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Tesis Doctoral

Síntomas somáticos funcionales, psicopatología y variables asociadas: un análisis en diferentes poblaciones pediátricas

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Reconocimientos

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1. Presentación

La somatización es un fenómeno controvertido que ha sido conceptualizado de diversas maneras a lo largo de los años. Sin embargo, las definiciones formuladas hasta el momento comparten un elemento en común: la presencia de síntomas físicos de patología desconocida.

Actualmente, se conoce que los niños y adolescentes presentan una variedad de síntomas físicos que no se explican mejor por una condición médica y que, al igual que los adultos, difieren en la frecuencia, severidad y forma de manifestarse. Se trata de un mismo fenómeno, pero con distintas implicaciones en función del proceso evolutivo que se encuentran los niños y adolescentes.

El trabajo actual forma parte de una investigación más amplia de la *Unitat de Recerca de Psicopatologia de la Infància i l'Adolescència de la Universitat Autònoma de Barcelona* sobre los Trastornos de Ansiedad en población infanto-juvenil. El objetivo principal de dicho proyecto ha sido obtener un mayor conocimiento que posibilite la prevención del desarrollo de las patologías de ansiedad. El presente estudio se integra en esta perspectiva.

El trabajo de tesis se compone de una revisión teórica respecto al tema que permite conocer los principales hallazgos en la literatura. Además, se presentan tres investigaciones empíricas realizadas con distintas poblaciones de la infancia y adolescencia, lo que posibilitó estudiar las somatizaciones y variables asociadas en distintos grupos de niños con sus respectivas particularidades.

2. Introducción

Las somatizaciones han recibido diferentes denominaciones a lo largo del tiempo. Términos como histeria, neurosis, neurastenia, trastorno psicosomático, entre otros, fueron utilizados para expresar la presencia de quejas físicas asociadas a dificultades psicológicas (Husain, Browne, & Chalder, 2007).

Es posible que el interés de los primeros investigadores por las somatizaciones en la infancia y adolescencia haya sido en gran parte por la poca atención recibida en la literatura pediátrica comparada con la de adultos (Campo & Fritsch, 1994), como también el reconocimiento de que se trata de una problemática bastante común en la práctica pediátrica (Campo & Fritsch, 1994; Campo, Jansen-McWilliams, Comer, & Kelleher, 1999; Rask et al., 2009a).

Los trabajos de Apley (1958, 1975) en los años 50 contribuyeron de manera significativa para el inicio de la investigación de las somatizaciones infantiles. Al estudiar dolores recurrentes abdominales, Apley y Naish (1958) verificaron que muchos de los niños no presentaban alguna causa orgánica que pudiera justificar sus dolores.

2.1 Sobre el concepto

Actualmente, algunos autores afirman que existen dos maneras de definir las somatizaciones. Una de ellas afirma que se trata de un fenómeno secundario resultado de una angustia o estrés psicológico. La segunda, entiende la somatización como un fenómeno primario caracterizado por la presencia de síntomas físicos sin una explicación clínica definida (De Gucht & Fischler, 2002). A pesar de las diferencias, hay un elemento común en ambas definiciones: la presencia de síntomas somáticos de causa desconocida.

Lipowski (1988), basándose en la primera corriente de pensamiento, define la somatización como la expresión de una dificultad psicológica manifestada a través de síntomas físicos. La presencia de una o más quejas físicas no revela ningún mecanismo físico, patológico o patofisiológico que los justifique (Kellner, 1991; Lipowski, 1988). Es interesante destacar que el concepto en sí sugiere la existencia de una relación causal entre la experiencia de estrés psicológico y la manifestación de síntomas físicos.

Garralda (1999; 2004) afirma que en dichas manifestaciones físicas los factores psicológicos juegan un papel importante. Su constatación abre una importante perspectiva hacia la etiología de las somatizaciones. Además, se establece una conexión entre los campos de la medicina y de la psicología, entre los procesos mentales y corporales (Fabrega, 1990).

Muchas investigaciones actuales se fundamentan en la segunda perspectiva, donde los síntomas somáticos son entendidos como un fenómeno primario. Dentro de esta perspectiva, las somatizaciones suelen ser denominadas como síntomas físicos de patología desconocida (Rask et al., 2009a), o como síntomas somáticos funcionales - SSF (Beck, 2008; Campo & Fritz, 2007).

2.2 Clasificación diagnóstica

Los síntomas físicos de patología desconocida son el núcleo de las características de los trastornos somatomorfos descritos en las clasificaciones del Manual diagnóstico y estadístico de los trastornos mentales, cuarta edición (DSM-IV-TR) y de la Clasificación internacional de enfermedades, décima versión (CIE-10) (American Psychiatric Association, 2000; World Health Organization, 1992).

La categoría de los trastornos somatomorfos en el DSM-IV utiliza pocos síntomas psicológicos que posibiliten una alternativa de diagnóstico psiquiátrico (Husain et al., 2007). Las subcategorías incluyen trastorno de somatización, hipocondría, trastorno dismórfico corporal, trastorno de conversión, trastorno por dolor y trastorno somatomorfo indiferenciado. Los síntomas manifestados no se explican mejor por alguna condición médica, efectos de una substancia, u otro trastorno mental. Su presencia debe de causar estrés o deterioro funcional y no deben de parecer voluntarios o intencionalmente producidos (Campo & Fritz, 2007).

Por otro lado, la CIE-10 incorpora los trastornos somatomorfos en una categoría amplia que incluye los trastornos relacionados al estrés y a los trastornos neuróticos (World Health Organization, 1992).

El trastorno de somatización en el DSM se define por algunos síntomas somáticos que son considerados particularmente indicativos de somatización: la presencia de 13 o más de estos síntomas son necesarios para el diagnóstico en la clasificación del DSM-III-R (American Psychiatric Association, 1987). El número de síntomas fue posteriormente reducido a ocho en el DSM-IV. El manual diagnóstico establece cuatro categorías para los síntomas: dolor, gastrointestinal, seudoneurológicos y sexual.

El trastorno de somatización tal como está definido en el DSM es poco frecuente en la edad pediátrica, principalmente en niños prepúberes (Offord, Boyle, Szatmari, & Rae-Grant, 1987). Algunos autores afirman que los criterios no son adecuados para la población infantil, lo que dificulta el proceso de diagnóstico (Garber, Walker, & Zeman 1991). Una prueba de ello es que Garber y sus colaboradores (1991) obtuvieron una prevalencia de 1% en una muestra comunitaria de niños y adolescentes. Por lo tanto, sería importante establecer

criterios menos estrictos y más adaptados al desarrollo de los niños (Campo & Fritsch, 1994; Silber & Pao, 2003).

La elaboración de un diagnóstico en el DSM-III y DSM-IV denominado ¨trastorno somatomorfo indiferenciado¨ posibilitó a los psiquiatras infantiles y pediatras un umbral más bajo para el diagnóstico. La categoría requiere una o más quejas físicas que persistan seis meses o más. Muchos de los niños con somatizaciones pueden ser incluidos en esta categoría (Masi, Favilla, Millepiedi, & Mucci, 2000).

2.3 Criterios diagnósticos de los Trastornos somatomorfos según el DSM-IV

2.3.1 Trastorno de somatización

A. Historia de múltiples síntomas físicos, que empieza antes de los 30 años, persiste durante varios años y obliga a la búsqueda de atención médica o provoca un deterioro significativo social, laboral, o de otras áreas importantes de la actividad del individuo.

B. Deben cumplirse todos los criterios que se exponen a continuación, y cada síntoma puede aparecer en cualquier momento de la alteración:

(1) *Cuatro síntomas dolorosos:* historia de dolor relacionada con al menos cuatro zonas del cuerpo o cuatro funciones (p. ej., cabeza, abdomen, dorso, articulaciones, extremidades, tórax, recto; durante la menstruación, el acto sexual, o la micción).

(2) *Dos síntomas gastrointestinales:* historia de al menos dos síntomas gastrointestinales distintos al dolor (p. ej., náuseas, distensión abdominal, vómitos [no durante el embarazo], diarrea o intolerancia a diferentes alimentos).

(3) *Un síntoma sexual:* historia de al menos un síntoma sexual o reproductor al margen del dolor (p. ej., indiferencia sexual, disfunción eréctil o eyaculatoria, menstruaciones irregulares, pérdidas menstruales excesivas, vómitos durante el embarazo).

(4) *Un síntoma seudoneurológico:* historia de al menos un síntoma o déficit que sugiera un trastorno neurológico no limitado al dolor (síntomas de conversión del tipo de la alteración de la coordinación psicomotora o del equilibrio, parálisis o debilidad muscular localizada, dificultad para deglutir, sensación de nudo en la garganta, afonía, retención urinaria, alucinaciones, pérdida de la sensibilidad táctil y dolorosa, diplopía, ceguera, sordera, convulsiones; síntomas disociativos como amnesia; o pérdida de conciencia distinta del desmayo).

