimentado en las puntuaciones de la PCS, evaluado mediante el tamaño del efecto, fue importante (d = 2,1-2,3) tanto para la PCS total como para las 3 subescalas. Representa una mejora sobre la puntuación inicial de más del 40% en todos los casos (tabla 6).

Comprensión y factibilidad

El tiempo necesario para completar la PCS fue de 10 min de mediana, con un percentil 25 de 7 min y un percentil 75 de 13 min. Ningún paciente solicitó ayuda para la interpretación del cuestionario y no hubo ningún ítem que dejara de contestar un 5% o más de los pacientes.

Discusión

Este estudio se realizó para valorar la utilidad de la PCS en pacientes con fibromialgia, un subtipo específico de pacientes con dolor crónico. Se espera que la PCS sea de gran valor para supervisar la efectividad de los tratamientos en la fibromialgia, sobre todo por la intensa relación de la CAD con medidas clave en estos pacientes como son el dolor, el miedo a éste, el estado general del paciente y la depresión[6,15]. La importancia de este estudio radica en que la PCS, uno de los cuestionarios más utilizados en todo el mundo para medir la CAD, se ha validado al español y se ha utilizado en una enfermedad tan prevalente como la fibromialgia. Nuestro estudio presenta como limitación que no compara la PCS con medidas objetivas de estrés, tales como procedimientos médicos electrodiagnósticos aversivos, la presión del esfigmomanómetro o el frío. Sin embargo, estos métodos se emplearon cuando se creó la escala original[6] y no suelen utilizarse en las validaciones a otro idioma.

Los resultados del estudio confirman las adecuadas propiedades psicométricas de la versión española de la PCS en pacientes con fibromialgia. Así, se mantiene la estructura original de 3 factores descrita por los autores[6] y confirmada por Van Damme et al[15] en 3 muestras holandesas de población sana, de dolor crónico y de fibromialgia. La variancia explicada de cada uno de los factores (rumiación: 39%; magnificación: 11%; desesperanza: 10%) es muy similar a la descrita por los autores originales (un 41, un 10 y un 8%, respectivamente)[6]. La reproducción de la misma estructura es frecuente cuando se compone de menos de 5 factores[30]. Los valores de consistencia interna y de fiabilidad test-retest son adecuados, superiores a 0,7[30]. También la sensibilidad al cambio es satisfactoria, con valores del tamaño del efecto mayores de 2.

No se han realizado hasta la fecha estudios sobre la correlación específica de cada una de las 3 subescalas de la PCS en la fibromialgia. En otras enfermedades que cursan con dolor crónico, la subescala de rumiación es la que en general se correlaciona más estrechamente con la intensidad del dolor y la discapacidad[6,9]. El único estudio realizado en fibromialgia con la PCS[15] no analizó este punto, por lo que no tenemos datos para poder comparar. Por otra parte, en el estudio original de validación realizado en personas sanas[6], tanto la PCS global como la subescala de rumiación se correlacionaron mucho más intensamente con el dolor que con la depresión. En nuestro estudio en pacientes con fibromialgia, la subescala de rumiación es la que mayor consistencia interna y mayor correlación de los ítems con la escala global presenta, así como la de mayor variancia explicada. Cuando analizamos las correlaciones de la CAD con otras medidas, comprobamos que hay una elevada correlación con la evitación del dolor (medida mediante el FABQ), dato esperable, ya que ambos constructos son muy similares. Existen correlaciones altas de la PCS con la discapacidad (medida con el FIQ) y con la calidad de vida (medida con el EQ-5D), lo que indica que, sin haber solapamiento de los constructos, la CAD muestra una importante relación con ambas. También existe una correlación relativamente elevada con 2 variables clave en la fibromialgia: el dolor (medido con la PVAS) y la depresión (evaluado con la HADS). Sin embargo, nuestros datos son diferentes de los de los estudios realizados con la PCS en otras enfermedades[6,15], ya que en nuestra muestra de fibromialgia la CAD se correlaciona más estrechamente con la depresión que con el dolor. Esto no es sorprendente, ya que estudios previos han demostrado la intensa correlación entre la CAD y la depresión en estos pacientes[12,13]. Por último, la correlación de la PCS con la ansiedad es relativamente baja, lo que indica el peso relativamente escaso de esta variable en la CAD.

Pese a que la CAD se considera una de las principales dianas terapéuticas en la fibromialgia y otras enfermedades que cursan con dolor crónico[15], todavía no se han llevado a cabo estudios sobre la eficacia terapéutica de los tratamientos farmacológicos o psicológicos sobre la CAD

ANEXO 1

Escala de catastrofización ante el dolor

Nombre: ....

Edad: .... Sexo: .... Fecha: ....

Todas las personas experimentamos situaciones de dolor en algún momento de nuestra vida. Tales experiencias pueden incluir dolor de cabeza, dolor de muelas, dolor muscular o de articulaciones. Las personas estamos a menudo expuestas a situaciones que pueden causar dolor como las enfermedades, las heridas, los tratamientos dentales o las intervenciones quirúrgicas.
Estamos interesados en conocer el tipo de pensamientos y sentimientos que usted tiene cuando siente dolor. A continuación se presenta una lista de 13 frases que describen diferentes pensamientos y sentimientos que pueden estar asociados al dolor. Utilizando la siguiente escala, por favor, indique el grado en que usted tiene esos pensamientos y sentimientos cuando siente dolor.

Everyone experiences painful situations at some point in their lives. Such experiences may include headaches, tooth pain, joint or muscle pain. People are often exposed to situations that may cause pain such as illness, injury, dental procedures or surgery.
We are interested in the types of thoughts and feelings that you have when you are in pain. Listed below are 13 statements describing different thoughts and feelings that may be associated with pain. Using the following scale, please indicate the degree to which you have these thoughts and feelings when you are experiencing pain.

0: Nada en absoluto	1: Un poco	2: Moderadamente	3: Mucho	4: Todo el tiempo
0: *Not al all*	1: *To aslight degree*	2: *To a moderate degree*	3: *To a great degree*	4: *All the time*

Cuando siento dolor… (*When I'm in pain*)

1. Estoy preocupado todo el tiempo pensando en si el dolor desaparecerá
   (I worry all the time about whether the pain will end)
2. Siento que ya no puedo más
   (I feel I can't go on)
3. Es terrible y pienso que esto nunca va a mejorar
   (It's terrible and I think it's never going to get any better)
4. Es horrible y siento que esto es más fuerte que yo
   (It's awful and I feel that it overwhelms me)
5. Siento que no puedo soportarlo más
   (I feel I can't stand it any more)
6. Temo que el dolor empeore
   (I become afraid that the pain may get worse)
7. No dejo de pensar en otras situaciones en las que experimento dolor
   (I think of other painful experiences)
8. Deseo desesperadamente que desaparezca el dolor
   (I anxiously want the pain to go away)
9. No puedo apartar el dolor de mi mente
   (I can't seem to keep it out of my mind)
10. No dejo de pensar en lo mucho que me duele
    (I keep thinking about how much it hurts)
11. No dejo de pensar en lo mucho que deseo que desaparezca el dolor
    (I keep thinking about how badly I want the pain to stop)
12. No hay nada que pueda hacer para aliviar la intensidad del dolor
    (There is nothing I can do to reduce the intensity of the pain)
13. Me pregunto si me puede pasar algo grave
    (I wonder whether something serious may happen)

… Total

en esta enfermedad. Esperamos que la validación de este cuestionario facilite la realización de dichos estudios en la población española afectada de fibromialgia. En conclusión, este estudio confirma las adecuadas características psicométricas de la versión española de la PCS en pacientes con fibromialgia. Además, indica que en la fibromialgia la CAD se correlaciona más con la depresión que con el dolor, a diferencia de otros estudios en población sana y en enfermedades que cursan con dolor crónico. Como es obvio, se requerirían nuevos estudios específicamente diseñados para confirmar este último punto.

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3.3 SEPARATA DEL ARTÍCULO

Stages of chronicity in fibromyalgia and pain catastrophising: a cross-sectional study.

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Stages of chronicity in fibromyalgia and pain catastrophising: a cross-sectional study

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Abstract

Background: Fibromyalgia (FM) is a prevalent and disabling disorder characterised by widespread pain and other symptoms such as insomnia, fatigue and depression. Catastrophisation is considered to be a key clinical symptom in FM; however, few studies have investigated how contextual factors, such as catastrophisation, might contribute to the duration of the pain. The present research examined the relationship among pain, catastrophic thinking and FM impact, as a function of stage of chronicity.

Methods: In this cross-sectional study, the sample of 328 patients diagnosed with FM was divided into 3 groups based on level of chronicity: Group A (6 months to 2 years, $N = 46$); Group B (2-4 years, $N = 59$); and Group C (more than 4 years, $N = 223$). The three subscales of the Pain Catastrophising Scale (PCS), rumination, magnification, and helplessness, were used as predictors of dysfunction. The Fibromyalgia Impact Questionnaire and the McGill Pain Questionnaire were also administered. A hierarchical regression analysis was performed on the entire sample and, subsequently, for each group to determine the effect of the continuous process variables (castastrophising and pain) on the stages of chronicity.

Results: Total score and PCS subscales were strongly associated with pain and impact in all the stages of chronicity in FM patients ($r = 0.27$-0.73, $p < 0.05$). For Group A, a regression analysis revealed that rumination predicted FM impact beyond the variance accounted for by age and pain. Both magnification and helplessness predicted impact in Group B, and helplessness was a significant predictor of impact in Group C.

Conclusion: These findings provide preliminary evidence that stage of chronicity is an important moderator of psychological vulnerability for FM impact and should be taken into account by tailoring psychological interventions.

Background

Fibromyalgia (FM) is defined by the American College of Rheumatology (ACR) as chronic (>3 months), widespread pain (axial plus upper and lower segment plus left and right sided pain) and tenderness in at least 11 of 18 tender points [1]. Patients frequently describe sensations of fatigue, sleep disturbances, morning stiffness, symptoms associated with irritable bowel syndrome and affective distress. The prognosis for symptomatic recovery is generally poor, and the estimation for lifetime prevalence is approximately 2% in community samples [2,3]. Most patients report a high degree of impairment in their daily functioning. When compared to patients with other chronic pain conditions, patients with FM report higher levels of pain and functional disability and judge their quality of life as poorer [4]. Moreover, they make extensive use of health services, thus leading to high costs for medical and societal care [5]. The syndrome's pathology is not well understood, and to date, no treatment has proven effective in fully alleviating its symptoms. A number of meta-analyses and reviews have been conducted on pharmacological [6,7] and non-pharmacological [8-10] treatments available for FM.

Psychological treatments seem to have beneficial short-term effects on the key symptoms of FM, but these effects largely disappear over the long term. Most studies to date have addressed the role of psychological factors in the development of chronic pain following

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acute pain [11,12]. Several psychological constructs have been associated with the prognosis of FM, such as fear-avoidance [13], self-efficacy and personal control [14], pain coping [15] and acceptance [16]. The construct receiving the most attention currently appears to be catastrophising [17]; this attention may be due to the construct's association with negative prognosis. Catastrophising refers to a combination of negative thoughts and expectations regarding pain, and research shows that it is a critically important variable in understanding the experience of pain in rheumatologic disorders and in other chronic pain conditions. Thus, this thought process may be an important target for both psychosocial and pharmacological treatment of pain [18,19].

Indeed, it has been proposed that the development of FM involves an interaction between the experience of pain and catastrophising, but it is unclear when and how this cognitive construct first becomes important [20]. Consequently, there is a need to study the relationship between catastrophising and dysfunction in relation to the development of FM. One approach might be to use cross-sectional comparisons where different stages of chronicity provide a proxy for the development process.

It is also unclear whether the three components of catastrophising (rumination, magnification, and helplessness) contribute equally to the prediction of dysfunction in FM or whether certain components are more predictive than others. Information concerning the relative importance of the components of catastrophising could help treatment providers to tailor interventions to facilitate positive outcomes.

The aim of the present research was to replicate and extend the findings of Sullivan [21] with regard to FM. To this end, the present study examined whether the three components of catastrophising interacted with chronicity (i.e., the length of time the individual had been diagnosed with FM) in predicting the severity of the FM impact (i.e., activity limitations due to pain).

Method

Design

This was a multi-centre, cross-sectional study.

Participants and setting

The study sample consisted of 328 patients from the Pain Clinic, Santander (Spain) and 8 primary care centres in Zaragoza (Spain) during the year 2009. To be included in the study, patients were required to fulfil several inclusion criteria: (1) be between 18 and 65 years old; (2) be able to understand and read Spanish; (3) meet the ACR criteria for primary FM [1]; and (4) have been diagnosed by a Spanish National Health Service rheumatologist. Exclusion criteria included the following: (1) diagnosis of a severe Axis I psychiatric disorder (dementia, schizophrenia, paranoid disorder, or abuse of alcohol and/or drugs) or a severe Axis II disorder that, from the clinician's point of view, might prevent them from following the study protocol; and (2) refusal to participate.

Measures

Demographic and Pain-Related Variables

Each participant was interviewed and asked to provide information about a number of demographic and pain-related variables, including age, work status, duration of FM diagnosis, medications and other medical treatments.

Catastrophising

The PCS is a 13-item scale designed to assess the catastrophising cognitions of individuals by asking them to reflect on thoughts or feelings associated with past painful experiences [22]. It can be divided into three subscales: rumination, magnification and helplessness. Each item is scored from 0 (not at all) to 4 (always), and scores range from 0 to 52. The PCS has good temporal stability, internal consistency and validity. The Spanish version of the PCS has been validated by the current study's authors and shows psychometric properties similar to those of the original questionnaire [23].

Pain Severity

The McGill Pain Questionnaire (MPQ) was used as a measure of pain severity [24]. It consists primarily of three types of descriptors, sensory words, affective words and evaluative words, which are used by patients to specify subjective pain experience. It also contains an intensity scale and other items to determine the properties of pain experience. For the purposes of the present study, the Pain Rating Index was used. The Pain Rating Index has been recommended as a reliable and valid measure of chronic pain experience. This instrument has a translated and validated Spanish version [25].

Fibromyalgia Impact Questionnaire

The Fibromyalgia Impact Questionnaire (FIQ) is a 10-item self-report questionnaire developed to measure the health status of FM patients [26]. The first item focuses on the patient's ability to carry out muscular activities. In the next two items, patients are asked to circle the number of days in the past week they felt good and how often they missed work. Finally, the last seven questions (ability to work, pain, fatigue, morning tiredness, stiffness, anxiety, depression) are measured using a visual analogue scale. This instrument also has a translated and validated Spanish version[27].

Procedure

The study questionnaires and protocol were approved by the Ethical Committee of the regional health authority, and the patients signed consent forms attesting to their willingness to participate. After consenting to the study, recruited patients were given a battery of questionnaires to complete. These questionnaires included a pain form for demographic variables, the FIQ, the PCS and the MPQ.

Patients were classified into 1 of 3 groups on the basis of the chronicity of their FM disorder. Patients in Group A had been diagnosed less than 2 years ago (*N* = 46), those in Group B had received the diagnosis between 2 and 4 years ago (*N* = 59), and the members of Group C had carried the diagnosis for more than 4 years (*N* = 223).

Statistical methods

Sample size

There are no previous studies assessing the distribution of disease chronicity in patients with FM. The large sample size was chosen to ensure a minimum of 45 patients in each group. Therefore, patients were recruited from both a tertiary care setting (the Pain Clinic, Santander; *N* = 175; 53.3%) and in primary care centres in Zaragoza (*N* = 153; 46.7%).