C. Cualquiera de las dos características siguientes:

(1) Tras un examen adecuado, ninguno de los síntomas del Criterio B puede explicarse por la presencia de una enfermedad médica conocida o por los efectos directos de una sustancia (p. ej., drogas o fármacos).

(2) Si hay una enfermedad médica, los síntomas físicos o el deterioro social o laboral son excesivos en comparación con lo que cabría esperar por la historia clínica, la exploración física o los hallazgos de laboratorio.

D. Los síntomas no se producen intencionadamente y no son simulados (a diferencia de lo que ocurre en el trastorno facticio y en la simulación).

2.3.2 Trastorno somatomorfo indiferenciado

A. Uno o más síntomas físicos (p. ej., fatiga, pérdida del apetito, síntomas gastrointestinales o urinarios).

B. Cualquiera de las dos características siguientes:

(1) Tras un examen adecuado, los síntomas no pueden explicarse por la presencia de una enfermedad médica conocida o por los efectos directos de una sustancia (p. ej., droga de abuso o medicación).

(2) Si hay una enfermedad médica, los síntomas físicos o el deterioro social o laboral son excesivos en comparación con lo que cabría esperar por la historia clínica, la exploración física o los hallazgos de laboratorio.

C. Los síntomas provocan un malestar clínico significativo o un deterioro social, laboral o de otras áreas importantes de la actividad del individuo.

D. La duración del trastorno es al menos de 6 meses.

E. La alteración no se explica mejor por la presencia de otro trastorno mental (p. ej., otro trastorno somatomorfo, disfunciones sexuales, trastornos del estado de ánimo, trastornos de ansiedad, trastornos del sueño o trastorno psicótico).

F. Los síntomas no se producen intencionadamente ni son simulados (a diferencia de lo que sucede en el trastorno facticio o en la simulación).

2.3.3 Trastorno de conversión

A. Uno o más síntomas o déficit que afectan las funciones motoras voluntarias o sensoriales y que sugieren una enfermedad neurológica o médica.

B. Se considera que los factores psicológicos están asociados al síntoma o al déficit debido a que el inicio o la exacerbación del cuadro vienen precedidos por conflictos u otros desencadenantes.

C. El síntoma o déficit no está producido intencionadamente y no es simulado (a diferencia de lo que ocurre en el trastorno facticio o en la simulación).

D. Tras un examen clínico adecuado, el síntoma o déficit no se explica por la presencia de una enfermedad médica, por los efectos directos de una sustancia o por un comportamiento o experiencia culturalmente normales.

E. El síntoma o déficit provoca malestar clínicamente significativo o deterioro social, laboral, o de otras áreas importantes de la actividad del sujeto, o requieren atención médica.

F. El síntoma o déficit no se limita a dolor o a disfunción sexual, no aparece exclusivamente en el transcurso de un trastorno de somatización y no se explica mejor por la presencia de otro trastorno mental.

Codificar el tipo de síntoma o déficit:

• Con síntoma o déficit motor

• Con crisis y convulsiones

• Con síntoma o déficit sensorial

• De presentación mixta

2.3.4 Trastorno por dolor

A. El síntoma principal del cuadro clínico es el dolor localizado en una o más zonas del cuerpo, de suficiente gravedad como para merecer atención médica.

B. El dolor provoca malestar clínicamente significativo o deterioro social, laboral o de otras áreas importantes de la actividad del individuo.

C. Se estima que los factores psicológicos desempeñan un papel importante en el inicio, la gravedad, la exacerbación o la persistencia del dolor.

D. El síntoma o déficit no es simulado ni producido intencionadamente (a diferencia de lo que ocurre en la simulación y en el trastorno facticio).

E. El dolor no se explica mejor por la presencia de un trastorno del estado de ánimo, un trastorno de ansiedad o un trastorno psicótico y no cumple los criterios de dispareunia.

Codificar el tipo:

Trastorno por dolor asociado a factores psicológicos: se cree que los factores psicológicos desempeñan un papel importante en el inicio, la gravedad, la exacerbación o la persistencia del dolor (si hay una enfermedad médica, ésta no desempeña un papel importante en el inicio, la gravedad, la exacerbación o la persistencia del dolor). Este tipo de trastorno por dolor no debe diagnosticarse si se cumplen también los criterios para trastorno de somatización.

Trastorno por dolor asociado a factores psicológicos y a enfermedad médica: tanto los factores psicológicos como la enfermedad médica desempeñan un papel importante en el inicio, la gravedad, la exacerbación o la persistencia del dolor. La enfermedad médica asociada y la localización anatómica se codifican en el Eje III.

Especificar (para ambos tipos) si:

Agudo: duración menor a 6 meses.

Crónico**:** duración igual o superior a 6 meses.

2.3.5 Hipocondría

A. Preocupación y miedo a tener, o la convicción de padecer, una enfermedad grave a partir de la interpretación personal de síntomas somáticos.

B. La preocupación persiste a pesar de las exploraciones y explicaciones médicas apropiadas.

C. La creencia expuesta en el criterio A no es de tipo delirante (a diferencia del trastorno delirante de tipo somático) y no se limita a preocupaciones sobre el aspecto físico (a diferencia del trastorno dismórfico corporal).

D. La preocupación provoca malestar clínicamente significativo o deterioro social, laboral o de otras áreas importantes de la actividad del individuo.

E. La duración del trastorno es de al menos 6 meses.

F. La preocupación no se explica mejor por la presencia de trastorno de ansiedad generalizada, trastorno obsesivo-compulsivo, trastorno de angustia, episodio depresivo mayor, ansiedad por separación u otro trastorno somatomorfo.

Especificar si:

Con poca conciencia de enfermedad**:** si durante la mayor parte del episodio el individuo no se da cuenta de que la preocupación por padecer una enfermedad grave es excesiva o injustificada.

2.3.6 Trastorno dismórfico corporal

A. Preocupación por algún defecto imaginado del aspecto físico. Cuando hay leves anomalías físicas, la preocupación del individuo es excesiva.

B. La preocupación provoca malestar clínicamente significativo o deterioro social, laboral o de otras áreas importantes de la actividad del individuo.

C. La preocupación no se explica mejor por la presencia de otro trastorno mental

2.3.7 Trastorno somatomorfo no especificado

En esta categoría se incluyen los trastornos con síntomas somatomorfos que no cumplen los criterios para un trastorno somatomorfo específico.

3. Epidemiología de las somatizaciones en la infancia y adolescencia

3.1 Prevalencia y principales síntomas presentados

Los síntomas somáticos en la infancia y adolescencia han sido estudiados como síntomas individuales (Garber, Zeman, & Walker, 1990) y también como un conjunto de síntomas (Rask et al., 2009a). Los estudios suelen utilizar como instrumento de medida subescalas de quejas somáticas como la del *Child Behavior Checklist* (Janssens, Oldehinkel, & Rosmalen, 2009), inventarios de quejas físicas como el *Children´s Somatization Inventor*y (Vila et al., 2009), o bien cuestionarios específicos desarrollados para el estudio, como en la investigación de niños preescolares españoles de Domènech-Llaberia et al. (2004).

El uso de diferentes instrumentos de medida y de distintas metodologías dificulta la comparación de las prevalencias obtenidas en los estudios realizados. El conjunto de síntomas somáticos evaluados o la edad de los niños, por ejemplo, son aspectos que suelen variar y corroboran para índices de prevalencia muy distintos (Rocha, Prkachin, Beaumont, Hardy, & Zumbo, 2003).

Los síntomas físicos de patología desconocida son comunes en la infancia y adolescencia; particularmente dolor de cabeza, dolor abdominal, dolor en las extremidades, dolor en el pecho, fatiga, mareos, dolor musculoesquelético y síntomas gastrointestinales, manifiestos en un variado rango de severidad (Garralda, 2004; Masi et al., 2000; Sandberg & Stevenson, 2008).

Según muestras comunitarias, los síntomas somáticos funcionales (SSF) afectan entre el 10 y el 30% de los niños y adolescentes de los Estados Unidos (Campo & Fritsch, 1994). En una revisión con muestras de población general, se verificó que entre el 2% y el 10% de

los niños y adolescentes presentaron dolores y molestias funcionales cuya causa no fue encontrada (Goodman & McGrath, 1991).

Offord y colegas (1987) encontraron una prevalencia de síntomas somáticos recurrentes en 11% de las niñas y en 4% de los niños con edades entre 12 y 16 años. Otros estudios han relatado múltiples y frecuentes quejas somáticas entre 10 y 15% de los adolescentes (Belmaker, Espinoza, & Pogrund, 1985).

Hay una evidencia convergente en la literatura de que los dolores abdominales recurrentes seguidos de los dolores de cabeza son los SSF más frecuentes en la infancia y adolescencia (Steinhausen & Metzke, 2007).