Analysis strategy

In the descriptive analysis of the sample, means and standard deviations were calculated for continuous variables (i.e., age and pain), and percentages were calculated for categorical variables (i.e., gender and treatment setting). Analysis of variance (ANOVA) was used to compare the three chronicity groups. Pearson correlations were used to assess the relationship between pain catastrophising (total score and subscales) and other psychometric variables such as pain (measured with MPQ) and impact of FM (measured with FIQ). A hierarchical regression analysis was performed on the entire sample to determine the effect of the continuous process variables (castastrophising and pain) on FM impact. All analyses were conducted with SPSS 15.

Results

No patients were rejected because of severe Axis I or Axis II psychiatric disorder. Only two patients (0.006%) refused to participate in the study. The study sample consisted of 328 patients (93.9% women and 6.1% men), aged 18-77 years (mean 49.5 years, SD: 10.6 years), and all of them self-described as from the European ethnic group. On average, the patients had been suffering from FM for 11.3 years (range 6 months - 40 years), and 22.8% had been granted an invalidity pension.

First, the data were summarised and explored. The mean scores on the measures were compared across the stages of chronicity using Pearson Correlation Coefficients. Mean and standard deviations for demographic and dependent variables are found in Table 1. Despite variations across some measures, there were no significant differences between groups for age, pain, the catastrophising subscales or FM impact. Correlations between the catastrophising subscales and pain and FM impact are displayed for each chronicity group in Table 2. In both cases, and in the three groups, catastrophising subscales were significantly correlated with pain and the FM impact.

Table 1 Sample characteristics

	Group A (< 2 years)	Group B (2-4 years)	Group C (> 4 years)
Age	47.0 (9.8)	48.3 (11.0)	50.3 (10.5)
MPQ	38.8 (7.9)	40.2 (8.2)	40.9 (8.3)
FIQ	71.3 (16.4)	70.8 (16.5)	73.6 (16.1)
PCS subscales			
Rumination	10.4 (4.2)	11.1 (4.1)	11.0 (4.0)
Magnification	6.7 (3.7)	6.6 (3.1)	6.6 (3.1)
Helplessness	13.8 (6.2)	15.4 (5.8)	15.5 (5.6)
PCS total	30.9 (14.3)	33.1 (11.9)	33.1 (11.6)

MPQ = McGill Pain Questionnaire.

FIQ = Fibromyalgia Impact Questionnaire.

PCS = Pain Catastrophising Scale. Values in parentheses are standard deviations.

Following these analyses, the moderational effect of the stage of chronicity was tested, as in the original paper [21], using a hierarchical regression analysis. To test whether stage of chronicity moderated the effect of the catastrophising components (rumination, magnification, and helplessness) on function, the interaction between catastrophising and stage of chronicity was added.

Firstly, the hierarchical regression analysis was performed on the entire sample to test whether any of the interactions between chronicity and the three catastrophising components was more predictive of FM impact than the individual PCS subscales. Age was entered in Step 1 of the analysis but did not contribute significant variance. Pain severity was entered in Step 2 and contributed 24% of variance to the prediction of FM impact, r= 0.48, $F = 95.9$, $p < 0.001$. The PCS subscales were entered in Step 3 of the analysis and contributed 8% to the prediction of impact, r= 0.56, $F = 48.0$, $p < 0.001$. The three interaction terms were entered in the final step of the analysis, but they did not contribute any additional variance to the prediction of FM impact.

Secondly, the nature of interactions was explored with separate multiple regressions for each level of chronicity. Pain intensity was used as a covariate in order to address whether the catastrophising components contributed to the variance in function beyond the variance accounted for by pain. The results of regression analyses predicting dysfunction in the three chronicity groups are presented in Table 3. For Group A, pain was entered in

Table 2 Correlations between PCS subscales and pain and impact

Group	Rumination	Magnification	Helplessness	Total PCS
MPQ (pain)				
A (< 2 years)	0.43**	0.44**	0.53**	0.50**
B (2-4 years)	0.27*	0.40**	0.47**	0.42**
C (> 4 years)	0.32**	0.23**	0.36**	0.34**
FIQ (impact)				
A (< 2 years)	0.76**	0.63**	0.68**	0.73**
B (2-4 years)	0.48**	0.59**	0.58**	0.60**
C (> 4 years)	0.46**	0.38**	0.50**	0.50**

Group A (n = 46), Group B (n = 59), Group C (n = 223). MPQ = McGill Pain Questionnaire; FIQ = Fibromyalgia Impact Questionnaire; PCS = Pain Catastrophising Scale. * p < 0.05, ** p < 0.01.

Step 1 of the analysis and contributed to 30% of the variance in ratings of impact, F = 17.91, p < 0.001. In Step 2 of the analysis, age was entered but did not contribute significant variance. The three subscales of the PCS were allowed to compete for entry in the next step of the analysis, and only the rumination subscale met criteria in the regression equation, F = 38.09, p < 0.001. Rumination accounted for 36% of the variance in ratings of FM impact beyond that accounted for by pain.

For Group B, pain was entered in Step 1 and accounted for 25% of the variance in disability ratings, F = 19.53, p < 0.001. When the three PCS scales were allowed to compete in the next step of the analysis, both magnification (F = 18.5, p < 0.001) and helplessness (F = 18.5, p < 0.001) met criteria for entry in the regression equation, and they accounted for roughly the same percentage of the variance (17% and 16%, respectively) in ratings of impact when controlling for pain.

For Group C, pain was also entered in Step 1 and accounted for 21% of variance, F = 57.0, p < 0.001. The helplessness subscale of the PCS was entered next because it was the only one that met minimum criteria for entry in the regression equation, F = 51.17, p < 0.001. It accounted for an additional 12% of the variance.

Table 3 Prediction of FM impact for each stage of chronicity

Predicting FM impact in Group A				
Variables		Beta	RÂ^{2}	Pearson r
Step1	Pain	0.55**	0.30	0.55**
Step2	Pain	0.32**	0.66	0.81**
	Rumination	0.61**		
Predicting FM impact in Group B				
Variables		Beta	RÂ^{2}	Pearson r
Step1	Pain	0.50**	0.25**	0.50**
Step2	Pain	0.28*	0.42**	0.64**
	Magnification	0.45**		
Step2	Pain	0.30*	0.41**	0.64**
	Helplessness	0.44**		
Predicting FM impact in Group C				
Variables		Beta	RÂ^{2}	Pearson r
Step1	Pain	0.46**	0.21**	0.46**
Step2	Pain	0.30**	0.33**	0.58**
	Helplessness	0.39**		

The impact was measured with the Fibromyalgia Impact Questionnaire, catastrophising with the Pain Catastrophising Scale and pain with the McGill Pain Questionnaire. * p < 0.05, ** p < 0.01.

Discussion

Most reviews of the current literature conclude that psychological interventions in patients with FM are relatively limited [8-10]. To improve treatment outcomes, more evidence is needed from experimental and prospective studies that examine the specific cognitive and behavioural mechanisms responsible for the development and maintenance of chronic pain and disability. Such evidence would help treatment providers to develop interventions tailored to a patient's risk profile.

Although considerable research has been conducted to elucidate the vulnerability factors associated with pain-related disability, the role of vulnerability-relevant contextual factors has not been systematically investigated.

The purpose of the present study was to test the role of FM impact in relation to a thinking process that often accompanies, and appears to worsen, the experience of unremitting pain, namely, catastrophising, as a function of stage of chronicity (i.e. number of years since the FM diagnosis). From the current perspective, the influence of catastrophising on FM impact was considered to be variable and dependent on the context (i.e., duration of diagnosis) in which the catastrophising thoughts occur.

Accordingly, the findings of the present study provide preliminary evidence that the psychological correlates of FM impact change over time. Specifically, regression analyses revealed that stage of chronicity moderated the relationship between the PCS subscales and FM impact. In the group of patients who had been diagnosed with FM for fewer than 2 years, rumination accounted for significant unique variance in FM impact. Magnification and helplessness predicted FM impact over and above the variance accounted for pain severity for patients who had been diagnosed for 2-4 years, and helplessness was the strongest predictor of FM impact in the group of patients diagnosed for more than 4 years.

Additionally, results are concordant with what was expected. Patients who have suffered from FM for less than 2 years are characterised by exaggerated threat appraisals (rumination), which may contribute to the development of an overly cautious or fearful approach to physical activity. In patients who have suffered from FM for more than 4 years, helplessness appraisals may accentuate the impact on function These results are also in line with those of previous studies on chronic pain, in which rumination was the best predictor of severity of disability in patients who had been experiencing pain for approximately 3 years [28], and helplessness was the best predictor of severity in patients who had been experiencing pain for approximately 9 years [29].

The present findings suggest that interventions that consider stage of chronicity as a moderator of vulnerability for impact may yield more positive outcomes than standardised approaches to the management of FM. Cognitive therapies should be more focused on specific assessments (threat or helplessness) depending on the context to optimise treatment outcomes These findings also suggest that there is an additional facet to consider with regard to the relationship between catastrophising and FM impact, one that derives from a contextual view of how thoughts will variably influence behaviour dependent upon history, situation and, of course, stage of chronicity.

Finally, it is notable that catastrophising was a stronger predictor of FM impact than pain itself for the three different stages of chronicity and that catastrophising remained constant over time, despite the fact that FM impact increased. These findings suggest that not only is the *type* of intervention important but also the *timing* of treatment. The findings accentuate the significance of early detection and treatment of patients who are at risk of developing FM and related problems [30]. Intervening early in the course of a pain condition may help prevent maladaptive patterns of pain coping and illness behaviours that are resistant to treatment, and it may have the potential to reduce or prevent the negative impacts of FM that, in turn, will reduce societal and medical costs. It follows that early intervention is far more likely to be effective than interventions administered in the later stages of the condition. Psychological treatments that are initiated shortly after a patient has been diagnosed with FM can help prevent long-term dysfunction and chronicity.

As Sullivan has pointed out [21], the results of our study are limited mainly because our correlational methods cannot unambiguously determine whether catastrophising leads to higher levels of FM impact or vice versa. Given the consistent relationship between catastrophising and FM impact, however, it is clear that there are important contextual processes at work. Experimental, longitudinal, or clinical methods are needed to illuminate these processes. A second limitation of this study lies in the accuracy of the chronicity classifications. One of the main difficulties that FM patients face is failure to receive the FM diagnosis until well after the onset of the disease. It is estimated that there is a 3 year delay in the diagnosis of FM in Spain [31]. Therefore, it is possible that some of the subjects in this research who were classified as being in one of the earlier stages of chronicity had actually been suffering from pain for some time previously. A final limitation concerns the recruiting methods; because half of the subjects were recruited from a specialised clinic, the sample as a whole may not be representative of all patients with FM.

Conclusion

The findings of this study highlight the important contribution of contextual factors in prolonging the pain condition, and as such, they have clinical implications for the assessment of FM. The study of contextual determinants of psychological vulnerability will play a role in the development of tailored interventions. Recent developments of Contextual Therapies aimed at pain acceptance have shown that such therapies are relevant in the treatment of chronic pain [32,33]. Based on these preliminary but promising findings, we conclude that if patients with FM were to be subdivided consistent with their distinctive contextual cognitive and behavioural patterns, and if interventions were subsequently modified to match these specific risk profiles, the efficacy of psychological treatment programs could be substantially advanced.

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Authors' contributions

BR, BC and JGC conceived the project. BC and RM performed the clinical diagnosis of fibromyalgia. YLdH, MR and BR collected the data. BR conducted the statistical analysis, and all authors interpreted the results, drafted the manuscript, and read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

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3.4 SEPARATA DEL ARTÍCULO

Validation of the Spanish version of the Chronic Pain Acceptance Questionnaire (CPAQ) for the assessment of acceptance in fibromyalgia.

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HEALTH AND QUALITY OF LIFE OUTCOMES

RESEARCH **Open Access**

Validation of the Spanish version of the Chronic Pain Acceptance Questionnaire (CPAQ) for the assessment of acceptance in fibromyalgia

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Abstract

Background: The aim of this study was to validate a Spanish version of the Chronic Pain Acceptance Questionnaire (CPAQ). Pain acceptance is the process of giving up the struggle with pain and learning to live a worthwhile life despite it. The Chronic Pain Acceptance Questionnaire (CPAQ) is the questionnaire most often used to measure pain acceptance in chronic pain populations.

Methods: A total of 205 Spanish patients diagnosed with fibromyalgia syndrome who attended our pain clinic were asked to complete a battery of psychometric instruments: the Pain Visual Analogue Scale (PVAS) for pain intensity, the Hospital Anxiety and Depression Scale (HADS), the Medical Outcome Study Short Form 36 (SF-36), the Pain Catastrophising Scale (PCS) and the Fibromyalgia Impact Questionnaire (FIQ).

Results: Analysis of results showed that the Spanish CPAQ had good test-retest reliability (intraclass correlation coefficient 0.83) and internal consistency reliability (Cronbach's α: 0.83). The Spanish CPAQ score significantly correlated with pain intensity, anxiety, depression, pain catastrophising, health status and physical and psychosocial disability. The Scree plot and a Principal Components Factor analysis confirmed the same two-factor construct as the original English CPAQ.

Conclusion: The Spanish CPAQ is a reliable clinical assessment tool with valid construct validity for the acceptance measurement among a sample of Spanish fibromyalgia patients. This study will make it easier to assess pain acceptance in Spanish populations with fibromyalgia.

Background

Fibromyalgia is a chronic musculoskeletal pain disorder of unknown aetiology, characterised by widespread pain and muscle tenderness and often accompanied by fatigue, sleep disturbance and depressed mood [1,2]. The prognosis for symptomatic recovery is generally poor, and the estimation for lifetime prevalence is approximately 2% in community samples [3]. The syndrome's pathology is not well understood and, to date, no treatment has proven effective in fully alleviating its symptoms.

In the last decade, "acceptance" has emerged as a valuable construct for contextual or third wave psychotherapies. Although sometimes misinterpreted as surrender [4], the real concept is far from this idea. Acceptance of chronic pain involves the individual reducing unsuccessful attempts to avoid or control pain and focusing instead on participation in valued activities and the pursuit of personally relevant goals [5].

Hayes described, for the first time, a general measure of acceptance and experiential avoidance, the Acceptance and Action Questionnaire [6,7]. The CPAQ was developed by Geiser [8] as an adaptation of this assessment for patients with chronic pain. Subsequent analyses carried

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out by McCracken [5,9,10] critically evaluated the content and factor structure, improving the questionnaire.

Factor analysis of the main tool for measuring acceptance, the Chronic Pain Acceptance Questionnaire (CPAQ), initially reveals 34 items and four components, which are as follows: activity engagement; pain willingness; thought control and chronicity. Based on evaluation of the psychometric properties of these four subscales, however, McCracken et al. [5] reduced the CPAQ to only 20 items and two subscales (activity engagement and pain willingness). A recent confirmatory factor analysis has provided further support for these 20 items and two-factor construct of the CPAQ [11].

The Activity Engagement subscale consists of eleven items and gauges the extent to which a person follows their activities in a normal way regardless of their experience of pain. The Pain Willingness subscale has nine items and measures how much a patient believes that avoiding or controlling pain are strategies that work for him. A total score is reached by combining both subscales. Previous research studies [5,9,12,13] show that acceptance of pain and willingness to act in its presence are associated with reports of lower pain intensity, less pain-related anxiety and avoidance, less depression, less physical and psychosocial disability, more daily uptime and better work status. Contrary to what is expected, pain acceptance does not correlate with pain intensity. The reason for this lack of correlation is that acceptance can be considered as similar to a personality trait, with a normal distribution in the population, and is independent from pain level. Finally, acceptance of pain predicts better adjustment on measures of patient functioning than perceived pain intensity does, which continues to be true even when pain intensity is factored out (see [14,15] for review papers on this subject).

These results imply the potential of an improved outcome for acceptance-based clinical methods for chronic pain management. The CPAQ has already been validated in German [16] and Chinese [17]; however, currently, a measure of acceptance of pain is not available in Spanish. Therefore, we translated the revised version of the CPAQ into Spanish and tested its reliability and validity in Spanish patients suffering from fibromyalgia.

Materials and methods

Participants

Sample size was calculated according to the recommended 10:1 ratio of the number of subjects to the number of test items [18]. The final study sample consisted of 205 patients attending the Pain Clinic (Santander, Spain) and Fibromyalgia Unit (Hospital Miguel Servet, Zaragoza) during the year 2009. To be included in the study, patients had to fulfil the American College of Rheumatology (ACR) criteria for primary fibromyalgia[1], which was diagnosed by a Spanish National Health Service rheumatologist. The only exclusion criterion was a medical or psychiatric disorder that impeded the patient's ability to correctly answer the questionnaire. The study questionnaires and protocol were approved by the Ethical Committee of the regional health authority, and patients signed a consent form attesting to their willingness to participate in the study.

After consenting to the study, recruited patients were given a battery of questionnaires for completion. All patients completed these instruments on the day of the visit. These included a pain form for demographic and pain-related variables, including the translated Spanish version of the CPAQ to be validated, a Pain Visual Analogue Scale (PVAS) for pain intensity, and the validated Spanish versions of the Hospital Anxiety and Depression Scale (HADS), the Short Form 36 (SF 36), the Pain Catastrophising Score (PCS) and the Fibromyalgia Impact Questionnaire (FIQ).

Translation of the CPAQ

Two researchers, who were aware of the objectives of the CPAQ, did the first translation into Spanish. Each researcher translated the questionnaire separately. Subsequently, two native English teachers who had no knowledge regarding the instrument carried out back-translations. Finally the two English versions were judged equivalent by a third native English teacher, [5]. Any differences between the translators were resolved by mutual agreement. Both translators and authors were present at the agreement. The authors read and write technical English and know the psychological construct to be assessed with the questionnaire well. We have followed the usual guidelines for cross-cultural adaptations [19]. The original authors accepted the questionnaire to be translated. They were sent the final version of the paper, and they agree with the results.

Measurement tools

1 Pain Visual Analogue Scale (PVAS)

The PVAS consists of a 10 cm long straight line whose tips represent the limits of pain intensity (none to unbearable). The patients estimated the pain intensity experienced on the same day between 0 and 10.

Chronic Pain Acceptance Questionnaire (CPAQ)

The Chronic Pain Acceptance Questionnaire (CPAQ) is a 20-item inventory designed to measure acceptance of pain. (see additional file 1: Spanish version of CPAQ) [5]. There are two principle factors measured by this questionnaire: activities engagement and pain willingness. All items are rated on a 0 (never true) to 6 (always true) scale. Nine items measuring pain willingness were reverse-keyed. Following the scoring procedure of McCracken et al. [5], a single total score was calculated based on the nine reverse-keyed items and the other eleven items measuring activities engagement. The maximum possible total score is 120, with a higher score indicating better acceptance. Complete information about the scoring calculation is given in the additional file 1: Spanish version of CPAQ.

Hospital Anxiety and Depression Score (HADS)

The HADS [20] is a self-report scale designed to screen for the presence of depression and anxiety disorders in medically ill patients. It is appropriate for use in both community and hospital settings and contains 14 items rated on 4-point Likert-type scale. Two subscales assessed depression and anxiety independently (HADS-Dep and HADS-Anx, respectively). It has been validated in a Spanish sample [21]. This is one of the most used questionnaires for the assessment of depression and anxiety in medical patients. We have used the cut-off point recommended in the validated Spanish version of the HADS [21], which is the same recommended by the original authors [20]: scoring 8+ on both the anxiety and depression scales. A cut off of 8 or more in HADS means suspected depression or anxiety.

Medical Outcome Study Short Form 36 (SF-36)

The Medical Outcome Study Short Form 36 (SF-36) is a 36-item instrument designed to measure general health status and health-related quality of life [22]. One item assesses perceived change in health status, while 35 items examine eight generic domains in both physical and mental health. The 8 domains include Physical Function (PF), Physical Role (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Function (SF), Emotional Role (RE) and Mental Health (MH). Scores on each subscale range from 0 to 100, with higher scores indicating better health status. The Spanish version of SF-36 has been shown to be reliable with good construct validity [23].

Pain Catastrophising Scale (PCS)

The PCS is a 13-item scale designed to assess the catastrophising cognitions of individuals by asking them to reflect on thoughts or feelings associated with present painful experiences [24]. The PCS can be subdivided into three subscales: rumination, magnification and helplessness. Each item is scored from 0 (not at all) to 4 (always), and scores range from 0 to 52. It has good temporal stability, internal consistency and validity. The Spanish version of the PCS has been validated by our team showing similar results to the original questionnaire [25]. Only the total score of the PCS was used in this investigation.

Fibromyalgia Impact Questionnaire (FIQ)

The Fibromyalgia Impact Questionnaire (FIQ) is a 10-item self-report questionnaire developed to measure the health status of fibromyalgia patients [26]. The first item focuses on the patient's ability to carry out muscular activities. In the next two items, patients are asked to circle the number of days in the past week they felt good and how often they missed work. Finally, the last seven questions (ability to work, pain, fatigue, morning tiredness, stiffness, anxiety and depression) are measured with the visual analogue scale. This instrument has a translated and validated Spanish version [27].

Validation process

Patients diagnosed with fibromyalgia, fulfilling the criteria previously described, who attended our clinics during the year 2009 were invited to participate until the expected sample was completed. In a subsample of 64 patients, test-retest reliability for a 2-week interval was calculated. Face validity was assessed asking patients from the Spanish Association of Fibromyalgia whether they thought that the test could adequately measure their pain acceptance. Construct validity was determined by correlating the Spanish CPAQ scores to validated Spanish versions of various psychometric instruments and comparing the results with those obtained from the original English version. As the FIQ, HADS and PCS reflect health status, mood changes and emotional distress (catastrophising) in fibromyalgia patients, we anticipated that higher CPAQ scores would be associated with lower FIQ, HADS and PCS scores. For patients' general health wellbeing, including physical, emotional and social functions, the SF-36 is able to measure these domains under eight different subscales. We predicted that acceptance, as measured by the CPAQ, should positively correlate to SF-36 subscales. Exploratory factor analysis was carried out as part of the validity test.

Statistics

Demographic data was analysed using the descriptive statistics of mean, standard deviation (SD) and range. Age and duration of pain were used as continuous variables. The remaining variables were used as dichotomous ones. The dichotomised categories and their prevalence for each variable are as follows: gender was dichotomised into male and female; marital status was grouped into married and single/separated/widowed; work status was divided into employed and unemployed and educational level was dichotomised into elementary/primary and secondary/tertiary. The CPAQ correlations were established with female, married, employed and secondary educational level.

The association between the Spanish CPAQ and demographic characteristics were evaluated using Pearson correlations. Cronbach's α coefficient was used to examine the internal consistency (ideally, α should range between 0.7-0.9) of the questionnaire. Test-retest reliability was assessed using analysis of variance intraclass correlation coefficients (ICC) [28]. ICC will range between 0 and 1, with values approaching 1 representing good reliability. Pearson correlations were also used to assess the relationship between CPAQ scores and other psychometric variables, such as pain intensity, anxiety, depression, pain catastrophising, health status and social functioning, as measured by various Spanish versions of the instruments. Finally, principle components analysis with varimax rotation was used to analyse the factorial structure of the Spanish version of CPAQ. All the variables studied showed a normal distribution. All statistical analyses were conducted using the Statistical Package for Social Science version 15.0 (SPSS 15.0) for Windows.

Results

None of the participants were ruled out because of the exclusion criteria. The study sample consisted of 205 patients (90.7% women and 9.3% men) between the ages of 26 and 77 years (mean 50.0 years, SD: 9.7 years). Each of the subjects described themselves as being of European ethnic origin. On average, the patients had suffered from fibromyalgia for 12.1 years (range 1-55 years), and 25.2% had been granted a disability pension. Two-thirds (65.7%) of patients were unemployed, whereas 34.3% of patients were employed full- or part-time. The majority of the participants were married (73.6%), while the rest were single/separated/widowed (26.4%) individuals. Finally, most participants had an elementary-primary education (59%), while 41% had received a secondary-tertiary education.

The mean CPAQ total score was 40.9 (SD 18.5, range 5-102). This amounted to a mean item rating of 2.0, which most closely corresponds with the lower range of the 0-6 scale and the rating category "Seldom true" for the average acceptance item. The mean for the subscales of activity engagement and pain willingness were 23.0 (SD 14.2, range 0-59) and 18.1 (SD 9.7, range 0-53), respectively. The scores for other instruments are summarised in Table 1.

There was no significant association between CPAQ total score and most demographic characteristics, including age, sex, marital status, duration of pain or education level. However, work status (r = 0.140, P = 0.056) was almost correlated to CPAQ, suggesting that there might be an association (Table 2).

Table 1: Mean and SD of Scores of the Spanish Versions of Various Instruments (N = 205)

Instruments	Mean	SD
CPAQ (0-120)	40.9	18.5
Activity engagement subscale (0-66)	23.0	14.2
Pain willingness subscale (0-54)	18.1	9.7
PVAS (0-10)	7.9	1.5
HADS-anx (0-21)	12.2	4.3
HADS-dep (0-21)	11.2	4.7
PCS-total (0-52)	32.4	12.8
FIQ (0-100)	72.0	16.4
SF36-PF (0-100)	34.1	21.4
SF36-RP (0-100)	7.4	21.4
SF36-BP (0-100)	19.2	16.2
SF36-GH (0-100)	24.8	14.3
SF36-VT (0-100)	15.6	15.1
SF36-SF (0-100)	35.2	24.2
SF36-RE (0-100)	24.0	38.9
SF36-MH (0-100)	38.3	20.2

For assessing face validity a sample of patients (N = 200) randomly recruited from the Spanish Association of Fibromyalgia were asked whether they thought that the test could adequately measure their pain acceptance. A total of 93.5% (187 out of 200) of them agreed.

The overall ICC value was 0.83 with individual values (Table 3) ranging from 0.32 (item 20) to 0.88 (item 2). Regarding the two subscales of the CPAQ, test-retest reliability values are as follows: Activity engagement (ICC: 0.85; 95% CI: 0.81-0.89) and Pain willingness (ICC: 0.82; 95%CI: 0.79-0.86). Cronbach's α for the CPAQ was 0.83. The item-total correlations for most items were moderate (mean 0.406, SD 0.213). Communalities ranged from 0.169 (item 7) to 0.633 (item 1). The Scree Plot (Figure 1) indicated that a two-factor solution was optimal. Both

Table 2: Associations between the Spanish version of the CPAQ and demographic parameters.

Demographic parameters	Association	Significance
Age	0.025	*P = 0.736*
Sex	0.103	*P = 0.160*
Marital Status	0.186	*P = 0.321*
Education level	0.162	*P = 0.422*
Duration of pain	-0.042	*P = 0.591*
Work status	0.140	*P = 0.056*

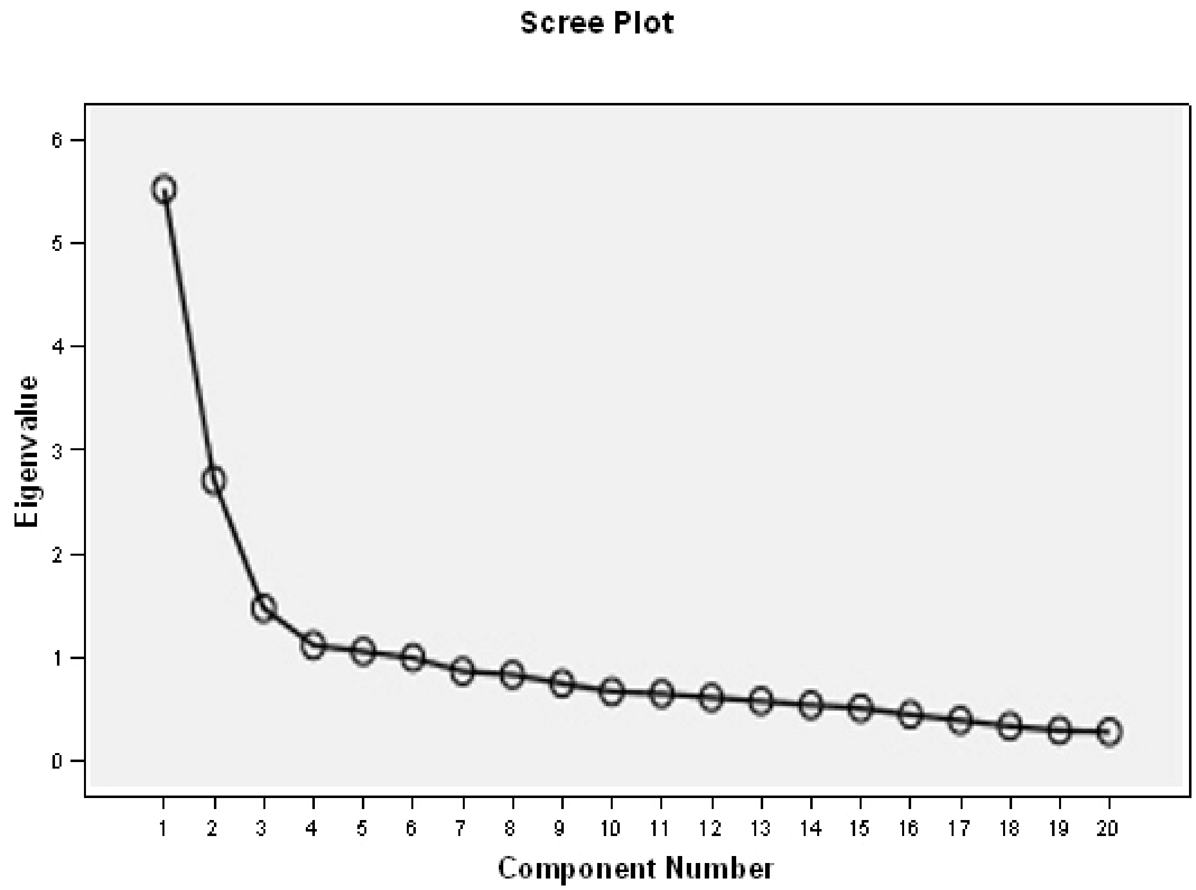

Figure 1 Scree Plot indicates an optimal two-factor solution for the Spanish version of CPAQ.

factors had eigenvalues greater than one. Principal components analysis with Varimax Rotation revealed a satisfactory percentage of Total Variance explained by the two factors 27.4% and 13.4%, respectively (Table 4), as well as a corresponding Component Matrix (Table 5). These values are consistent with the original model of McCracken et al. [5] and subsequent studies [11,17], providing further support for the two-factor CPAQ.

The Pearson correlation was used to assess the relationship between CPAQ and other psychometric instruments, and the results are summarised in Table 6. The CPAQ total score and the subscale for activity engagement were significantly correlated with all of the other psychometric instruments, including the VAS, HADS, PCS, FIQ and SF36. Whereas the subscale for pain willingness was only significantly correlated to certain scales.

Discussion

The psychometric properties of the Spanish version of the CPAQ among patients with fibromyalgia patients are adequate. The Scree plot indicated a two-factor construct of the translated questionnaire similar to its original English version. Both factors had eigenvalues greater than one. Principal Components with Varimax Rotation revealed a satisfactory percentage of Total Variance explained (40.7%) by the two factors. Looking at the Component Matrix of the two-factor construct, individual items could be allocated to the same subscales as they were in the English version of the CPAQ. Therefore, construct validity of the translated CPAQ can be supported.