En el trabajo de Garber y colaboradores (1991), el síntoma más común relatado fue el dolor de cabeza (25%), seguido de baja energía (23%), dolores musculares (21%) y malestar abdominal (17%). La media de síntomas observados por los niños fue menos de dos, cantidad muy inferior a los ocho síntomas necesarios para el diagnóstico actual del trastorno de somatización según el DSM-IV (American Psychiatric Association, 2000).

Entre el 7 y el 25% de los niños en edad escolar presentaron dolores abdominales en diferentes estudios (Abu-Arafeh & Russell, 1995; Apley & Naish, 1958; Campo & Fritz, 2007). Se trata del síntoma somático funcional más común en niños preescolares, con prevalencias de entre el 7 y el 11% (Domènech-Llaberia et al., 2004; Zuckerman, Stevenson, & Bailey, 1987). Síntomas gastrointestinales como las náuseas y los vómitos también son comunes, normalmente en asociación con los dolores abdominales.

En un estudio longitudinal con una muestra epidemiológica de niños entre 2 a 6 años, se verificó la prevalencia de dolores abdominales recurrentes. A los 2 años, el porcentaje encontrado fue de 3.8%; a los 3 años de 6.9%; y a los 6 años se observó una frecuencia de 11.8%. Los resultados indican una importante continuidad de los síntomas y un pico de

prevalencia alrededor de los 7 años (Ramchandani, Hotopf, Sandhu, Stein, & the ALSPAC Study Team, 2005).

El dolor de cabeza es la queja física más común observada en niños con edad escolar. Entre 10 a 30% de niños y adolescentes manifestaron un dolor frecuente en las últimas semanas (Egger, Angold, & Costello, 1998). La prevalencia obtenida en niños preescolares fue menor, con índices que varían de 0,5% a 3,6% (Ostkirchen et al., 2006; Sillanpää, Piekkala, & Kero, 1991).

Los mareos son otro tipo de síntoma informado por hasta 15% de los niños en los estudios, y normalmente están relacionados con migrañas (Garber et al., 1991). Otros dolores comunes incluyen el dolor musculoesquelético, dolor en las extremidades y de espalda (Campo & Fritsch, 1994). Cerca de un tercio de los jóvenes fineses informaron tener dolor musculoesquelético por lo menos una vez a la semana (Mikkelsson, Sourander, Piha, & Salminen, 1997).

El cansancio es otra queja también muy presente. En un estudio con muestra comunitaria, la mitad de adolescentes informaron tener cansancio por lo menos una vez a la semana, y 15% manifestaron tener cansancio diario (Belmaker, et al., 1985). Además, cerca del 10% de niños y adolescentes en edad escolar presentaron dolores en el pecho (Sandberg & Stevenson, 2008).

Al analizar las investigaciones realizadas en Europa, se puede afirmar que las principales quejas físicas funcionales de los niños europeos son bastante semejantes a las de niños norteamericanos, con variaciones en las frecuencias principalmente debidas por cuestiones metodológicas. Los hallazgos indican que el fenómeno de las somatizaciones tiene un carácter mundial y parece ser que no está asociado a una cultura específica.

Los resultados de una muestra de preescolares en España indican que el 20% de los participantes presentaron por lo menos una queja física durante un período de dos semanas. Las principales quejas fueron: dolor de estomago (7.9%), cansancio (5.7%), dolor en las piernas (3.8%), dolor de cabeza (2%) y mareos (0,4%) (Domènech-Llaberia et al., 2004). En otro estudio realizado con población danesa, Rask et al. (2009b) obtuvieron índices similares a la investigación con niños españoles. 23,2% de los niños de 5 a 7 años manifestaron SSF, con una sintomatología caracterizada principalmente por dolores en las extremidades, cabeza y estómago.

En una muestra británica con adolescentes de 11 a 16 años, los síntomas más frecuentes entre los sujetos con somatizaciones fueron: dolor de cabeza (13%), nausea (12%), dolores musculares (11%), baja energía (11%), dolor de espalda (11%) , dolores de estomago (9%) y debilidad (8%). 37% de la muestra ha relatado por lo menos una queja física frecuente, 12% han tenido cuatro o más quejas, 4% han tenido 7 o más síntomas y 0,8% manifestaron 13 o más síntomas (Vila et al., 2009).

En Italia, Masi y colaboradores (2000) investigaron una muestra comunitaria de niños de 8 a 18 años. Los índices de prevalencia son distintos a otros estudios, pero las quejas más frecuentes fueron los dolores de cabeza, dolores abdominales y en los músculos.

3.2 Edad y género

Aunque todavía exista una marcada controversia sobre las posibles explicaciones de por qué la edad y el género son aspectos importantes en el fenómeno de las somatizaciones, no hay duda de que ambas variables están relacionadas a la prevalencia, al tipo y la cantidad de síntomas experimentados.

La literatura demuestra que las chicas manifiestan más SSF que los chicos a la medida que se acercan a la adolescencia. Sin embargo, no hay evidencias de diferencias significativas en la distribución de los SSF según el género en la infancia temprana (Campo & Fritsch, 1994).

Al estudiar la presencia de los SSF en una muestra de niños prepúberes y adolescentes, Garber et al. (1991) y Campo et al. (1999) verificaron que únicamente las chicas con más de 11 años presentaron más quejas físicas que los chicos. La diferencia de género suele mantenerse en la edad adulta (Abu-Arafeh & Russell, 1995; Steinhausen & Metzke, 2007).

Son muchos los factores que sirven como base para justificar la mayor prevalencia de síntomas somáticos de las niñas en edad escolar. Algunos de ellos son: las alteraciones hormonales producidas en la pubertad, diferencias biológicas y temperamentales, el mayor riesgo de desarrollar trastornos de ansiedad o depresión que en el hombre, entre otros.

La edad, a su vez, puede ser un factor importante en el tipo y cantidad de síntomas que experimentan los niños y adolescentes (Garber et al., 1991). El dolor abdominal, por ejemplo, es la queja más común a los 9 años, mientras que el dolor de cabeza suele ser la queja más frecuente alrededor de los 12 (Campo & Fritz, 2007). Además, a medida que aumenta la edad hay una tendencia de que las quejas físicas sean polisintomáticas (Campo et al., 1999).

Egger y colaboradores (1998) verificaron que la prevalencia de un determinado síntoma puede aumentar o disminuir según la edad. En la muestra estudiada de niños de 9 a 15 años, los investigadores constataron que la prevalencia de los dolores de cabeza aumentó de manera significativa con la edad (Egger et al., 1998).

3.3 Deterioro funcional

Las somatizaciones pueden producir deterioros considerables en la vida de algunos de los niños y adolescentes, afectando áreas como el desarrollo, ajuste social y escolar (Konijnenberg et al., 2005; Robinson, Alverez, & Dodge, 1990).

Campo y colegas (1999) verificaron que los niños afectados por síntomas somáticos fueron más propensos a ser considerados enfermos y con problemas de salud por los padres. También presentaron más ausencias escolares y bajo rendimiento académico. Además, experimentaron más dificultades emocionales y problemas de conducta.

Los resultados de muchas investigaciones apuntan que los niños con dolor de cabeza u otros síntomas presentaron más problemas en las guarderías o escuelas, desarrollaron menos actividades de ocio, demostrando un gran impacto de los síntomas físicos en la vida diaria (Aromaa, Sillanpää, Rautava, & Helenius, 2000; Bandell-Hoekstra et al., 2002)

Está bastante documentado que niños y adolescentes con distintos tipos de SSF presentan un elevado número de ausencias escolares y bajo rendimiento académico (Campo et al., 2004; Fichtel & Larsson, 2002). También hay que considerar otras posibles consecuencias como aislamiento social o temor a perder las relaciones sociales (Bernstein et al., 1997).

Los resultados de un estudio con niños de 7 años demostraron que los participantes con dolores recurrentes presentaron un peor rendimiento escolar (Bakoula, Kapi, Veltsista, Kavadias, & Kolaitis, 2006). Los autores consideran la posibilidad de que estos niños tengan más dificultades para adaptarse al trabajo escolar cuando son comparados con niños sanos. Las dificultades les producirían un mayor nivel de estrés, lo que contribuiría para el desarrollo de los dolores recurrentes.

También son bastante comunes problemas como: reducción en las actividades de deportes, problemas alimentarios y problemas del sueño (Konijnenberg et al., 2005; Roth-Isigkeit, Thyen, Stöven, Schwarzenberger, & Schmucker, 2005).

En una muestra de adolescentes los deterioros relacionados a los síntomas físicos fueron: dificultades de concentración, disminución de la capacidad de disfrutar, ausencias escolares, y una menor presencia junto a los amigos (Vila et al., 2009). Estas limitaciones podrían afectar los sentimientos respecto a la autoestima, lo que aumentaría la probabilidad de presentar síntomas depresivos (Erkolahti, Ilonen, Saarijärvi, & Terho, 2003).