We have selected a two-factor solution, although it was not the only possible solution. More than two factors had eigenvalues above 1, and the Scree plot was not absolutely clear in supporting this decision. We have selected this solution because it seems the more coherent from a clinical point of view. This is the same factor structure obtained by both the original authors [5] and the German and Cantonese validations previously carried out [16,17]. This has been defended by many other studies on pain acceptance [29-33]. We are currently carrying out a confirmatory factor analysis in a different population of patients with fibromyalgia, and preliminary results also seem to support this two-factor solution.

Table 3: Item Means and SD, Intraclass Correlations (ICC) with 95% Confidence Interval (CI), Item-total correlations, Cronbach's α if item deleted for Spanish version of CPAQ (N = 205)

Item no.	Mean	SD	ICC (95% CI)	Item-total correlation	Cronbach's α if item deleted
1	2.4	1.9	0.83 (0.73-0.90)	0.592	0.81
2	2.1	1.7	0.88 (0.80-0.92)	0.583	0.81
3	1.7	1.8	0.72 (0.55-0.83)	0.480	0.82
4	1.9	1.8	0.56 (0.27-0.73)	0.367	0.82
5	1.9	1.9	0.54 (0.25-0.72)	0.415	0.82
6	2.1	1.8	0.82 (0.72-0.89)	0.566	0.81
7	2.5	2.0	0.61 (0.36-0.76)	0.164	0.83
8	2.2	1.8	0.75 (0.60-0.85)	0.488	0.81
9	1.7	1.7	0.85 (0.76-0.91)	0.554	0.81
10	2.1	1.9	0.64 (0.41-0.78)	0.495	0.81
11	2.5	2.1	0.81 (0.69-0.88)	0.241	0.83
12	2.4	1.9	0.65 (0.42-0.79)	0.395	0.82
13	2.1	2.0	0.47 (0.12-0.67)	0.197	0.83
14	2.1	1.9	0.52 (0.22-0.71)	0.312	0.82
15	1.9	1.8	0.80 (0.67-0.88)	0.531	0.81
16	2.3	2.0	0.65 (0.42-0.78)	0.126	0.83
17	1.7	1.8	0.60 (0.34-0.75)	0.401	0.82
18	1.6	1.9	0.59 (0.32-0.75)	0.378	0.82
19	2.0	1.9	0.69 (0.49-0.81)	0.509	0.81
20	1.3	1.7	0.32 (0.12-0.59)	0.339	0.82

Overall ICC was 0.83 (95% confidence interval: 0.79-0.86)
Cronbach's α of the total score was 0.83

The Spanish version of the CPAQ showed good test-retest reliability (overall ICC 0.83 with 95% CI 0.79-0.86) and internal consistency reliability (Cronbach's α 0.83). Items n° 13 and 20 showed lower test-retest reliability than the other items (ICC < 0.5). In the original McCraken study, these data are not available [5], and in the Chinese validation study [17], ICC values are higher than 0.5 (item 13: 0.55 and item 20: 0.76). Both items belong to the subscale "Acceptance of pain". We are not sure why the test-retest reliability was low, but we suggest that cultural factors may play a role. Many Spanish pain patients have a quite passive viewpoint of pain and consider pain difficult to control by will power alone.

As tends to happen in fibromyalgia surveys, the SF-36 scores were below average. In this case, the average total score for CPAQ in this fibromyalgia group (mean 40.9 with SD of 18.5) was lower than other samples, where usually the mean is around 50 [12,13,16,17]. Statistical analysis showed that greater acceptance of pain and activity participation were associated with lower reported pain intensity, less anxiety, depression and emotional distress, as well as worse general health status and health-related quality of life (measured with the SF-36). These findings were in concordance with reports from previous studies [5,12,13]. It is also remarkable that the FIQ, a questionnaire specifically designed for fibromyalgia patients to measure health status, showed the highest correlation with the CPAQ, indicating how important acceptance is in predicting the impact of fibromyalgia. As far as we know, there are no acceptance studies among fibromyalgia patients using these scales, thus, it was not possible to compare our results.

Regarding demographic data, the variable duration of pain has received special attention, as it may indicate that acceptance of chronic pain is in some way a product of experience or something acquired over time. In fact, one recent work showed a positive correlation between the CPAQ and duration of pain [17]. However, in our research, as in the majority of studies, no correlation with duration of pain was found, suggesting that the length of time a person has suffered from pain may not account for whether a person is accepting of pain or not. Further studies may be required to clarify the factors contributing to such discrepancies.

Table 4: Forced two-factor solution by Principal Items Loading and Varimax Rotation for the Spanish version of the CPAQ (N = 205).

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	5.480	27.400	27.400	5.480	27.400	27.400	5.284	26.421	26.421
2	2.675	13.377	40.778	2.675	13.377	40.778	2.871	14.356	40.778
3	1.441	7.205	47.983						
4	1.086	5.429	53.412						
5	1.026	5.131	58.543						
6	.965	4.827	63.370						
7	.834	4.170	67.540						
8	.802	4.010	71.550						
9	.716	3.581	75.131						
10	.638	3.191	78.322						
11	.619	3.096	81.418						
12	.580	2.898	84.317						
13	.547	2.735	87.051						
14	.509	2.547	89.598						
15	.478	2.392	91.990						
16	.417	2.084	94.075						
17	.362	1.809	95.884						
18	.307	1.533	97.416						
19	.265	1.324	9.740						
20	.252	1.260	100.000						

These study results concurred with our prediction and supported the content validity of the Spanish version of the CPAQ. In the future, the Spanish CPAQ could help to illustrate treatment mechanisms. To reach this goal, the next step would be to assess the responsiveness of the CPAQ to intervention. Further research with longitudinal designs and multivariate models would be required to investigate treatment mechanisms.

As McCracken has already pointed out [5], the results of our study are limited because correlation methods cannot unambiguously determine whether acceptance leads to decreased levels of disability and distress or vice versa. Given the consistent relationship between acceptance and these measures, however, we would suggest that there are important behavioural processes at work. Experimental, longitudinal or clinical methods are needed to illuminate these processes. Finally, another possible limitation could be that the sample was recruited from a specialised clinic and, thus, may not be representative of all patients with fibromyalgia. This could be the reason for the lower CPAQ scores in this sample.

These findings hold potentially significant implications for the treatment of patients with fibromyalgia and chronic pain at a time in psychology when the usefulness of traditional, control-based approaches is under question. The increasingly popular Contextual Therapies approach proposes that attempting to control negatively valenced internal events, such as pain sensations and negative emotional reactions, is problematic. For example, from the Acceptance and Commitment Therapy (ACT) perspective, attempts to control aversive experiences are, in the best case, an unproductive endeavour that can hinder the pursuit of valued experiences or, in the worst case, an additional source of distress [34]. Experimental data suggest that some common control-based strategies to manage acute pain may be detrimental to functioning and adaptation [35,36]. Existing psychological treatments for chronic pain, such as ACT [37] or specific contextual therapy for chronic pain [38], aim to increase pain patients' pain acceptance on multiple levels.

Finally, in order to prevent misunderstandings, it should be noted that acceptance of chronic pain is but

Table 5: Two-factor solution: Factor Loadings by Principal Components Analysis on Items of the Spanish version of the CPAQ (N = 205).

	Factor Loadings		Communalities
Summary Item Content	**1**	**2**	
Q1 = I am getting on with the business of living no matter what my level of pain is	**.796**	.006	.633
Q2 = My life is going well, even though I have chronic pain	**.747**	.076	.564
Q6 = Although things have changed, I am living a normal life despite my chronic pain	**.739**	.057	.549
Q8 = There are many activities I do when I feel pain	**.706**	-.022	.499
Q9 = I lead a full life even though I have chronic pain	**.702**	.125	.508
Q19 = It's a relief to realise that I don't have to change my pain to get on with my life	**.686**	.043	.473
Q15 = When my pain increases, I can still take care of my responsibilities	**.674**	.101	.464
Q3 = It's OK to experience pain	**636**	.088	.412
Q10 = Controlling pain is less important than other goals in my life	**.619**	.108	.394
Q12 = Despite the pain, I am now sticking to a certain course in my life	**.593**	-.061	.355
Q5 = It's not necessary for me to control my pain in order to handle my life well	**.560**	.042	.316
Q20 = I have to struggle to do things when I have pain	.095	**.664**	.450
Q18 = My worries and fears about what pain will do to me are true	.140	**.662**	.458
Q14 = Before I can make any serious plans, I have to get some control over my pain	.062	**.620**	.388
Q13 = Keeping my pain level under control takes first priority whenever I'm doing something	-.041	**.549**	.303
Q11 = My thoughts and feelings about pain must change before I can take important steps in my life	.011	**.533**	.284
Q16 = I will have better control over my life if I can control my negative thoughts about pain	-.150	**.528**	.302
Q17 = I avoid putting myself in situations where my pain might increase	.269	**.528**	.351
Q4 = I would gladly sacrifice important things in my life to control this pain better	.218	**.483**	.281
Q7 = I need to concentrate on getting rid of my pain	-.032	**.410**	.169

(Items sorted according to loadings by factor and size for easier comprehension.)
The bold numbers (items) belong to the respective factor.

Table 6: Correlation between Spanish version of CPAQ scores (total and subscales) and other Spanish instruments.

Instruments	Correlation (T)	Correlation (AE)	Correlation (PW)
VAS	-0.446 **	-0.427 **	-0.306 **
HADS-anx	-0.447 **	-0.456 **	-0.210 **
HADS-dep	-0.503 **	-0.605 **	-0.093
PCS-total	-0.461 **	-0.388 **	-0.344 **
FIQ	-0.603 **	-0.649 **	-0.231**
SF36-PF	0.397 **	0.415 **	0.169*
SF36-RP	0.248 **	0.298 **	0.056
SF36-BP	0.394 **	0.495 **	0.068
SF36-GH	0.438 **	0.410 **	0.239**
SF36-VT	0.395 **	0.381 **	0.197**
SF36-SF	0.450 **	0.526 **	0.101
SF36-RE	0.388 **	0.386 **	0.187**
SF36-MH	0.390 **	0.415 **	0.098

* Significant: P < 0.05
** Significant: P < 0.01
T = Total score of Spanish version of CPAQ
AE = Activity Engagement subscale of Spanish version of CPAQ
PW = Pain Willingness subscale of Spanish version of CPAQ

one part of a contextual model of chronic pain and its treatment. Other relevant processes include, among others, present-focused awareness, values-based guidance of actions and cognitive defusion. It will be interesting to continue to explore the influence of these processes on patient functioning.

In conclusion, the study confirms the adequate psychometric properties of the Spanish version of the CPAQ in fibromyalgia patients. Although acceptance is considered to be one of the key processes of recovery in pain syndromes, there have been hardly any studies in our country to enhance our knowledge of this concept. This study will make it easier to assess acceptance in Spanish populations.

Additional material

Additional file 1 Spanish version of the CPAQ.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

BR, JGC, BC and ASS conceived the study design. BC performed the clinical diagnosis of fibromyalgia. YLdH and BR collected the data. BR and JVL conducted the statistical analysis, and all authors interpreted the results, drafted the manuscript and read and approved the final manuscript.

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3.5 SEPARATA DEL ARTÍCULO

Relationship between behavioural coping strategies and acceptance in patients with fibromyalgia syndrome: elucidating targets of interventions.

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Relationship between behavioural coping strategies and acceptance in patients with fibromyalgia syndrome: Elucidating targets of interventions

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Abstract

Background: Previous research has found that acceptance of pain is more successful than cognitive coping variables for predicting adjustment to pain. This research has a limitation because measures of cognitive coping rely on observations and reports of thoughts or attempts to change thoughts rather than on overt behaviours. The purpose of the present study, therefore, is to compare the influence of acceptance measures and the influence of different behavioural coping strategies on the adjustment to chronic pain.

Methods: A sample of 167 individuals diagnosed with fibromyalgia syndrome completed the Chronic Pain Coping Inventory (CPCI) and the Chronic Pain Acceptance Questionnaire (CPAQ).

Results: Correlational analyses indicated that the acceptance variables were more related to distress and functioning than were behavioural coping variables. The average magnitudes of the coefficients for activity engagement and pain willingness (both subscales of pain acceptance) across the measures of distress and functioning were $r = 0.42$ and 0.25, respectively, meanwhile the average magnitude of the correlation between coping and functioning was $r = 0.17$. Regression analyses examined the independent, relative contributions of coping and acceptance to adjustment indicators and demonstrated that acceptance accounted for more variance than did coping variables. The variance contributed by acceptance scores ranged from 4.0 to 40%. The variance contributed by the coping variables ranged from 0 to 9%.

Conclusions: This study extends the findings of previous work in enhancing the adoption of acceptance-based interventions for maintaining accurate functioning in fibromyalgia patients.

Background

Fibromyalgia (FM) syndrome is a chronic rheumatologic disorder of unknown aetiology that affects between 2 and 4% of the general population [1]. Some environmental familial factors, such as learned strategies for coping with problems in life, have been pointed to as intrinsic parts of the pathogenesis of fibromyalgia [2]. The traditional approach to treatment typically focuses on symptom reduction through medical management or self-management approaches, often within the context of multidisciplinary pain management programs [3].

Behavioural and cognitive-behavioural treatments, which are included in these programs, are based on the idea that modifying an individual's responses to his or her condition will reduce disability and suffering from chronic pain. Researchers had paid attention to the fact that although chronic pain could lead to dysfunction among some individuals, others seem to adjust relatively well to the ongoing experience of pain; additionally, these researchers tried to identify the factors that

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promote adaptive functioning in the face of pain. Along these lines, a great deal of research has examined the range and efficacy of patients' "coping" strategies [4]. It has been assumed that an individual's choice of coping strategies will determine his or her adjustment to chronic pain, and research has focused largely on identifying healthy strategies. Unfortunately, research using coping strategies has more readily identified detrimental–rather than specific and adaptive–coping responses. For example, coping responses such as guarding or resting have often shown a strong positive association with disability and distress [5,6].

Therefore, researchers and clinicians have begun to embrace emerging psychological theories that discuss acceptance in relation to the effects of aversive thoughts, moods, or sensations. Acceptance-based interventions attempt to teach clients to feel emotion and bodily sensations more fully and without avoidance and to notice the presence of thoughts without following, resisting, believing, or disbelieving them [7]. However, it is understood that experiential avoidance is a process in which an individual attempts to change the form or frequency of a private event that he or she is unwilling to experience. Although experiential avoidance might be effective in the short term, in the long term, it seriously limits quality of life. Most of the actions of patients with chronic pain are aimed at avoiding painful sensations and emotions as well as thoughts or memories associated with pain, but paradoxically, as has been widely documented [8,9], avoidance behaviour leads to disability.

A great deal of research supports the role of pain acceptance in the daily functioning of people with chronic pain. In clinical samples, the acceptance of pain is associated with less pain, distress and disability [10-12] and with greater psychological wellbeing [13]. In treatment outcome studies, acceptance-based methods are associated with improved emotional, psychosocial and physical functioning and with reduced healthcare use [14-17].

The traditional medical approach uses strategies (e.g., encouraging wellness-focused strategies and discouraging illness-focused strategies) [18] to alleviate or avoid symptoms. In contrast, acceptance-based interventions, rather than attempt to eliminate unwanted experiences, help the individual to identify valued directions, start to act in those directions and, thus, to follow a meaningful life. For this purpose, patients are taught how to make willing contact with and tolerate the experience of pain or other distressing events that might appear, without attempts to control them [19]. Coping with pain is directly trying to change pain, and what the person feels and thinks about pain. Acceptance of pain is directing efforts towards functioning and living; acceptance is "coping" with life.

McCracken and Eccleston [20,21] each found that acceptance of pain accounted for much more variance in measures of patient functioning–including disability, work status, depression and pain-related anxiety–than did a measure of cognitive strategies. Both studies used the Coping Strategies Questionnaire (CSQ) [22]; however, the CSQ has been observed to be more heavily weighted towards the measurement of cognitive rather than behavioural coping strategies, and this represents a limitation [23]. Cognitive coping instruments depend on patient memory to gauge accurately what the patient usually does to cope. It is possible that patients may place more weight on their most recent coping efforts when rating their "usual" coping responses. Memory is also mood-dependent, and because pain can influence mood, it can likewise affect memory [24]. To deal with these concerns, the utilisation of measures of behavioural coping efforts that are readily observable, such as rest, medication or exercise, is highly recommended.

The primary aim of this study was to replicate and extend the findings of previous studies using the Chronic Pain Coping Inventory (CPCI) [18], which is an inventory that is focused on behavioural strategies. In addition to having been validated in a sample of Spanish patients with fibromyalgia [25], this questionnaire has explained unique and significant variance in measures of adjustment when compared to the CSQ [6,26]. It was expected that the acceptance-based measures would continue to show greater utility in comparison with the behavioural coping strategies in predicting important aspects of patient distress and functioning. Furthermore, the CPCI will allow us to observe differences between acceptance and behavioural strategies and to elucidate the targets of intervention in pain management.

Methods

Settings and Participants

The study sample consisted of 167 patients who were recruited from the 41 primary healthcare centres in the city of Zaragoza, Spain, during the year 2010.

To be included in the study, patients were required to fulfil several inclusion criteria: (1) be between 18 and 67 years old; (2) be able to understand and read Spanish; (3) meet the American College of Rheumatology criteria for primary FM [1]; and (4) have been diagnosed by a Spanish National Health Service rheumatologist. Exclusion criteria included the following: (1) diagnosis with a severe Axis I psychiatric disorder (dementia, schizophrenia, paranoid disorder, or abuse of alcohol and/or drugs) or a severe Axis II disorder (personality disorder) that, from the clinician's point of view, might prevent them from following the study protocol; and (2) refusal to participate. The study questionnaires and protocol were approved by the Ethical Committee of the regional health authority, and the patients signed a consent form attesting to their willingness to participate.

Measures

Demographic and Pain-Related Variables

Each participant was interviewed and provided information about a number of demographic and pain-related variables including age, work status, time diagnosed with FM, medications and other medical treatments.

Visual Analogue Scale (VAS)

The Visual Analogue Scale (VAS) consists of a 10 cm long straight line whose extremities represent the limits of pain intensity (from none to unbearable). Patients estimated the pain intensity experienced between 0 and 10 at the time that they were interviewed.

Physical symptoms

The number of comorbid physical symptoms was obtained from a standardised symptom checklist [27]. This self-report checklist instructs participants to indicate whether they experienced each of the 75 symptoms for at least 3 months over the past year. A score was obtained by totalling the affirmative responses to all 75 symptoms. Sample symptoms include dry eyes, shortness of breath, dizziness, irregular heartbeat, tingling in the extremities, urinary urgency, and coughing spells.

Chronic pain acceptance questionnaire (CPAQ)

The Chronic Pain Acceptance Questionnaire (CPAQ) is a 20-item inventory designed to measure the acceptance of pain [12]. There are two principal factors measured by this questionnaire: activities engagement and pain willingness. All items are rated on a 0 (never true) to 6 (always true) scale. Nine items measuring pain willingness were reverse-keyed. Following the scoring procedure, a single total score was calculated based on the nine reverse-keyed items and the other eleven items measuring activities engagement. The maximum possible total score is 120, with a higher score indicating better acceptance. The Spanish version of the CPAQ showed sound psychometric properties (α = 0.79-0.86) and good test-retest reliability (intraclass correlation coefficient 0.83) [28].

The Chronic Pain Coping Inventory - 42 (CPCI-42)

The Chronic Pain Coping Inventory (CPCI) [18] was originally a 65-item self-report questionnaire; based on recent analyses, it has been shortened to 42 items [29]. It asks patients to rate the frequency of use of behavioural and cognitive strategies over the previous week. It has the same CPCI-65 strategies, which are grouped into the following eight subscales: Guarding, Resting, Asking for Assistance, Relaxation, Task Persistence, Exercise/Stretch, Seeking Social Support and Coping Self-Statements. This instrument was translated and validated into Spanish by our team. Reliability coefficients were adequate based on the current data (α = 0.65-0.82) and test-retest reliability (intraclass correlation coefficient 0.76) [25].

Hospital Anxiety and Depression Score (HADS)

The HADS [30] is a self-report scale designed to screen for the presence of depression and anxiety disorders in medically ill patients. It is appropriate for use in both community and hospital settings and contains 14 items rated on 4-point Likert-type scales. Two subscales assess depression and anxiety independently. The HADS has been validated in a Spanish sample [31] and has demonstrated good reliability and validity. The test-retest reliability presented correlation coefficients above 0.85, and the internal consistency showed satisfactory coefficients α = 0.86 (anxiety) and α = 0.86 (depression).

Medical Outcome Study Short Form 36 (SF-36)

The Medical Outcome Study Short Form 36 (SF-36) is a 36-item instrument designed to measure general health status and health-related quality of life [32]. One item assesses perceived change in health status, while 35 items examine eight generic domains in both physical and mental health. The eight domains include Physical Function, Physical Role, Bodily Pain, General Health, Vitality, Social Function, Emotional Role and Mental Health. Scores in each subscale range from 0 to 100 with higher scores indicating better health status. The Spanish version of SF-36 has been shown to be reliable with good construct validity (α = 0.78-0.96) [33].

Fibromyalgia Impact Questionnaire (FIQ)

The Fibromyalgia Impact Questionnaire (FIQ) is a 10-item self-report questionnaire developed to measure the health status of fibromyalgia patients [34]. The first item focuses on the patient's ability to perform functional activities. In the next two items, patients are asked to circle the number of days in the past week that they felt good and the number of days that they missed work. Finally, the last seven questions (ability to work, pain, fatigue, morning tiredness, stiffness, anxiety, and depression) are measured with the visual analogue scale. This instrument has a translated and validated Spanish version [35] that showed good psychometric properties (α = 0.82-0.86) and good test-retest reliability (intraclass correlation coefficient 0.74) [28].

Statistical methods

Sample size

The sample size was calculated based on the population that suffers from FM in the region of Aragon, which according to previous studies [1] can be estimated in 36,000 patients out of a total of 1,200,000 inhabitants that live in Aragon. With a confidence level of 95% and an estimated error of 5% based on previous studies [20,21], a sample of 167 patients was necessary for an adequate power calculation [36]. EPIDAT 3.1 was used to calculate the sample size.

Analysis strategy

Prior to analyses, a factor analysis was performed to determine if there was any overlapping between scales. Results suggested excluding four SF-36 subscales: first, the Physical Role and Bodily Pain subscales and, second, the Emotional Role and Mental Health subscales because of their overlap with the FIQ and HADS scales, respectively. Next, to compare and contrast our results, we followed the same steps as McCracken and Eccleston's previous papers [20,21]. First, a correlation analysis with the Bonferroni correction (α= 0.05/n) was used to assess the relationship among acceptance subscales, coping scores, and measures of pain and functioning [37]. Additionally, Cohen's criteria [38] were taken into account to evaluate the substantive significance of correlations (large correlations are those > 0.50, medium correlations are from 0.30 to 0.49, and small correlations are from 0.10 to 0.29). Then, two sets of hierarchical regression analyses were performed to investigate combined and unique relations of acceptance and coping scores with measures of functioning. The criterion variables included pain, number of symptoms, FM impact, general health, vitality, anxiety, depression and physical and social functioning. In the first set of analyses, the eight coping variables were tested as predictors for entry at the predictive model, and then the two acceptance scores were tested for entry *(p* <0.05 to enter, p > 0.10 to remove). In the second set of analyses, the order of entry was reversed; first, the acceptance scores were tested for entry, and then the coping scores were tested. Together, this regression method is designed to show which variable set accounts for the largest increment of unique variance in the measures of pain and functioning. Condition indices were inspected to flag excessive collinearity in the data (a condition index over 30 suggests serious collinearity problems). All statistical analyses were performed using the SPSS 15 statistical package.

Results

Characteristics of the participants

The study sample consisted of 167 patients (90.4% women and 9.6% men), aged 19 - 67 years (50.6 years, SD = 9.9 years); all of them were self-described as from the Caucasian ethnic group. On average, the patients had been suffering from fibromyalgia for 12.3 years (range 1 - 40 years), and 19.7% had been granted an invalidity pension.

Correlational analyses between study measures

Results from correlational analyses of acceptance subscales, coping scores, and measures of pain and functioning are shown in Table 1.

Both acceptance scores were correlated with task persistence but negatively correlated with guarding, resting and asking for assistance. Furthermore, pain willingness was negatively correlated with relaxation and seeking social support.

The acceptance subscales were significantly correlated with almost all nine of the measures of pain and functioning in the expected direction. The average magnitudes of the coefficients for activity engagement and pain willingness across the measures of distress and functioning were r = 0.42 and 0.25, respectively.

Forty-three out of 71 of the correlations between the coping scores and measure of pain and functioning were significant, at p < 0.05. The average magnitude of the significant correlation was r = 0.17. Guarding, resting and asking for assistance were reliably associated with poorer functioning in nine out of nine measures including greater pain, number of symptoms, anxiety and depression. Seeking social support was also related to greater problems with functioning, reaching significance in four out of nine measures. In only 10 out of 71 instances did coping scores corre-late with measures of distress and functioning in a way that suggested a positive relationship. Task persistence was associated with better functioning in eight out of nine measures. Coping self-statements were associated with two out of nine measures. Contrary to our expectations, exercise/stretch did not show any correlation with the diverse variables, and relaxation was associated with a greater number of symptoms and worse physical functioning.

After the Bonferroni correction for multiple tests, fifty-one correlations still remained significant. Forty-six of these correlations fulfil the most stringent criteria used (p= 0.00069; 0.05/72). Within this criterion, it is noteworthy that there were sixteen out of 19 possible correlations between the acceptance scores and measure of pain and functioning, which demonstrate the importance of the acceptance measures. Only four correlations met with the second corrected p-value (p= 0.0028; 0.05/18), and, finally, only one correlation complied with the less stringent criteria (p= 0.003125; 0.05/16).

Hierarchical regression analyses

Table 2 shows the results of the first set of regression analyses. Resting and task persistence showed significant contributions to six of the nine regression equations. Guarding made significant contributions to four of the nine regression equations, coping self-statements and relaxation contributed to two, and exercise and seeking social support contributed to one. In general, resting predicted greater pain, fibromyalgia impact, anxiety, and depression and predicted worse vitality and social functioning. Guarding predicted a greater impact on general function and worse general health and physical and social functioning. Relaxation predicted a greater number of symptoms and worse general health. However,

Table 1 Correlations of Acceptance scales and Coping strategies with Pain, Number of symptoms, Fibromyalgia impact, General health, Anxiety and Depression (*N* = 167)

	Activity engagement	Pain willingness	Pain (VAS)	Number of symptoms	Physical functioning	General health	Vitality	Social functioning	Fibromyalgia Impact	Anxiety	Depression
Acceptance-measures											
Activity engagement			-0.42^{**c}	-0.20**	0.44^{**c}	0.41^{**c}	0.33^{**c}	0.50^{**c}	-0.62^{**c}	-0.42^{**c}	-0.53^{**c}
Pain willingness	0.28^{**c}		-0.32^{**c}	-0.14	0.34^{**c}	0.35^{**c}	0.28^{**c}	0.17*	-0.32^{**c}	-0.31^{**c}	-0.27^{**c}
Coping strategies											
Guarding	-0.42^{**c}	-0.29^{**c}	0.28^{**c}	0.16*	-0.46^{**c}	-0.30^{**c}	-0.34^{**c}	-0.35^{**c}	0.49^{**c}	0.25^{**b}	0.28^{**c}
Resting	-0.45^{**c}	-0.37^{**c}	0.34**	0.22**	-0.29^{**c}	-0.28^{**c}	-0.39^{**c}	-0.39^{**c}	0.54^{**c}	0.35^{**c}	0.41^{**c}
Asking for assistance	-0.35^{**c}	-0.19*	0.23^{**a}	0.15*	-0.33^{**c}	-0.24^{**b}	-0.33^{**c}	-0.18*	0.42^{**c}	0.17*	0.22**
Relaxation	-0.06	-0.25^{**b}	0.01	0.30^{**c}	-0.18*	-0.14	-0.07	-0.14	0.10	0.05	-0.02
Task persistence	0.49^{**c}	0.17*	-0.34^{**c}	-0.10	0.35^{**c}	0.24^{**b}	0.21**	0.30^{**c}	-0.37^{**c}	-0.30^{**c}	-0.37^{**c}
Exercise/ Stretch	0.08	-0.11	-0.01	0.11	-0.00	0.06	0.04	0.00	0.05	0.00	-0.07
Seeking social support	-0.14	-0.21**	0.17*	0.09	-0.20**	-0.07	-0.10	0.01	0.20**	0.21**	0.02
Coping self-statements	0.10	-0.08	-0.10	0.08	-0.02	0.21**	0.06	0.08	-0.06	-0.11	-0.24**

Note: Pain was assessed with a 100 mm visual analogue scale, Number of symptoms with standardised symptom checklist, General functioning with some of the SF-36 subscales, the Fibromyalgia impact with the FIQ, and Anxiety and Depression with the HADS.

*$p < 0.01$; $^{**}p < 0.05$; Bonferroni-corrected p values; a = 0.003125 (0.05/16); b = 0.0028 (0.05/18); c = 0.00069 (0.05/72).

coping self-statements predicted better general health and less depression. Exercise contributed to better general health, and seeking social support contributed to better social functioning. Furthermore, it is worth noting that task persistence made significant contributions to six of the nine regression equations, and its predictions were associated with better wellbeing, including less pain, impact, anxiety, and depression, and better physical and social functioning. Asking for assistance was the unique subscale that did not make any contribution. Both acceptance scores were selected together in four out of nine equations; otherwise, activity engagement was selected as a predictor of the number of symptoms, impact, vitality, social functioning and depression, but pain willingness alone did not predict any variable. The sums of variance increments attributed to all selected coping variables ranged from 7.4 to 37%. The variance increments for the acceptance scores ranged from 3.2 to 12%. Across the seven equations, the average variance contributed by coping and acceptance were 20 and 8%, respectively.

Table 3 includes the results of the second set of regressions in which the acceptance scores were entered prior to the coping scores. Both acceptance scores were selected together as predictors in six out of nine equations. Activity engagement was selected alone as a predictor of a number of symptoms, including social functioning and depression. In each case, acceptance predicted better functioning. Resting and guarding were selected as significant predictors in three out of nine equations with both predicting poorer functioning. It is remarkable that there was not any significant coping predictor for anxiety. The variance contributed by acceptance scores ranged from 4.0 to 40%. The variance contributed by the coping variables ranged from 0 to 9%. Across the nine equations, the average variance contributed by acceptance was 22%, while the average variance contributed by coping was 4.7%.