La somatización pediátrica también está altamente asociada con el aumento de la utilización de los servicios de salud (Campo & Fritsch, 1994). Quejas físicas como dolores recurrentes pueden causar constantes visitas médicas y la realización de varias pruebas médicas que busquen comprender el fenómeno (Sandberg & Stevenson, 2008). Cerca de 2 a 4% de las visitas pediátricas están relacionadas con los SSF (Netherton, Holmes, & Walker, 1999).

En una muestra comunitaria con niños de 5 a 7 años, 4,4% de los niños con quejas físicas recurrentes han demostrado tener algún deterioro significativo. Estos niños recibieron medicación en función de los síntomas funcionales (Rask et al., 2009b).

La realización de exámenes y tratamientos innecesarios pueden exponer el niño a un sufrimiento físico innecesario e incluso llegar a producir algún daño en su desarrollo físico como consecuencia de las acciones médicas. Además, las constantes visitas médicas pueden aumentar la creencia familiar de que una enfermedad seria no está siendo diagnosticada (Grattan-Smith, Fairley, & Procopis, 1988).

También es importante considerar que algunos estudios demuestran la estabilidad de los SSF a lo largo del tiempo; y que el deterioro generado no mejora con el paso de los años (Mulvaney, Lambert, Garber, & Walker, 2006; Steinhausen & Metzke, 2007).

3.4 Síntomas psiquiátricos

Los síntomas físicos de patología desconocida han sido asociados con psicopatología tanto en muestras comunitarias como en clínicas, incluso en estudios con diferentes informantes (Eminson, Benjamin, Shortall, Woods, & Faragher, 1996; Poikolainen, Kanerva, & Lönnqvist, 1995; Taylor, Szatmari, Boyle, & Offord, 1996).

Características como una tendencia a ser ansioso, sensibilidad y timidez son frecuentes en los niños con quejas físicas, indicando la presencia de problemas emocionales (Apley & Naish, 1958; Rask et al., 2009). Rasgos similares como nerviosismo, síntomas de ansiedad, depresión, estrés, quejas somáticas y baja autoestima fueron descritos en niños y adolescentes con dolores de cabeza (Kowal & Pritchard, 1990).

Campo y colegas (1999) analizaron una muestra comunitaria de niños y adolescentes de 4 a 15 años. Los autores constataron que los niños considerados somatizadores fueron más propensos a experimentar dificultades emocionales y del comportamiento. Este grupo ha presentado casi 4 veces más incidencia de psicopatología que su grupo control. En otra investigación, cerca de 80% de los niños con dolor de cabeza o dolores abdominales frecuentes presentaron algún trastorno psiquiátrico, comparado con 15% de los niños del grupo control (Liakopoulou-Kairis et al., 2002).

Los trastornos de ansiedad y depresión son los trastornos psiquiátricos más comúnmente asociados a las somatizaciones infantiles (Eminson, 2001; Sandberg &

Stevenson, 2008); tanto en muestras clínicas como comunitarias (Campo et al., 2004; Egger, Costello, Erkanli, & Angold, 1999; Garralda, 2004).

Las investigaciones específicas sobre una determinada queja física también han demostrado la fuerte presencia de síntomas o trastorno de ansiedad y de depresión. Éste fue el caso de niños con dolores recurrentes (Liakopoulou-Kairis et al., 2002), niños con dolor de cabeza (Kowal & Pritchard, 1990), con dolor musculoesquelético (Egger et al., 1999) y con dolor en el pecho (Kashani, Lababidi, & Jones, 1982).

Al evaluar trastornos específicos de ansiedad, Ginsburg y colegas (Ginsburg, Riddle, & Davies, 2006) verificaron que los niños con fobia social o con ansiedad de separación han relatado un número similar de SSF. Por otro lado, los niños diagnosticados con ansiedad generalizada presentaron un elevado número de síntomas somáticos comparados con niños sin este diagnóstico.

Algunas investigaciones han demostrado asociación con conductas externalizantes en niños preescolares, tales como problemas de comportamiento e hiperactividad (Ramchandani et al., 2005; Zuckerman et al., 1987). También se encontraron asociaciones con problemas de atención, hiperactividad y de conducta en niños y adolescentes de 4 a 18 años con dolores de cabeza (Galli et al., 2007; Strine, Okoro, McGuire, & Balluz, 2006). Sin embargo, el efecto de la asociación ha sido más fuerte para los problemas emocionales.

A pesar de los hallazgos que asocian los SSF a problemas de comportamiento e hiperactividad (en menor grado que la ansiedad o depresión), hay muy pocos estudios específicos sobre la presencia de quejas físicas funcionales en niños y adolescentes con Trastorno por Déficit de Atención e Hiperactividad (TDAH). En muestras generales, el dolor abdominal recurrente y el cansancio se asociaron con el TDAH (Holmberg, 2010; Holmberg

& Hjern, 2006). La ausencia de un mayor número de investigaciones demuestra la necesidad de ampliar el conocimiento ya existente.

Un importante moderador de la asociación entre síntomas somáticos y problemas psicológicos es el género. Los resultados de los estudios de Egger y colegas (1998; 1999) apuntan que, en general, las quejas somáticas se asociaron con trastornos emocionales en niñas y con trastornos de conducta en niños. Los dolores abdominales solo fueron asociados con trastorno de ansiedad en chicas. En los chicos, los dolores abdominales fueron asociados con el Trastorno Negativista Desafiante y el TDAH. El dolor musculoesquelético fue asociado con trastornos depresivos tanto en chicos como en chicas. Los resultados de esta investigación sugieren que existen diferentes procesos psicobiológicos en ambos sexos. Según los autores del estudio, sería importante una exploración de cómo los cambios hormonales, morfológicos, estrés ambiental y expectativas culturales afectan los diferentes patrones entre quejas somáticas y psicopatología en chicas y chicos (Egger et al., 1998, 1999).

La presencia de síntomas o trastorno psiquiátrico tiene un importante impacto en las somatizaciones. Se ha verificado, por ejemplo, que la frecuencia de los síntomas somáticos suele aumentar según la severidad de la ansiedad o de los síntomas de depresión (Bernstein et al., 1997; Dhossche, Ferdinand, van der Ende, & Verhulst, 2001). Además, resultados de una investigación longitudinal apuntan que ambos trastornos son un factor de riesgo para las somatizaciones (Janssens, Rosmalen, Ormel, van Oort, & Oldehinkel, 2010).

También se encontraron evidencias de que elevados niveles de SSF en niños predijeron un trastorno psiquiátrico posterior (Egger et al., 1999; Zwaigenbaum, Szatmari, Boyle, & Offord, 1999). Siguiendo la misma línea, en un estudio longitudinal de veinte años se comprobó que los niños con dolores abdominales persistentes fueron más predispuestos a

presentar un trastorno psiquiátrico a la edad adulta cuando fueron comparados con niños sanos (Hotopf, Carr, Mayou, Wadsworth, & Wessely, 1998).

Todavía no hay estudios concluyentes que expliquen qué mecanismos actúan para que los trastornos psiquiátricos como la ansiedad o depresión estén asociados a la presencia de quejas físicas funcionales. Es cierto que los síntomas físicos son características intrínsecas de los trastornos de ansiedad y depresión, formando parte de los criterios diagnósticos para ambos trastornos (Garralda, 2004). Sin embargo algunas investigaciones que eliminaron dichos ítems de los análisis estadísticos, la asociación con las somatizaciones todavía fue significativa (Domènech-Llaberia et al., 2004).

Los constantes avances en el estudio de la psicopatología de la infancia y adolescencia invitan a la elaboración de nuevas hipótesis de investigación. Por este motivo, en el primer estudio empírico se verifica la existencia o no de una asociación entre el Severe Mood Dysregulation y los SSF. Se trata de un nuevo síndrome descrito por Leibenluft y colaboradores. Algunos de los síntomas presentes son: alteraciones del humor, irritabilidad, agitación, insomnio entre otros síntomas. Sin embargo, estos niños no llegan a cumplir los criterios necesarios para el Trastorno Bipolar (Leibenluft, Charney, Towbin, Bhangoo, & Pine, 2003)

4. Etiología de las somatizaciones

A pesar de que las quejas somáticas sean frecuentes en los centros de atención pediátricos, todavía resulta necesario un mayor número de estudios que clarifiquen las causas del fenómeno. Los estudios realizados sugieren una interacción entre factores ambientales y del propio niño (genética, fisiología, temperamento, etc) en el desarrollo de los SSF (Gillespie, Zhu, Heath, Hickie, & Martin, 2000; Torgersen, 1986).