Discussion

The purpose of this study was to compare the acceptance of chronic pain with behavioural coping in predicting adjustment to chronic pain and, in the process, to replicate and extend McCracken and Eccleston's earlier papers [20,21]. The results of the present work can be summarised as follows: a greater acceptance of chronic pain was associated with less pain, symptoms, fibromyalgia impact, anxiety, and depression as well as with better general health, vitality and physical and social functioning. Regarding behavioural coping

Table 2 Hierarchical regression analyses examining prediction of Pain, Number of symptoms, General functioning, Fibromyalgia impact, Anxiety and Depression after controlling for Coping strategies

Predictor	β (final)	ΔR^2	*p* <	R^2
Pain				
1. Task persistence	-0.15	0.11	0.001	
Resting	0.09	0.051	0.01	0.16
2. Activity engagement	-0.22	0.050	0.01	
Pain willingness	-0.19	0.030	0.01	0.24
Number of symptoms				
1. Relaxation	0.26	0.074	0.001	0.07
2. Activity engagement	-0.17	0.032	0.01	0.10
Impact				
1. Resting	0.25	0.28	0.001	
Guarding	0.17	0.058	0.001	
Task persistence	-0.01	0.028	0.01	0.37
2. Activity engagement	-0.42	0.11	0.001	0.49
Physical functioning				
1. Guarding	-0.24	0.18	0.001	
Task persistence	0.13	0.064	0.01	0.24
2. Activity engagement	0.26	0.066	0.001	
Pain willingness	0.16	0.024	0.05	0.33
General health				
1. Guarding	-0.18	0.083	0.001	
Coping self-statements	0.29	0.089	0.001	
Relaxation	-0.18	0.033	0.05	
Exercise/Stretch	0.13	0.025	0.05	0.23
2. Pain willingness	0.23	0.067	0.001	
Activity engagement	0.20	0.032	0.05	0.33
Vitality				
1. Resting	-0.30	0.16	0.001	0.16
2. Activity engagement	0.22	0.043	0.001	0.20
Social functioning				
1. Resting	-0.17	0.13	0.001	
Task persistence	0.05	0.041	0.01	
Guarding	-0.14	0.021	0.05	
Seeking social support	0.16	0.028	0.05	0.22
2. Activity engagement	0.35	0.084	0.001	0.30
Anxiety				
1. Resting	0.13	0.11	0.001	
Task persistence	-0.08	0.032	0.05	0.15
2. Pain willingness	-0.21	0.056	0.01	
Activity engagement	-0.22	0.031	0.05	0.23
Depression				
1. Resting	0.22	0.15	0.001	
Task persistence	-0.08	0.070	0.001	
Coping self-statements	-0.18	0.041	0.01	0.26
2. Activity engagement	-0.35	0.080	0.001	0.34

Note: Pain was assessed with a 100 mm visual analogue scale, Number of symptoms with standardised symptom checklist, General functioning with some of the SF-36 subscales, the Fibromyalgia impact with the FIQ, and Anxiety and Depression with the HADS.

In these analyses, the eight Coping scale scores were tested for entry ($p < .05$) and removal ($p > 0.10$) on initial steps based on statistical criteria. After Coping scores meeting criteria were selected, the Acceptance scores were similarly tested for entry.

strategies, guarding and resting were consistently associated with a greater fibromyalgia impact and, individually, with less healthy functioning. Regression analyses revealed that in the first and more conservative model, acceptance added to the variance explained, independently of coping, all of the outcomes, with variance increments averaging 8% (compared to 20% for coping). When the model was reversed, many of the coping effects diminished, and acceptance continued to independently predict outcome on all adjustment measures with variance increments averaging 22% (compared to 4.7% for coping).

Although this study confirmed that acceptance of pain can still account for more variance than various measures of behavioural coping, in a range of important measures of distress and patient functioning, the results of this study were slightly different from those of other studies [20,21]. There are two possible reasons for these differences. First, previous studies used cognitive coping questionnaires, and it may be possible that behavioural coping predicts both distress and functioning better. Another possible reason is that fibromyalgia is a chronic disorder characterised by a large number of symptoms. Previous work has pointed out the possibility of fibromyalgia patients showing fewer acceptance scores than other pain conditions [28], so this would also explain the lack of a greater difference between measures. Indeed, the acceptance mean scores for other pain conditions were 47.8, 49.0 and 50.4 [15,17,39], which are substantially different from our fibromyalgia sample, where the mean score was 40.3.

Previous research has shown on more than one occasion that CPCI has three well-defined groups [18,29]: the illness-focused group (guarding, resting and asking for assistance), the wellness-focused group (task persistence, relaxation, exercise/stretching and coping self-statements), and a neutral group (seeking social support). Most of our results are concordant with previous studies, but there are also some incoherent results. Relaxation was associated with a greater number of symptoms and worse general health; the exercise/stretch strategy only contributed to explaining one positive variable; and the coping self-statements only contributed to explaining two. Unfortunately, these results are usual when presumably adaptive strategies are sought, and a series of studies has shown they are only weakly or

Table 3 Hierarchical regression analyses examining prediction of Pain, Number of symptoms, General functioning, Fibromyalgia impact, Anxiety and Depression after controlling for Acceptance of pain

Predictor	β (final)	ΔR^2	*p* <	R^2
Pain				
1. Activity engagement	-0.25	0.17	0.001	
Pain willingness	-0.22	0.041	0.01	0.21
2. Task persistence	-0.17	0.022	0.05	0.23
Number of symptoms				
1. Activity engagement	-0.17	0.040	0.01	0.04
2. Relaxation	0.26	0.067	0.01	0.10
Impact				
1. Activity engagement	-0.42	0.38	0.001	
Pain willingness	-0.06	0.024	0.05	
2. Resting	0.23	0.071	0.001	0.40
Guarding	0.17	0.021	0.05	0.49
Physical Functioning				
1. Activity engagement	0.33	0.22	0.001	
Pain willingness	0.16	0.038	0.01	0.26
2. Guarding	-0.25	0.054	0.01	0.31
General health				
1. Activity engagement	0.23	0.17	0.001	
Pain willingness	0.26	0.060	0.01	0.24
2. Coping self-statements	0.25	0.043	0.01	
Guarding	-0.17	0.024	0.05	0.30
Vitality				
1. Activity engagement	0.20	0.13	0.001	
Pain willingness	0.11	0.031	0.05	0.16
2. Resting	-0.27	0.057	0.01	0.21
Social functioning				
1. Activity engagement	0.41	0.24	0.001	0.24
2. Resting	-0.19	0.030	0.05	0.27
Anxiety				
1. Activity engagement	-0.31	0.15	0.001	
Pain willingness	-0.25	0.057	0.01	0.21
Depression				
1. Activity engagement	-0.38	0.26	0.001	0.26
2. Resting	0.23	0.035	0.01	
Coping self-statements	-0.19	0.038	0.01	0.33

Note: Pain was assessed with a 100 mm visual analogue scale, Number of symptoms with a standardised symptom checklist, General functioning with some of the SF-36 subscales, the Fibromyalgia impact with the FIQ, and Anxiety and Depression with the HADS.

In these analyses, the two Acceptance of pain scores were tested for entry ($p < .05$) and removal ($p > 0.10$) criteria. The eight Coping scale scores were tested for entry or removal on subsequent steps based on the same statistical criteria.

inconsistently related to functioning [40-42]. Furthermore, as in previous studies regarding coping strategies [25,29], our results show types of patient behaviour that lead to more suffering and poor functioning and not the types of patient behaviour that lead to less suffering and better functioning. For example, strategies such as guarding or resting seem to be reliable in predicting poor wellbeing. However, there is one behavioural coping subscale that predicted good functioning consistently–task persistence–and this is also in agreement with previous studies [18,29].

From a traditional medical approach, it is assumed that good strategies need to be identified and targeted in order to improve outcome treatment. Although well intended, such approach shows that it is difficult to conclude which type of strategies are adaptive without taking into account the context. It might be appropriate to interpret the strategy in light of the intention, avoidance or non-avoidance. Strategies aimed at reducing symptoms (e.g., relaxation) or fibromyalgia impact (e.g., as resting or guarding) as well as at avoiding unwanted private thoughts, feelings and sensations are generally associated with a poorer general functioning. Conversely, strategies that are focused on proceeding despite symptoms–tolerance for symptoms–paradoxically are associated with less symptoms, less fibromyalgia impact, less distress, and better general functioning. Therefore, it seems that in chronic conditions, where the psychological area is of great importance, the acceptance-based approach is highly recommendable.

The results obtained here are limited mainly due to the cross-sectional design of the study: correlation methods cannot unambiguously infer a causal relationship. Additional research should compare acceptance scores and coping methods in an experimental pain situation [43]. Second, the list of coping questionnaires validated in Spanish is limited. The domain of coping was sampled with the contents of only one inventory, the CPCI. Other inventories exist that conceptualise pain coping strategies in different ways with potentially different results. Furthermore, to obtain a more representative sample, specifically of the male gender, it would be desirable for subsequent studies to use larger samples. Finally, another possible limitation could be that the sample in this study was a non-treatment-seeking population whose pain duration was longstanding. It is therefore possible that this sample of fibromyalgia patients may have responded differently from others.

Conclusions

The main conclusion of the present study is that the coping-behaviours strategies often targeted within treatments have not been shown to be related to outcomes as predicted. Additionally, acceptance measures may offer more utility in guiding treatment. It seems wise, therefore, for targets of intervention to focus not only on what the clients must accomplish but also on how one can encourage them to accomplish the necessary tasks. Acceptance-based interventions seem to promote a motivational context that makes it easier for the client to move forward. There are ongoing studies in this area trying to re-appraise some of the coping responses defined as adaptive within current psychological frameworks [44-46]. Additional research is needed to clarify the processes underlying the acceptance-based strategies.

Abbreviations

FM: Fibromyalgia; CSQ: Coping Strategies Questionnaire; CPCI: Chronic Pain Coping Inventory; VAS: Visual Analogue Scale; CPAQ: Chronic Pain Acceptance Questionnaire; HADS: Hospital Anxiety and Depression Score; SF-36: Medical Outcome Study Short Form 36; FIQ: Fibromyalgia Impact Questionnaire.

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Authors' contributions

BR, MG, JGC, ASB and JVL conceived the study design. BR and JGC collected the data, BC and BR conducted the statistical analysis, and all authors interpreted the results, drafted the manuscript, and read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

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4. General Discussion

Currently, it is widely acknowledged that fibromyalgia is a complex condition involving pathophysiological, psychological, emotional and environmental factors. Concerning the psychological area, a much scientific literature is focused on optimizing psychological interventions. One suggested way to improve the treatment efficacy is to better match treatments to patient's characteristics. Matching research requires careful examination of patient characteristics, treatment components, and patient-treatment interactions. Baron and Kenny (1986) clearly distinguish between moderators and mediators when studying associations between two variables. Briefly, moderators provide the answer to the question "In what circumstances does a treatment effect appear?" whereas mediators are concerned with the question "How does treatment work?" Moderators are looked for when the association is unexpectedly absent or weak. Mediators are examined when the researcher wants to examine the intermediate variables by which the association can be explained. Thus, it is proposed to classify dimensions of the treatment process as mediator or moderator variables (Vlaeyen & Morley, 2004). In therapy research, moderator variables partition the independent variable into subsets, of which some strengthen the effectiveness of the treatment while others do not. In fact, moderators may be common to several treatments. Potential moderators are dose of treatment, therapist's skilfulness and competence, and patient expectancies about the treatment. Mediators are intervening variables that produce the relationship between the treatment and the outcome, and which are unique to the treatment associated with a specific match. Characteristic of mediator variables is that they account for greater variation in the dependent variable than the independent variable does. Crucial for the identification of mediators is an advanced insight into the mechanisms of change of the treatment studied.

The mediators role has been the centre of this thesis. Some of the contemporary mediators that have been pointed out by researchers as core targets of intervention in the field of pain include catastrophizing, acceptance, mental defeat, injustice, mindfulness or psychological flexibility. Specifically, this thesis will evaluate the role of two specific mediators - catastrophizing and acceptance, which seem essential in the field of chronic pain - in association with multiple outcomes. But at the time of starting this thesis, none of them had its own Spanish adaptation, nor was there any paper in existence relating to them in our country, clearly a lack in development. For this reason, the thesis was also carried out to provide and promote psychological research on chronic pain (Fibromyalgia) in Spain

4.1 Validations of the Spanish versions of the PCS and CPAQ in fibromyalgia

A large body of research has recently been devoted to the development of psychological constructs questionnaires in the field of pain. Such questionnaires are increasingly used in clinical trials (Alda et al., 2011; Dahl, Wilson & Nilsson, 2004) to determine the impact of psychological interventions on quality of life in chronic pain patients. Without exception, all the measures so far developed are in the English language and are intended for use in English-speaking countries. There is nonetheless a need for measures specifically designed to be used in non English-speaking countries and also among immigrant populations, since cultural groups vary in disease expression and in their use of various health care systems. This need has become more acute with the growing number of large multicentre multicountry trials.

In order to meet that need, two options are available: (1) to develop a new measure, and (2) to use a measure previously developed in another language. The first option, the generation of a new questionnaire is a time consuming process in which the bulk of the effort is devoted to the conceptualization of the measure and the selection and reduction of its items. In the second option, if the transposition of a measure from its original cultural context is done by simple translation it is unlikely to be successful because of language and cultural differences (Berkanovic, 1980). Furthermore, the perception and the ways in which health problems are expressed vary from culture to culture (Kleinman, Eisenberg & Good, 1978). To be successful this option requires a systematic approach to the translation and to the cross-cultural adaptation process of the questionnaires.

We proceeded to validate and adapt the Pain Catastrophizing Scale (Sullivan, Bishop & Pivik, 1995; PCS) and the Chronic Pain Acceptance Questionnaire (McCracken, Vowles & Eccleston, 2004; CPAQ). Once we obtained permission from the original authors, we followed the usual guidelines for cross-cultural adaptations (Translation, Back-translation, Committee review, Pre-testing) (Guillermin, Bombardier & Beaton, 1993). In summary, the psychometric properties of the Spanish validated version of the PCS as well as the CPAQ, were adequate. The Scree plot indicated the same number of factors as the original English versions. Principal Components with Varimax Rotation revealed a satisfactory percentage of Total Variance explained by the two psychological constructs. Looking at the Component Matrix, individual items could be allocated to the same subscales as in the English version. In addition, face validity, internal consistency and test-retest reliability, fulfilled criteria established. Therefore, construct validity of the translated versions can be supported.

Catastrophizing and acceptance have proven to be key targets of treatment in chronic pain approaches and results regarding both of them are consistent with previous findings. Specifically, we have found that catastrophizing is positively related to the reported severity of pain, anxiety, depression, disability and worse general functioning and health status. Contrarily, greater acceptance of chronic pain was associated with less severity of pain, number of symptoms, anxiety, depression, disability and better general health, vitality and physical and social functioning.

In conclusion, these studies will make it possible to assess catastrophizing and acceptance in Spanish populations. Furthermore, the validation of these two questionnaires widely used throughout the world, will be invaluable for monitoring the effectiveness of treatments. Finally, these results add support to the importance of both as treatment mediators. It seems that neither of these constructs appears to dominate over the other, both contribute. However, it is expected that one of them will be the stronger predictor depending on the treatment model utilized. It might be catastrophizing using a CBT approach but acceptance under an ACT intervention.

4.2 Catastrophizing

Patients who fail to significantly improve with treatment often share common personality characteristics, including neuroticism, anxiety, external locus of control, negative affectivity, and a cognitive set referred to as catastrophizing (Affleck, Tennen, Urrows, & Higgins, 1992; Asghari & Nicholas, 1999; Gatchel & Weisberg, 2000). Catastrophizing refers to an exaggerated negative mental set brought to bear during the experience of pain (Sullivan et al., 2001). Individuals who catastrophize expect the worst from their pain problem, ruminate about pain sensations, and feel helpless about controlling their pain. It is not surprising that these individuals have a poor adjustment to pain as compared to patients who are not burdened by such maladaptive cognitions.

CBT is one of the most prevalent treatments for patients with fibromyalgia. Multimethod CBT typically consists of a combination of various therapeutic elements, such as cognitive restructuring, pain-coping skills, problem-solving techniques, goal setting, increasing activity levels, activity pacing, stress management and adjustment of pain-related medication, and frequently also comprises educational and relaxation components.

It is apparent that CBT intervention has a limited effect on the outcome measures, namely, pain, disability and mood. Only a few studies have shown improvement after CBT methods and techniques, and even then the positive effects frequently disappeared in the long run. But, the outcomes might be improved if more targeted psychological interventions are used. So we planned two studies focused on targeting aspects related to catastrophzing. The first, aims at one specific cognitive variable (rumination). The second, goes for the possible role of the contextual factors (stages of chronicity).

4.2.1 Imagined Exposure as treatment of catastrophzing in fibromyalgia: a pilot study

Catastrophizing is a relevant mediator of CBT treatment and it is characterized by rumination, magnification and helplessness. Of these three components, the one which has the most consistent relationship with pain intensity is rumination. That is, the recurrent character of these thoughts plus their negative aspect is that which is associated with greater pain and worse functioning. Indeed, chronic pain generates a wide range of fears, not just those relating to pain, injury, and disability but also ones relating to future possible health status. When we worry, we engage in ruminative self-talk (private or public) that is typically about threat to self in the future. Worry is thought to be functional because it maintains a vigilance for a real or perceived threat to self in the future ("I have to keep in mind") and promotes problem-solving to remove the threat or avoid its consequences ("I must do something about that"). Chronic pain patients, however, report unsurprisingly that they worry more about pain and their health than any other topic, and that they experience these worries as highly intrusive, unpleasant, and difficult to diminish (Eccleston, Crombez & Aldrich, 2001). Despite the aversive experience of worry, they find it difficult to stop. Patients report worrying about who they will be in the future and their ability to change the seemingly inevitable consequences of chronic pain. It seems that what may characterize chronic pain patients is the extent to which they persevere in unsuccessful attempts to solve insoluble problems (van den Hout et al. 2003).

The main approach developed to treat ruminations from the CBT perspective is Thought Stopping. This technique is a form of aversion training that is based on the assumption that the introduction of an aversive stimulus will produce a response that is different from the undesirable, habitual emotional response (e.g. anxiety) (Wolpe, 1973). In the thought stopping procedure, the therapist yells "stop!" or delivers a painful shock when the individual signals that an unwanted thought has appeared. However, major criticism of thought stopping has been raised based in later research. Research has consistently found an ironic effect, such that suppression is associated with more frequent thought occurrences and more distress over thoughts (Ehlers & Clark 2000). Rumination has been related to greater negative affect and depressive symptoms, negatively biased thinking, poor problem-solving, impaired motivational and inhibition of instrumental behavior and impaired concentration and cognition.

Therefore, we proposed a different technique for rumination treatment known as Imaginal Exposure, and it is based on the same principles as in vivo exposure. In vivo exposure involves graduated exposure to the upsetting stimulus itself. The goal is to repeatedly activate all the fear structures (e.g. memories, emotion, cognition) without allowing avoidance or escape behaviors until the anxiety decreases on its own. Salkovskis and Westbrook (1989) developed an exposure procedure for obsessions-ruminations that are accompanied by a covert (i.e., mental), rather than overt compulsive act in which the rumination is repeated on audiotape. The tape is fixed in a loop so that repeats itself. In this manner the individual is exposed to the rumination without having the opportunity of using mental ritual. The crucial aspect of the exposure in treatment of ruminations is that the individual be fully aware of all details of the scene and, the exposure session not be terminated until there has been a significant reduction in anxiety. Treatment outcome studies suggest that imaginal exposure treatment is effective for ruminations relative to other psychological techniques, with high end state functioning observed in 40-60% of individuals (Craske, 2000).

The manual specifically designed to reduce catastrophizing and proposed by Thorn was used for the treatment (Thorn, 2004). This is a 10 session CBT to which we added one additional session. Session 1: the connection between stress and pain. Session 2: identification of automated thoughts. Session 3: evaluation of automated thoughts. Session 4: questioning the automatic thoughts and constructing alternatives. Session 5: nuclear beliefs. Session 6: nuclear beliefs on the pain. Session 7: changing the coping. Session 8: coping with ruminations-obsessions-worrying. Session 9: expressive writing. Session 10: assertive communication. Session 11: final session.

The session added corresponds to number 8, after beginning with the coping section. This is especially directed at subjects who show high rumination and consisted in instructing the patients to write a story about the worse possible scenario imaginable for the future based on their greatest fear, stressing those aspects that would generate the greatest emotional malaise (How do you see yourself in this situation? What do you think?, How do you feel?, etc.). The story is recorded on a tape for subsequent presentation to the patient. It is then recommended to them that they should listen to this story between 30 and 60 minutes (enough time for them to become accustomed) until said story no longer causes anxiety (in general between 10 and 15 sessions of exposure).

Results from our study cannot be conclusive as it was conceived as a pilot study. Nevertheless it allows us to extract some ideas. Firstly, CBT seems to be an adequate approach to reduce catastrophizing. Results indicated that participants not only improved in catastrophizing but also reported reductions in pain intensity, anxiety, depression and disability. Secondly, this study would support the fact that despite some literature available defending catastrophizing as a personality trait, and therefore stable, catastrophizing might be susceptible to being altered by CBT. Thirdly, although rumination could potentially be a crucial subscale, it is not always the most intense so it would not be recommendable to incorporate imagined exposure for every case. Finally, patients usually report their ruminations as less frequent, intense, or distressing after the imaginal exposure, consequently this technique might be highly recommended in those cases where rumination clearly predominates.

4.2.2 Stages of chronicity in fibromyalgia and catastrophizing: a cross-sectional study

Regarding the contextual factor, we can see that in recent years, considerable research has addressed the role of psychological factors in the development of disability (Boersma& Linton, 2006; Denison, Asenlof & Lindberg, 2004; McCracken & Gutierrez, 2011; Tang et al., 2010; Vlaeyen & Linton, 2012; Vowles, McCracken & O´Brien 2011). This literature has revealed that a variety of cognitive and affective variables play a significant role in determining the severity of pain-related disability. However, there has been little attention given to how contextual factors associated with persistent pain might interact with vulnerability factors in contributing to pain-related disability.

The study of contextual determinants of psychological vulnerability in persistent pain disorders holds promise in contributing to the refinement of theoretical models on the relationship between psychology and pain and may also contribute to the development of interventions that can be tailored to meet specific patient needs (Sullivan, Sullivan & Adams, 2002).

The objective of this research was to examine whether duration of chronicity interacted with psychological vulnerability factors in determining the severity of pain-related disability (i.e. activity limitations due to pain measured by the Fibromyalgia Impact Questionnaire). For the purposes of this research, duration of chronicity was defined as the length of time the individual had been diagnosed with fibromyalgia. “Catastrophizing” was chosen as the psychological vulnerability factor for study.

When a fibromyalgia patient principally attends the state health centre things usually occur very differently from that expected. The patient comes to the pain unit because pain and tiredness have stopped him from working or functioning generally. Most of the patients do not get better following the usual treatment and their pain and disability do not improve. Apart from ineffective treatments, their prognosis will depend on the practitioner (pro- or anti-fibromyalgia) who attends (Muller & Stratz, 2004; Gralow, 2004). Often these individuals undergo several diagnostic procedures, are referred to different specialists and later are treated with suspicion, questioning the authenticity of the disability due to the fact that they are not improving as expected.

Under these circumstances, the potential importance of duration of chronicity as a contextual determinant of pain-related disability can be very different. In the early stages, there may be considerable uncertainty about the underlying basis of pain symptoms and the medical prognosis and the patient is probably going to be worried about the potential loss of function, independence and financial security. However, in a later stage, it is likely that after repeated failures in diagnostic procedures and treatment interventions, the fibromyalgia patient is prone to expect less in the resolving of their symptoms, treatment outcome and, in many cases, the early worries about possible losses will have changed into reactions about actual losses.

The findings in our study provide preliminary evidence that the psychological correlates of pain-related disability change over time in fibromyalgia. Specifically, regression analyses revealed that stage of chronicity moderated the relationship between the PCS subscales and disability. In the group of patients who had been diagnosed with fibromyalgia for less than 2 years, rumination accounted for significant unique variance in disability. Magnification and helplessness predicted disability over and above the variance accounted for pain severity for patients who had been diagnosed for 2-4 years, and helplessness was the strongest predictor of disability in the group of patients diagnosed for more than 4 years.

These findings are consistent with a pattern of results that has emerged in previous research in different pathologies. For example, Sullivan et al. (1998) reported that the rumination subscale of the PCS was the best predictor of severity of disability in patients who had been experiencing chronic pain for approximately 3 years. Vienneau, Clark, Lynch & Sullivan (1999) reported that the helplessness subscale of the PCS was the best predictor of severity of disability in patients who had been experiencing for approximately 9 years. Although differences in sample composition limit the conclusions that can be drawn from these studies, the pattern of results is nevertheless consistent with the present findings and supports the view that chronicity may be an important moderator of psychological vulnerability for pain-related disability. In summary, the results suggest that interventions that consider stage of chronicity as a moderator of vulnerability for pain-related disability may yield more positive outcomes than standardized approaches to the management of fibromyalgia.

There is increasing research indicating that patients with fibromyalgia cannot be considered a homogeneous group (Turk, 2005; Turk, Okifuji, Sinclair & Starz, 1998; Turk & Rudy, 1988). Fibromyalgia patients differ with respect to the etiology and course of their pain symptoms and, more importantly, they differ with respect to the areas of psychological and social functioning that are likely to be affected by their pain condition. The time may be approaching when assessment protocols can be developed to yield profiles of psychological vulnerability and dysfunction in fibromyalgia patients that will permit the administration of individually tailored intervention programs.

4.3 Relationship between behavior coping strategies and acceptance in patients with fibromyalgia syndrome: Elucidating targets of interventions.

Although chronic pain can lead to dysfunction among some individuals, others appear to adjust relatively well to the ongoing experience of pain. For example, even though the prevalence of depression is substantially higher in chronic pain patients than in groups of individuals without pain, the majority of chronic pain patients are not clinically depressed (Love, 1987). Even in the most dysfunctional group of chronic pain patients, those referred to pain clinics, studies have found that only about one-third meet standard diagnostic criteria for major depression (Turner & Romano, 1984). Similarly, while inactivity and disability are commonly seen in chronic pain patients, many individuals can learn to function fairly normally despite the presence of chronic pain (Doleys, Crocker & Patton, 1982; Fordyce, 1976). Finally, many individuals in the general population experience pain frequently, yet continue to work productively and rarely seek medical assistance (Taylor & Curran, 1985). Because chronic pain is not synonymous with disability and depression, it is important to identify the factors which promote adaptive functioning in the face of pain.

Models of stress and coping may be useful in explaining adjustment differences among chronic pain populations (Turner, 1991). Using such models as a conceptual base, a number of researchers have developed several self-report measures of cognitive or behavioral coping strategies. The pain coping measure most widely used in studies of adults with non-specific chronic pain syndromes (e.g. chronic musculoskeletal pain) is the Coping Strategies Questionnaire (CSQ; Rosenstiel & Keefe, 1983), which has been found to be associated consistently with adjustment to chronic pain (Lester, Lefebvre & Keefe, 1996).

The CSQ as well as most studies regarding coping with chronic pain are focused on teaching individuals strategies to control or eliminate pain in a broad range of forms, including thought suppression, imaginative distraction, sensory attention, emotional or mood manipulations, and stress inoculation. Unfortunately, it has been difficult to reliably identify specific, adaptive, coping responses. For example, whilst methods such as increasing activities, engaging in exercise, using distraction, or practicing relaxation are presumed to be adaptive, a series of studies has shown they are only weakly or inconsistently related to functioning (Jensen, Turner & Romano, 2007). These findings illustrate a significant issue - in essence, if the processes assumed to determine the effectiveness of the treatment have not held up under empirical scrutiny, alternative processes must be considered.

On the other hand, there are a small number of empirical studies that have demonstrated a positive association between acceptance and successful adaptation to chronic pain. Jacob et al.

(1993) reported that people who accommodate to pain, defined as the ability to live a satisfying life despite chronic pain, demonstrated less depression and less overt pain behavior. Schmitz et al. (1996) have shown that pain patients who modify unachievable goals or substitute more achievable ones (accommodation) report less pain-related suffering. McCracken (1998) found that patients with more accepting responses to chronic pain showed better adjustment as measured by the self-report of depression, anxiety, and disability. In a similar and more recent study McCracken et al. (1999) found that accepting pain was the most powerful predictor of whether patients are classified as dysfunctional or adaptive copers, independent of pain intensity or depression.

Therefore, we proposed a study to replicate and extend the findings of earlier comparisons of coping and acceptance approaches to chronic pain using a different coping questionnaire this time. Previous studies used coping questionnaires based on cognitive strategies (CSQ) but there is a limitation because these measures rely on the observation and report of thoughts or attempts to change thoughts (McCracken & Eccleston, 2003; 2006). This time, coping strategies derived from behavioral strategies would be applied. The Chronic Pain Coping Inventory (CPCI; Jensen et al., 1995) was developed to assess behavioral and cognitive pain coping strategies such as exercise, guarding, resting and coping self-statements that are targeted as part of many multidisciplinary pain management programs. The purpose of this study was to compare acceptance and behavioral coping in predicting adjustment to chronic pain as measured by anxiety, depression, pain, number of symptoms, disability, physical functioning, general health, vitality and social functioning.

As we predicted, results confirmed that acceptance of pain can still account for more variance than various measures of behavioral coping, in a range of important measures of distress and patient functioning. This study also demonstrated that coping behaviors strategies have not been shown to be related to outcomes in the way we assumed they would. For example, relaxation was associated with a greater number of symptoms and worse general health. Finally, this study also helps us to clarify misconceptions about acceptance as an act of resignation or surrender. As we can see from the results, acceptance has nothing in common with strategies such us guarding, resting or relaxation and means much more. Those patients who accept chronic pain are not passive, they engage in daily activities, feel efficacious, and are motivated to complete their activities. In conclusion, acceptance measures may offer more utility in guiding treatment. Item content directly fits a positive and activity orientated treatment approach of exposure and behavioral activation and seems to promote a motivational context which makes it easier for the patient to go ahead.

4.4 Limitations

The results obtained here are limited mainly due to the cross-sectional design of the study: correlation methods cannot unambiguously infer causal relationship. However, given the consistent relationship between psychological constructs (catastrophizing and acceptance) and pain outcomes, it is clear that there are important processes at work. Experimental, longitudinal, or clinical methods are needed to illuminate these processes. Secondly, in order to obtain a more representative sample, specifically of the male gender, it would be desirable if subsequent studies used larger samples. Another possible limitation could be the recruiting methods. Sometimes half of the subjects were recruited from a specialised clinic and for the others the study was based on a non treatment-seeking population whose pain duration was longstanding. It is therefore possible that these samples of fibromyalgia patients may have responded differently.

Finally, depending on the study, there are specific limitations concerning each one. For example, in the study regarding the stages of chronicity, one of the main difficulties that fibromyalgia patients face is failure to receive the diagnosis until well after the onset of the disease. It is estimated that there is a 3 year delay in Spain. Therefore, it is possible that some of the subjects in this research who were classified as being in one of the earlier stages of chronicity had actually been suffering from pain for some time previously; regarding the study about acceptance and coping, the list of coping questionnaires validated in Spanish is limited. We sampled the domain of coping with the contents of just one inventory, the CPCI. Other inventories exist that conceptualize pain coping strategies in different ways with potentially different results.