El trabajo de Kendler y colaboradores (1995) sugiere un componente hereditario en las somatizaciones. Sin embargo, otro estudio con gemelos reveló poca o ninguna evidencia de una fuerte contribución genética en el desarrollo de las quejas físicas funcionales (Torgersen, 1986). En suma, mientras que los factores ambientales y genéticos asociados parecen ser relevantes en el origen de las somatizaciones, la evidencia de un componente genético específico es bastante limitada. No obstante, hay una contribución importante de los factores genéticos en la determinación de rasgos de personalidad que presentan una mayor predisposición a la somatización (Walker, Garber, & Greene, 1994).

Se ha señalado una variedad de factores predisponentes y precipitantes de las somatizaciones, aunque ninguno es ni necesario ni suficiente por sí solo (Eminson, 2001). Los niños somatizadores podrían presentar una vulnerabilidad a reaccionar ante la adversidad con mayores niveles de excitación emocional y angustia. La intensidad de la reacción contribuiría con la producción del síntoma físico (Campo & Fritz, 2007). También pueden existir factores desencadenantes de origen ambiental que sean exclusivos de cada niño y de su entorno.

4.1 Teorías psicológicas y posibles mecanismos de las somatizaciones

Diversos investigadores de la infancia y la adolescencia han estudiado muchas teorías en la búsqueda de explicar los mecanismos que influencian el origen y la progresión de los SSF. La teoría psicodinámica de Freud (1962) resalta que el desarrollo de las quejas físicas está vinculado a las necesidades y emociones reprimidas del niño. Esta teoría considera que los síntomas somáticos son una defensa psicológica contra emociones reprimidas o inconscientes. Las quejas físicas serían la expresión de un malestar.

Una segunda escuela de pensamiento, fundamentada en la teoría del apego, caracteriza la somatización como una forma para que el niño se mantenga muy cerca de la figura cuidadora y obtenga su atención (Bowlby, 1973). En la literatura, hay pocos estudios que fundamentan ambas teorías.

Una tercera corriente, el pensamiento sistémico familiar postula que las somatizaciones infantiles posibilitan un funcionamiento familiar equilibrado y evitan el surgimiento de conflictos (Aro, Hänninen, & Paronen, 1989; Aro, 1987).

El aprendizaje también ha sido implicado en el desarrollo y mantenimiento de las somatizaciones infantiles. Bandura (1976) ha demostrado que el aprendizaje social del comportamiento es uno de los mayores modos de adquisición de un nuevo comportamiento.

Los teóricos basados en el aprendizaje social postulan que los SSF son resultado de un conjunto de comportamientos sociales aprendidos. Éstos, a su vez, son frecuentemente reforzados por miembros de la familia o la propia sociedad (Craig, Cox, & Klein, 2002; Walker & Greene, 1989;1991; Walker, Claar, & Garber, 2002).

Según esta teoría, los síntomas somáticos pueden ser reforzados por una atención especial de los padres o bien por el hecho de que el niño, en función de su estado físico, no realice tareas consideradas desagradables como los exámenes escolares (Walker et al., 2002).

Una quinta perspectiva, la teoría psicobiológica cognitiva, afirma que los SSF son el resultado de una reacción fisiológica a la excitación emocional. Los niños percibirían los síntomas físicos con una preocupación mayor y una sensibilidad elevada. Dicha percepción estaría fundamentada en un procesamiento de la información distorsionado y por cogniciones negativas (Boyer et al., 2006). Como resultado, se daría una amplificación de las sensaciones corporales, siendo a su vez, uno de los principales procesos en el desarrollo de los SSF (Rief, Shaw, & Fichter, 1998).

Por último, considerando la alta comorbilidad con síntomas psiquiátricos, hay una corriente que defiende que las somatizaciones son consecuencia de un trastorno psiquiátrico, particularmente los trastornos de ansiedad y depresión (Campo et al., 2004). Muchos estudios han investigado la relación positiva entre somatizaciones y síntomas como la ansiedad o depresión, pero pocos autores intentan explicar los mecanismos posibles para esta asociación (Beck, 2008).

4.2 Factores temperamentales

Sanders y sus colaboradores (1989) destacan que factores psicológicos como características temperamentales y de personalidad son importantes aspectos a ser considerados en la etiología de los SSF. El temperamento se caracteriza por el estudio psicobiológico de las diferencias individuales en estilos de respuestas básicas del comportamiento (Nigg, 2006).

En el ámbito clínico, los niños y adolescentes con SSF tienden a ser descritos como perfeccionistas, sensibles, inseguros y ansiosos. Son niños considerados buenos por sus padres y que se preocupan mucho por su rendimiento académico y en corresponder con las expectativas familiares (Garralda, 1996; Kowal & Pritchard, 1990).

Los rasgos temperamentales relacionados a los niños somatizadores son: inhibición conductual, una tendencia a no establecer conflictos (evitación al daño) y a evitar situaciones nuevas, neuroticismo, afecto negativo (Campo et al., 2004; Davison, Faull, & Nicol, 1986; Muris & Meesters, 2004), temor al fracaso y anticipación al peligro (Lavigne, Schulein, & Hahn, 1986).

Los mecanismos de afrontamiento (*coping mechanisms*) también han sido destacados en las investigaciones como un importante factor asociado a las somatizaciones. Éstos se caracterizan por los esfuerzos voluntarios para regular las emociones, pensamientos, comportamiento, fisiología, y el ambiente en respuesta a eventos estresantes o diferentes circunstancias (Compas, Smith, Saltzman, Thomsen, & Wadsworth, 2001). También están vinculados a las características temperamentales de cada niño.

Los hallazgos en la literatura sugieren que los niños y adolescentes con síntomas físicos funcionales utilizan estrategias de afrontamiento poco adaptativas y, en cierta medida, una respuesta emocional al estrés elevada en comparación con niños sanos (Aromaa et al., 2000; Bandell-Hoekstra et al., 2002; Walker, Smith, Garber, & Claar, 2007). Según estos estudios, algunas de las estrategias de afrontamiento utilizadas por dichos niños son: la evitación, la ira, pensamientos obsesivos o alguna combinación de estos procesos.

Frare, Axia, & Battistella (2002) analizaron la calidad de vida y su correlación con las estrategias de afrontamiento. Los autores concluyeron que la habilidad del niño en utilizar

una estrategia de suceso con relación al síntoma físico presentado indica mejores resultados en la escuela, vida social y en el funcionamiento físico.

Al estudiar el temperamento de niños de 6 años con dolores recurrentes abdominales, Davison y colegas (1986) defienden la idea de que estos dolores pueden ser resultado de una vulnerabilidad al estrés. Aunque se hayan sugerido varias causas, frecuentemente se destaca la vulnerabilidad a los eventos estresantes como un factor desencadenante de las somatizaciones (Hodges, Kline, Barbero, & Flanery, 1985). Bakoula y colegas (2006) afirman que los niños con quejas de dolor reaccionan al estrés de la vida con altos niveles de angustia somática cuando son comparados con sus pares no afectados.

Otra característica peculiar en los niños con somatizaciones es su elevada sensibilidad para las sensaciones corporales, lo que se ha llamado amplificación ¨somatosensorial¨. Ésta se caracteriza por una mayor atención a las sensaciones corporales y una tendencia a fijarse en sensaciones infrecuentes (Barsky, Goodson, Lane, & Cleary, 1988).

4.3 Factores sociales y del ambiente

4.3.1 Cultura

Las posibles influencias de la cultura, raza o etnia en el desarrollo de las somatizaciones no han sido estudiadas de manera adecuada en población pediátrica (Campo & Fritsch, 1994). Sin embargo, se reconoce que son aspectos que pueden ser influentes y necesitan mayor investigación (Campo & Fritz, 2007).

4.3.2 Estatus socioeconómico

La literatura tampoco es concluyente sobre la influencia del estatus socioeconómico en las somatizaciones. Algunos autores han señalado una asociación entre bajo estatus

socioeconómico y bajo nivel de educación paterna con somatizaciones infantiles (Campo et al., 1999; Lieb et al., 2002; Steinhausen, von Aster, Pfeiffer, & Göbel, 1989). Otros autores informan de resultados dudosos o negativos (Stevenson, Simpson, & Bailey, 1988; Walker & Greene, 1991).

4.3.3 Eventos vitales estresantes

Hay importantes evidencias que afirman que los acontecimientos vitales adversos están asociados con la presencia de somatizaciones infantiles. Situaciones traumáticas como abuso sexual (Rimsza, Berg, & Locke, 1988), maltrato infantil (Haugaard, 2004; Perkonigg et al., 2005), la pérdida o la muerte de un familiar son factores que se asocian con la manifestación de quejas físicas (Aro et al., 1989; Walker & Greene, 1991).

Las situaciones negativas en casa o en la escuela suelen ser experiencias que producen un gran estrés somático en niños con mayor vulnerabilidad, elevando la presencia de síntomas físicos funcionales tanto en muestras clínicas como en muestras comunitarias (Boey & Goh, 2001; Walker, Garber, & Greene, 1993; 1994).

4.3.4 Factores familiares

Campo y colegas (1999) verificaron que niños con quejas físicas funcionales suelen venir de familias no intactas, donde los padres pueden estar casados pero no viven juntos. Los resultados de otra investigación de niños con dolores abdominales también revelaron que dichos niños suelen proceder de familias monoparentales (Campo et al., 2004; Sanberg & Stevenson, 2008).

Hay una evidencia importante de que los padres de niños con síntomas somáticos o familiares padecen más de quejas físicas que los de los niños no afectados (Hotopf, 2002; Walker, Garber, & Greene, 1991; Walker & Greene, 1989). La exposición a una enfermedad

de un miembro familiar también ha sido asociada con SSF a la edad adulta (Craig et al., 2002).

Es bastante común la presencia de problemas de salud en algún familiar de niños y adolescentes con síntomas físicos (Garralda, 1999; Craig, Boardman, Mills, Daly-Jones, & Drake, 1993). Algunos autores afirman que esta característica está implicada en la manifestación de las síntomas somáticos en la infancia, llegando a sugerir la existencia de un modelo familiar para los niños somatizadores (Grattan-Smith, Fairley, & Procopis, 1988; Maloney, 1980). Se acredita que la presencia de quejas físicas en un miembro familiar podría servir como un ejemplo conductual al niño. Este modelo contribuiría (junto con otros factores) con el desarrollo de las somatizaciones en los hijos (Osborne, Hatcher, & Richtsmeier, 1989).

También se ha verificado una elevada presencia de trastornos psiquiátricos en familias de niños con somatizaciones cuando se han comparado con familias de niños sanos, siendo los más comunes los trastornos de ansiedad, depresión y trastornos somatomorfos (Garber et al., 1990; Walker et al., 1994).

En investigaciones clínicas (Campo et al., 2007) y comunitarias (Zuckerman et al., 1987), las madres de niños y adolescentes con dolor crónico suelen presentar altos niveles de sintomatología depresiva o de ansiedad comparado con madres de niños no afectados (Hodges, Kline, Barbero, & Flanery, 1985; Hodges, Kline, Barbero, & Woodruff, 1985).

Por otro lado, se sabe que la relación entre padres e hijos juega un papel central en la comprensión de la conducta y en el desarrollo psicosocial del niño (Cummings, Davies, & Campbell, 2002). Basados en esta perspectiva, algunos investigadores estudiaron la relación entre los estilos educativos parentales y la presencia de somatizaciones pediátricas. Los estilos educativos parentales se definen por el conjunto de prácticas ejercidas por los padres

(o substitutos de los mismos) que caracterizan el cuidado de sus hijos (Pereira, Canavarro, Cardoso, & Mendonça, 2009).

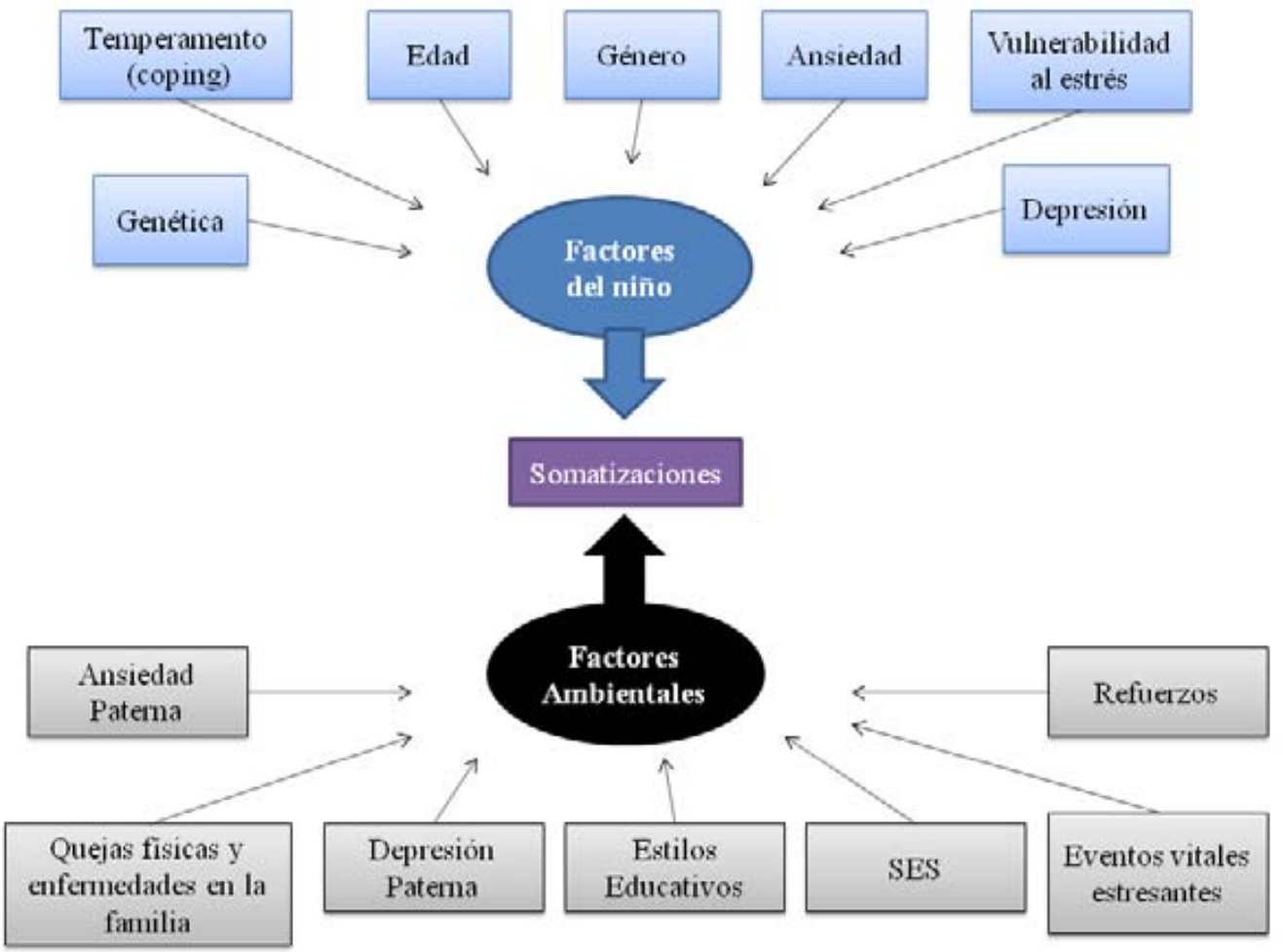
Los estudios indican que una excesiva preocupación y vigilancia ansiosa hacia los síntomas del niño pueden actuar como factores de mantenimiento de los síntomas físicos funcionales. Altos niveles de estrés materno y demasiada protección (sobreprotección, preocupación excesiva con el hijo) han sido descritos en mayor frecuencia en padres de niños con somatizaciones que en los padres de niños sanos (Garralda, 2004; Walker et al., 2006).

Robinson et al. (1990) afirman que hay una tendencia a la sobreprotección y a los temores de separación en los padres de los niños con somatización. Esto puede promover un sentido de vulnerabilidad personal en el niño que, a su vez, puede traducirse en una somatización (Spierings, Poels, Sijben, Gabreëls, & Renier, 1990).

En una investigación longitudinal con adolescentes de 10 a 12 años, Janssens et al. (2009) verificaron que la sobreprotección materna fue un predictor de somatizaciones para las chicas, mientras que la sobreprotección paterna fue un predictor para el desarrollo de quejas físicas en los chicos. Los resultados sugieren que padres sobreprotectores pueden corroborar con el desarrollo de SSF en jóvenes adolescentes.

En la figura 1 se observan los principales factores implicados en el desarrollo de las somatizaciones a partir de las investigaciones realizadas.

5. Figura 1: Factores implicados en el desarrollo de las somatizaciones



6. Presentación de los estudios empíricos

Dada la importancia verificada en muchos estudios entre la manifestación de los SSF y los trastornos de ansiedad en la infancia y adolescencia, las investigaciones presentadas en esta tesis se centran en esta asociación, intentando aportar algo o ampliar el conocimiento científico en esta área de investigación. Además, hay dos estudios que tienen por finalidad detectar posibles asociaciones entre los SSF y las conductas externalizantes. Aunque la literatura apunta una menor implicación de trastornos como el TDAH en el desarrollo de los SSF, se sabe que dichos niños también pueden manifestar SSF y presentar deterioros importantes decurrentes de ellos.