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5. Conclussions

1. **Validation process:**

Both psychometric properties of the Spanish validated versions of the Pain Catastrophzing Scales and the Chronic Pain Acceptance Questionnaire are adequate. The Scree plot indicated the same number of factors as the original English versions. Principal Components with Varimax Rotation revealed a satisfactory percentage of Total Variance explained by the two psychological constructs. Looking at the Component Matrix, individual items could be allocated to the same subscales as they were in the English version. Therefore, construct validity of the translated versions can be supported.

2. **Regarding Catastrophizing**

2.1 Cognitive-behavioral treatment targeting reduction of catastrophizing for fibromyalgia reduced negative cognitive and affective variables. Furthermore, Imagined Exposure technique might contribute to enhance the improvement in those cases where the ruminations scores are emphasized.

2.2 The influence of catastrophizing on global functioning in fibromyalgia patients is variable and dependent on the context (i.e., duration of diagnosis) in which the catastrophizing thoughts occur. Therefore, this issue should be taken into account by tailoring psychological interventions.

2.3 Specifically, regression analyses revealed that rumination accounted for significant unique variance in FM impact in the group of patients who had been diagnosed with FMS for less than 2 years; Magnification and helplessness predicted FM impact over and above the variance accounted for pain severity for patients who had been diagnosed for 2-4 years, and helplessness was the strongest predictor of FM impact in the group of patients diagnosed for more than 4 years.

2.4 Catastrophizing was a stronger predictor of global functioning than pain itself for the three different stages of chronicity and the catastrophizing remained constant over time, despite the fact that fibromyalgia impact increased.

2.5 These findings suggest that not only is the type of intervention important but also the timing of the treatment. The results accentuate the significance of early detection and treatment of patients who are at risk of developing fibromyalgia and related problems. Intervening early in the course of a pain condition may help prevent maladaptive patterns of pain coping and illness behaviours that are resistant to treatment, and it may have the potential to reduce or prevent the negative impacts of fibromyalgia that, in turn, will reduce societal and medical costs.

2.6 If patients with fibromyalgia were to be subdivided consistent with their distinctive contextual cognitive and behavioural patterns, and if interventions were subsequently modified to match these specific risk profiles, the efficacy of psychological treatment programs could be substantially advanced.

3. Regarding Acceptance:

3.1 Acceptance of chronic pain predicted adjustment to chronic pain better than behavioural coping strategies in fibromyalgia patients.

3.2 A greater acceptance of chronic pain in fibromyalgia patients was associated with less pain, symptoms, fibromyalgia impact, anxiety, and depression as well as with better general health, vitality and physical and social functioning.

3.3 Our results found that most of the behavioural coping strategies showed types of patient behaviour that lead to more suffering and poor functioning. In turn, acceptance of pain components, showed the types of patient behaviour that lead to less suffering and better functioning.

3.4 The coping behaviours strategies often targeted within psychological treatments have not been shown to be related to outcomes as predicted. Additionally, acceptance measures may offer more utility in guiding treatment.

Conclusiones

1. Proceso de validación:

Las propiedades psicométricas de los dos cuestionarios validados, la escala de catastrofización ante el dolor (Pain Catastrophzing Scales; PCS) y el cuestionario de aceptación del dolor crónico (Chronic Pain Acceptance Questionnaire; CPAQ) resultaron adecuadas.

2. Catastrofismo:

2.1 El Tratamiento Cognitivo-Conductual parece adecuado para reducir la frecuencia de los pensamientos catastrofistas y la mejora en la calidad de vida de los pacientes. Además, la técnica de exposición en imaginación podría ser recomendable para aquellos pacientes caracterizados por una notable rumiación.

2.2 La influencia del catastrofismo en el funcionamiento general de los pacientes con fibromialgia es variable y depende del contexto en el que se dan los pensamientos catastrofistas (ej. tiempo desde el diagnóstico). Por tanto, esta cuestión debería ser tenida en cuenta para dirigir adecuadamente las intervenciones psicológicas

2.3 En concreto, el análisis de regresión mostró que era la subescala de rumiación la que mejor explicaba la discapacidad de los pacientes que habían sido diagnosticados de fibromialgia en un periodo menor a 2 años. En el grupo de pacientes que habían sido diagnosticados de fibromialgia en un periodo de entre 2 y 4 años, fueron las subescalas de magnificación e indefensión. Por último, la escala de indefensión fue el predictor más robusto en el grupo de pacientes que habían sido diagnosticados en un periodo mayor a 4 años.

2.4 En los tres estadios, el catastrofismo predijo mejor el funcionamiento global del paciente que la intensidad de dolor. Además, a pesar de que la discapacidad de los sujetos tendía a incrementarse con el tiempo, el indicador del catastrofismo se mantenía constante.

2.5 Estos resultados resaltan la importancia de una intervención temprana en pacientes con fibromialgia que pudiera prevenir patrones de afrontamiento desadaptados. Esto se traducirían una reducción de costes futuros tanto médicos como sociales.

2.6 La eficacia de los programas de tratamiento psicológico podrían mejorar sustancialmente si clasificáramos a los pacientes de fibromialgia según sus características conductuales y cognitivas y las intervenciones se dirigiesen específicamente a esas variables de riesgo.

3. Aceptación:

3.1 La aceptación del dolor crónico predijo mejor que las estrategias de afrontamiento conductuales la adaptación al dolor crónico.

3.2 Una mayor aceptación del dolor crónico en los pacientes con fibromialgia estuvo asociada con menor dolor, número de síntomas, ansiedad, depresión, discapacidad y mejor estado de salud general, vitalidad y funcionamiento tanto físico como social.

3.3 Nuestros resultados mostraron que la gran mayoría de estrategias de afrontamiento conductuales (ej; relajación, descanso, pedir ayuda) parecen conducir a mayor sufrimiento y un pobre funcionamiento. En cambio, los dos componentes de la aceptación mostraron tipos de de conducta que conducen a un menor sufrimiento y un mejor funcionamiento.

3.4 Las estrategias de afrontamiento conductuales que a menudo son objetivos de tratamientos psicológicos parecen no relacionarse con los resultados de la manera que se esperaban. Los componentes de aceptación parecen ofrecer mayor utilidad para guiar el tratamiento.

APÉNDICES

- Factor de impacto de las revistas y áreas temáticas correspondientes a las publicaciones que se recogen en la tesis y la justificación de la contribución del doctorando para trabajos en coautoría.

- Escala de Catastrofización ante el dolor. Spanish version of The Pain Catastrophizing Scale (PCS)

- Cuestionario de Aceptación ante el dolor crónico. Spanish version of The Chronic Pain Acceptance Questionnaire (CPAQ)

- Factor de impacto de las revistas y áreas temáticas correspondientes a las publicaciones que se recogen en la tesis y la justificación de la contribución del doctorando para trabajos en coautoría.

Rodero B, García-Campayo J, Casanueva B, Sobradiel N. [**Imagined exposure as treatment of catastrophizing in fibromyalgia: a pilot study**]. Actas Esp Psiquiatr. 2008 Jul-Aug;36(4):223-6.

For **2010**, the journal **ACTAS ESPANOLAS DE PSIQUIATRIA** has an Impact Factor of **0.695**

Category Name	Total Journals in Category	Journal Rank in Category	Quartile in Category
PSYCHIATRY	128	103	Q4

Authors´ Contributions:

BR and JGC conceived the study design. BR and NS collected the data, BC, JGC and BR conducted the statistical analysis. BC performed the clinical diagnosis of fibromyalgia. All authors contributed to the interpretation of the results and the drafting of the manuscript, and all authors approved the final manuscript for publications.

García Campayo J, Rodero B, Alda M, Sobradiel N, Montero J, Moreno S.[**Validation of the Spanish version of the Pain Catastrophizing Scale in fibromyalgia**].Med Clin (Barc). 2008 Oct 18;131(13):487-92. Spanish.

For **2010**, the journal **MEDICINA CLINICA** has an Impact Factor of **1.413**

Category Name	Total Journals in Category	Journal Rank in Category	Quartile in Category
MEDICINE, GENERAL & INTERNAL	153	64	Q2

Authors´ Contributions:

JGC, BR, MA and NS conceived the study design. JM and SM collected the data. JGC and BR conducted the statistical analysis, and all authors interpreted the results, drafted the manuscript and read and approved the final manuscript.

Rodero B, García-Campayo J, Casanueva B, del Hoyo YL, Serrano-Blanco A, Luciano JV. **Validation of the Spanish version of the Chronic Pain Acceptance Questionnaire (CPAQ) for the assessment of acceptance in fibromyalgia.** Health Qual Life Outcomes. 2010 Apr 12;8:37.

For **2010**, the journal **Health and Quality of Life Outcomes** has an Impact Factor of **1.860**

Category Name	Total Journals in Category	Journal Rank in Category	Quartile in Category
HEALTH CARE SCIENCES & SERVICES	72	31	Q2

Authors´ Contributions:

BR, JGC, BC and ASS conceived the study design. BC performed the clinical diagnosis of fibromyalgia. YLdH and BR collected the data. BR and JVL conducted the statistical analysis, and all authors interpreted the results, drafted the manuscript and read and approved the final manuscript.

Rodero B, Casanueva B, García-Campayo J, Roca M, Magallón R, del Hoyo YL. **Stages of chronicity in fibromyalgia and pain catastrophising: a cross-sectional study**. BMC Musculoskelet Disord. 2010 Oct 27;11:251.

For **2010**, the journal **BMC MUSCULOSKELETAL DISORDERS** has an Impact Factor of **1.941**

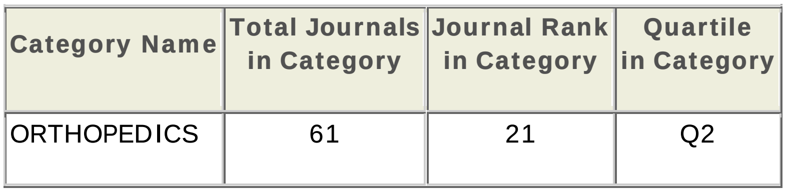
Category Name	Total Journals in Category	Journal Rank in Category	Quartile in Category
ORTHOPEDICS	61	21	Q2

Authors´ Contributions:

BR, BC and JGC conceived the project. BC and RM performed the clinical diagnosis of fibromyalgia. YLdH, MR and BR collected the data. BR conducted the statistical analysis, and all authors interpreted the results, drafted the manuscript, and read and approved the final manuscript.

Rodero B, Casanueva B, Luciano JV, Gili M, Serrano-Blanco A, García-Campayo J. **Relationship between behavioural coping strategies and acceptance in patients with fibromyalgia syndrome: elucidating targets of interventions**. BMC Musculoskelet Disord. 2011 Jun 29;12:143.

For **2010**, the journal **BMC MUSCULOSKELETAL DISORDERS** has an Impact Factor of **1.941**



Category Name	Total Journals in Category	Journal Rank in Category	Quartile in Category
ORTHOPEDICS	61	21	Q2

Authors´ contributions:

BR, MG, JGC, ASB and JVL conceived the study design. BR and JGC collected the data, BC and BR conducted the statistical analysis, and all authors interpreted the results, drafted the manuscript, and read and approved the final manuscript.

- Escala de Catastrofización ante el dolor. Spanish version of The Pain Catastrophizing Scale (PCS)

ESCALA DE CATASTROFIZACION (PCS)

Nombre:………………………………………………………………………………………
Edad:…………… Género: ……………. Fecha: ……………………………………..

Todas las personas experimentamos situaciones de dolor en algún momento de nuestra vida. Tales experiencias pueden incluir dolor de cabeza, dolor de muelas, dolor muscular o de articulaciones. Las personas estamos a menudo expuestas a situaciones que pueden causar dolor como las enfermedades, las heridas, los tratamientos dentales o las intervenciones quirúrgicas.
Estamos interesados en conocer el tipo de pensamientos y sentimientos que usted tiene cuando siente dolor. A continuación se presenta una lista de trece frases que describen diferentes pensamientos y sentimientos que pueden estar asociados al dolor. Utilizando la siguiente escala, por favor indique el grado en que usted tiene esos pensamientos y sentimientos cuando siente dolor.

0 Nada en absoluto **1** Un poco **2** Moderadamente **3** Mucho **4** Todo el tiempo

Cuando siento dolor...

1.- Estoy preocupado todo el tiempo pensando en si el dolor desaparecerá.

2.- Siento que ya no puedo más.

3.- Es terrible y pienso que esto nunca va a mejorar.

4.- Es horrible y siento que esto es más fuerte que yo.

5.- Siento que no puedo soportarlo más.

6.- Temo que el dolor empeore.

7.- No dejo de pensar en otras situaciones en las que experimento dolor.

8.- Deseo desesperadamente que desaparezca el dolor.

9.- No puedo apartar el dolor de mi mente.

10.- No dejo de pensar en lo mucho que me duele.

11.- No dejo de pensar en lo mucho que deseo que desaparezca el dolor.

12.- No hay nada que pueda hacer para aliviar la intensidad del dolor.

13.- Me pregunto si me puede pasar algo grave.

…Total

- Cuestionario de Aceptación ante el dolor crónico. Spanish version of The Chronic Pain Acceptance Questionnaire (CPAQ)

Instrucciones: A continuación, encontrará una lista de afirmaciones. Puntúe cada una de ellas haciendo un círculo en el número que mejor defina la frecuencia con la que dicha información es cierta para usted. Utilice la siguiente escala de puntuación para hacer su elección. Por ejemplo, si cree que una afirmación es "siempre cierta" para usted, deberá seleccionar un 6 en el espacio para su respuesta.

0	1	2	3	4	5	6
Nunca cierta	Muy raramente cierta	Raramente cierta	A veces cierta	A menudo cierta	Casi siempre cierta	Siempre cierta

1. Continúo haciendo las cosas de la vida diaria sea cual sea mi nivel de dolor …….
2. Mi vida va bien, aunque tenga dolor crónico ……
3. No importa sentir dolor ……
4. Si tuviera que sacrificar cosas importantes de mi vida para controlar mejor este dolor, lo haría con mucho gusto ……
5. No necesito controlar el dolor para poder llevar bien mi vida ……
6. Aunque las cosas han cambiado, llevo una vida normal pese a mi dolor crónico …
7. Tengo que concentrarme para poder librarme del dolor ……
8. Hay muchas actividades que hago cuando tengo dolor ……
9. Llevo una vida plena aunque tenga dolor crónico ……
10. Controlar el dolor es un objetivo menos importante que otros objetivos de mi vida
11. Antes de poder tomar decisiones importantes en mi vida, mis ideas y sentimientos hacia el dolor deben cambiar ……
12. A pesar del dolor, ahora me ciño a una dirección concreta en mi vida ……
13. Tener controlado el nivel de dolor es la primera prioridad cuando hago algo ……
14. Antes de poder hacer planes en serio, tengo que tener algo de control sobre el dolor ……
15. Cuando aumenta el dolor, puedo seguir ocupándome de mis responsabilidades …
16. Podría controlar mejor mi vida si pudiera controlar mis pensamientos negativos sobre el dolor ……
17. Evito enfrentarme a situaciones en las que el dolor pudiera aumentar ……
18. Mis preocupaciones y miedos sobre lo que el dolor puede hacerme son auténticos
19. Es un alivio darse cuenta de que no tengo por qué cambiar el dolor para seguir con mi vida ……
20. Cuando tengo dolores, me cuesta mucho hacer cosas ……

Puntuación:
Disposición para las actividades = Sume los ítems 1, 2, 3, 5, 6, 8, 9, 10, 12, 15, 19.
Aceptación del dolor = Invierta las puntuaciones de los ítems 4, 7, 11, 13, 14, 16, 17, 18, 20 y súmelas.
Total = Disposición para las actividades + Aceptación del dolor.