Considerando esta perspectiva, en el primer estudio denominado *Somatic symptoms, severe mood dysregulation, and aggressiveness in preschool children* (Serra Giacobo, Jané, Bonillo, Ballespí, & Díaz-Regañon, 2012) se investigó la presencia de quejas físicas funcionales en niños preescolares, una edad en que los estudios son escasos. Además, también se centró en la asociación con el *Severe Mood Dysregulation*, un síndrome presente en el ambiente clínico que está relacionado con el trastorno pediátrico bipolar y que actualmente resulta de gran interés en el ambiente científico (Leibenluft, Charney, Towbin, Bhangoo, & Pine, 2003).

El segundo artículo denominado *ADHD and functional somatic symptoms: Structural equations of a conceptual model*, se estudió la presencia de los SSF en una población clínica de niños y adolescentes de 6 a 18 años diagnosticados con TDAH.

En el tercer estudio denominado *Functional somatic symptoms: Structural equations of a conceptual model in a Spanish sample*, se utilizó una muestra comunitaria de niños escolares de 6 a 8 años para elaborar un modelo de ecuación estructural. El uso de ecuaciones

estructurales permite establecer relaciones entre las variables propuestas en un único análisis estadístico.

7. Objetivos, hipótesis y justificación de la tesis

7.1 Objetivo general

El objetivo general de la tesis doctoral es el de examinar la relación existente entre psicopatología, la sobreprotección paterna y la presencia de SSF en población infanto-juvenil.

Para cumplir con el objetivo se realizaron tres estudios empíricos con muestras distintas. La opción por estudiar la presencia de SSF en niños de diferentes edades y características se debió a la posibilidad de contribuir con algún dato de interés en áreas que todavía necesitan mayor atención, o bien porque los hallazgos ya encontrados necesitan ser replicados.

7.2 Objetivos específicos del primer estudio:

Somatic symptoms, severe mood dysregulation, and aggressiveness in preschool children (Serra Giacobo et al., 2012)

1. Conocer la prevalencia de los síntomas somáticos en una muestra de niños preescolares española.

2. Establecer asociaciones con psicopatología, agresividad y con el síndrome denominado Severe Mood Dysregulation (SMD).

7.3 Hipótesis del primer estudio:

1. Se espera encontrar una prevalencia de síntomas somáticos similar a los estudios previos, asociaciones con sintomatología de ansiedad pero no con el *Severe Mood Dysregulation* ni con síntomas de agresividad.

7.4 Objetivos específicos del segundo estudio:

ADHD and functional somatic symptoms: Structural equations of a conceptual model

1. Examinar el efecto de la ansiedad, depresión, y la sobreprotección paterna sobre los SSF manifestados en una muestra de niños con TDAH. En el estudio se utilizan dos modelos estructurales: uno basado en la información de los padres y otro en la de los niños.

2. Verificar si los SSF están asociados con el nivel de deterioro del funcionamiento general.

7.5 Hipótesis del segundo estudio:

1. El modelo conceptual propuesto presentará un buen ajuste a los datos.

2. El modelo de los padres y de los niños presentarán diferencias.

3. La ansiedad generalizada infantil y la sobreprotección paterna ejercerán un efecto sobre los SSF.

4. El nivel de deterioro funcional estará asociado con la presencia de los SSF.

7.6 Objetivos específicos del tercer estudio:

Functional somatic symptoms: Structural equations of a conceptual model in a Spanish sample

1. Elaborar un modelo de ecuación estructural para los SSF en una muestra de población general.

2. Verificar si la ansiedad, depresión y los síntomas somáticos de los padres tienen un efecto sobre la presencia de SSF en los niños.

3. Conocer cuáles variables del modelo propuesto tienen mayor influencia sobre los SSF.

7.7 Hipótesis del tercer estudio:

1. El modelo conceptual propuesto presentará un buen ajuste a los datos.

2. Las variables ansiedad de separación, sobreprotección paterna y las quejas físicas de los padres ejercerán un efecto significativo sobre los SSF.

7.8 Justificación

El interés por el tema se debe, fundamentalmente, por una motivación personal fruto de la experiencia clínica con niños y adolescentes y de la necesidad de aprender más sobre las somatizaciones para un mejor desarrollo profesional, sea en el ámbito clínico o académico.

También hay dos razones primordiales que justifican el estudio. La primera razón es por la importancia del tema y el impacto negativo que las somatizaciones pueden producir en el desarrollo evolutivo del niño. La segunda, porque su estudio permite establecer una

perspectiva integrada del comportamiento humano, donde las manifestaciones físicas y los procesos mentales son resultado de un proceso interactivo.

8. Primer estudio empírico

Somatic symptoms, severe mood dysregulation, and aggressiveness in preschool children

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ORIGINAL PAPER

Somatic symptoms, severe mood dysregulation, and aggressiveness in preschool children

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Abstract Many researchers have studied somatic symptoms in children. However, its association with severe mood dysregulation (SMD) is poorly known. The aim of this study is to detect the presence of SMD in preschool children and to know the prevalence of somatic symptoms and associations with psychopathology, SMD, and aggressiveness. The study population consists of children between 3 to 6 years of age enrolled in Barcelona's kindergarten schools (n=319). Their parents completed questionnaires about the presence of somatic symptoms in children, absences from school and pediatric visits, child psychiatric symptoms, presence of symptoms of SMD, and aggressiveness. Teachers were also informed about SMD and aggressiveness. Children who complained frequent somatic symptoms (three or more in the last 2 weeks) were compared with those who did not. Two hundred five children (64.3%) reported at least one physical complaint in the 2 weeks preceding the study. One hundred participants (31.3%) reported frequent somatic complaints. Positive associations were found with anxiety symptomatology, separation anxiety, social phobia, pediatric visits, and school absences, but not with aggressiveness or SMD symptoms. Somatic symptoms are common in a sample of preschool children but do not show a positive association with the symptoms of SMD.

Keywords Somatic symptoms · Preschoolers · Psychopathology · Severe mood dysregulation

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Introduction

There are several difficulties and controversies in the diagnosis of pediatric bipolar disorder (BPD). This led to Leibenluft et al. [32] to propose a new syndrome present in the clinical setting [4] called severe mood dysregulation (SMD). The need arose to diagnose children who had mood disorders like irritability or sleep disorders, among others, but that did not meet the criteria for BPD.

Leibenluft [32] proposed a separate classification of the disorder because it is still unclear when an SMD symptomatology belongs to the broad phenotype of bipolar disorder. The syndrome is defined by an abnormal mood such as irritability, anger, or sadness. It also has symptoms such as insomnia, restlessness, inefficient thinking, talking too much, distractibility, and increased reactivity to negative stimuli (tantrums). These symptoms must begin before 12 years of age [5]. Literature shows that studies have been conducted with schoolchildren and adolescents [5, 6, 32] but it has not been detected whether preschoolers can have those symptoms. Many works investigated psychiatric disorders in preschool children [28, 35]. However, according to the available literature, there are no studies in which an association between SMD and somatic symptoms is shown.

Somatization is characterized by the presence of physical symptoms that are not better explained by a medical condition [23, 27, 29]. It can be defined as an expression

of a psychological difficulty through one or more physical complaints [34]. Somatization is quite common in childhood and adolescence and is responsible for a significant number of visits to pediatric care centers [7, 37, 44].

In research with general population samples, parents often reported recurrent somatic symptoms in their children. According to Goodman and McGrath [24], between 2% and 10% of children have functional pain without justified cause. Domènech-Llaberia et al. [14] evaluated somatic symptoms in a sample of preschool children. The most frequent complaints were: stomachache (38.8%), fatigue (20.4%), headache (16.7%), and leg pain (16.6%). The prevalence of recurrent somatic complaints was 20.4%. In another study with similar population [42], the frequency was 23.2% and complaints such as headache and stomachache were the most present.

Bakoula et al. [2] explored recurrent pain in an epidemiological sample and found a prevalence of 7.2%. Zuckerman et al. [47] analyzed recurrent headaches and stomachaches in preschool children and found a frequency of 3% and 9%, respectively.

Age and gender may be related to the frequency of somatic symptoms. There is a tendency to have no differences until late childhood and puberty, when symptoms are more common in girls than in boys, especially the closer they get to adolescence [2, 8, 10, 17, 22, 27, 41]. Nevertheless, Rask et al. [42] found gender differences in preschool children, and girls showed more recurrent physical complaints.

In many studies, somatization has been associated with psychopathology, particularly anxiety and depression [3, 11, 16, 20, 29, 33]. Most authors find that the association with internalizing disorders is higher than with externalizing disorders [6, 9, 10, 12, 24, 28, 29]. However, Egger et al. [16, 17] found positive association between somatic symptoms and conduct disorder in males and also with oppositional defiant disorder. Pakalins et al. [39] also found an association between migraines and oppositional defiant disorder.

Many investigations have focused on specific symptoms such as recurrent stomachache or headache [11, 16, 20, 33, 41]. Furthermore, most researches have been devoted to studying schoolchildren and adolescents. Studies focused on preschool children are scarce [14, 15, 38]. Since research suggests that somatic symptoms in adults have their origins in childhood and maintain certain continuity [3, 9, 18, 34], it seems important to verify the presence of symptoms at early ages.

Relationship between aggressiveness and somatic symptoms has been poorly studied. Aggressive behavior or behavioral problems may be defined in terms of a psychiatric disorder such as disruptive behavior disorders [40]. It may also be understood as a strategy to solve interpersonal conflicts [36]. Some degree of aggressive behavior towards peers in preschool tends to occur and it is not necessarily indicative of emotional or behavioral disturbance. It only represents a normal, appropriate response to the needs of development. However, when it becomes persistent, as in the case of children with SMD, it may be a risk factor for psychopathology [45].

So far, studies indicate that children with somatic complaints have a higher level of neuroticism and fewer antisocial traits such as aggression. They also have a tendency to harm avoidance and have fewer disciplinary problems in school than their peers [11, 26]. Considering that research on somatization and specific behavioral traits such as aggression is scarce, it is important to extend the information especially about preschoolers in which aggressive behaviors are often present.

The aim of this research is to know the prevalence of somatic symptoms and associated variables in a sample of preschool children. Also, it is intended to verify the presence of SMD symptoms in such sample.

According to literature and to the above aims, it is expected to find a prevalence of somatic symptoms similar to that of previous studies. Also, it is expected to find associations with the symptoms of anxiety but not with SMD or with symptoms of aggressiveness.

Method

Participants

The study population consisted of children from the city of Barcelona, enrolled in preschool education, which in Spain includes three levels: P3 (3–4 years of age), P4 (4–5 years of age), and P5 (5–6 years of age). The sample universe was comprised of 18 concerted schools, that is, private schools subsidized by the city of Barcelona. From this sample, five schools were selected, each located in one of the largest districts of the city. The total number of children between 3 and 6 years of age enrolled in these schools was 475. Three of them were specific to early childhood (0–6 years of age), and the other two offered nursery, primary education, and secondary education. It was, therefore, a non-probability quota sampling.

Parents of 365 children (76.8%) gave their consent, a similar participation index to previous investigation [13]. It was possible to obtain full details of parents and teachers in 333 (91.2%) cases. Children suffering from chronic illness ($n=14$) were excluded. Previously, children with a pervasive developmental disorder or mental deficiency were also excluded. Thus, 319 participants composed the final sample.

Instruments

Physical symptoms

Qüestionari Pels Pares (Questionnaire for Parents) [14]. It is a questionnaire of general information on children and their families. In the section on physical symptoms, parents completed the items on the presence and frequency (one, two, three, or more occasions) of children's somatic complaints. The assessed symptoms were: stomachache, headache, fatigue, dizziness, and other complaints. These symptoms were selected because they are common in general population studies [22]. The questionnaire also asked about pediatric visits and school absences related to physical complaints. The Four Factor Index of Social Status was used to measure the socioeconomic status of families [25].

Psychopathology

Early Childhood Inventory-4 (ECI-4) [19, 46], version for parents and teachers. This is a screening instrument that follows the DSM-IV [1] criteria for emotional and behavioral disorders in children aged 3 to 6 years. The category of symptoms has adequate internal consistency and test–retest reliability. It also has good criterion validity for the most common disorders in children aged 3 to 6 years [46]. ECI-4 psychometric properties have been previously studied in Spanish samples. Internal consistency between versions for parents and teachers has been satisfactory but low in emotional disorders [28]. This study used information from parents to establish psychiatric symptoms.

Severe mood dysregulation

In a previous study, items from the Child and Adolescent Psychiatric Assessment (CAPA) were used to determine the presence of SMD [5] based on the definition of the disorder provided by Leibenluft et al. [32]. On the same line, items from ECI-4 [19] answered by parents and teachers were used to define the presence of symptoms of SMD. Those items are similar to the CAPA ones which is a diagnostic interview that also follows the DSM-IV (see Table 1).

Aggressiveness toward peers

Peer Conflict Scale [19]. This is a ECI-4 scale containing ten items based on categories of physical, verbal, symbolic aggressiveness, and aggressiveness toward an object. The scale has a version for teachers and parents.

General aggressiveness

Items from ECI-4 [19] answered by parents and teachers were used. Selected items belong to the scale assessing

Table 1 Child and Adolescent Psychiatric Assessment items and ECI's corresponding items used to verify the presence of severe mood dysregulation

CAPA's[a] section and item(s)	ECI's categories, item(s), and number of item(s)
Depression section	Category F: depression
1. Sensible	1. Sensible (76)
2. Irritability	2. Irritability (67)
3. Resentment	3. Resentment (67)
4. Depressed mood	4. Depressed mood (66)
5. Inefficient thoughts	5. Inefficient thoughts (75)
Defiant behavior section	Category B: oppositional defiant
1. Losing control	1. Losing control (21)
2. Tantrums	2. Tantrums (26)
Sleep disorder section	Category H: sleep and F: dysthymia
1. Insomnia	1. Sleep disorder (81, 82, 83)
	2. Change of sleep habits (73)
ADDH section	Category A: ADDH
1. Hyperactivity or agitation	1. Hyperactivity or agitation
2. Difficulty in remaining sat	2. Difficulty in remaining sat
3. Talks too much	3. Talks too much
4. Interrupts others	4. Interrupts others
5. Difficulty in waiting turns	5. Difficulty in waiting turns
6. Difficulty in concentrating	6. Difficulty in concentrating
7. Difficulty in following directions	7. Difficulty in following directions

CAPA Child and Adolescent Psychiatric Assessment, *ECI* Early Childhood Inventory-4, *ADDH* attention deficit disorder with hyperactivity

[a] Based on the criteria of SMD provided by Leibenluft and colleagues [5]

conduct disorder and indicate the presence of aggressive behavior. They are: 1, "starts physical fights"; 2, "deliberately destroys others' property"; 3, "he/she is physically cruel to animals"; 4, "he/she is physically cruel to people".

Procedure

After obtaining the consent of the participating schools' management staffs, a letter was sent to parents summoning them to a meeting where the aims of this study were explained and where they signed an informed consent. Absent parents were informed and teachers encouraged them to participate.

All schools were given the possibility that teachers to be replaced with members of the research team to give them time to answer the questionnaires. Only one of the schools agreed to be helped. The other teachers from other schools completed the questionnaires relating to students at another time and had 1 month to return them to the research team. In turn, parents received questionnaires from teachers and completed them at home. They were asked to deliver the questionnaires with the minimum delay possible. Teachers conducted the return of questionnaires.

Statistical analysis

The Pearson χ^2 test was used to determine the statistical significance of differences between children who complained frequent somatic symptoms and children who did not complain. A Student's t test was used to verify the variability of SMD symptoms. Finally, binary logistic regression models were used to calculate the effect of SMD, general aggression, and aggression among peers in the presence of somatic symptoms, adding the confounding variables age and gender. Following the guidelines of many authors [30, 31, 43] and since regression is used as a means to measure an effect, and it does not has a predictive objective, only the coefficients b of interest and their respective odds ratios are showed. It is noteworthy that in all statistical analysis, the level of significance was $p<0.05$.

Results

Sample

From 319 participants who were part of the sample, 128 were girls (40.1%) and 191 were boys (59.9%), distributed between the ages of three to six (mean age=4.7, SD=0.89), studying the P3 [n=118 (37%)], P4 [n=108 (33.9%)], and P5 [n=93 (29.2%)] levels of early childhood education. Most of the sample [n=298 (93.4%)] was placed in the middle and upper-middle socioeconomic level. The sample did not show a significant ethnic or cultural variability.

Somatic complaints

Only 35.7% (n=114) of participants had no physical complaints. In other words, a total of 205 (64.3%) children according to their parents had at least one physical complaint in the 2 weeks preceding the study: 116 boys (60.7%) and 89 girls (69.5 %). The most frequent complaints were stomachache [143 (44.8%)], fatigue [83 (26%)], headache [56 (17.6%)], leg pain [45 (14.2%)], and dizziness [6 (1.9%)] (Table 2).

Frequent somatic complaints

In line with other investigations, the criteria for case definition were the presence of any somatic complaints more often than three times during the 2 weeks preceding the study [14, 22]. These children were compared with those children who did not have frequent somatic complaints (n=219).

Prevalence of somatic symptoms

The prevalence of children considered as "somatizing" was 31.3% [95% CI=26.5% to 36.6% (n=100)]. With regard to gender and age when comparing both groups, significant differences were not found. There were also no significant

Table 2 Types and distribution of complaints reported by parents (n=319)

Types	Never		Once		2–3 Times		+3 Times	
	Count	Percent (%)	Count	Percent (%)	Count	Percent (%)	Count	Percent (%)
Stomachache	176	55.2	48	15	46	14.4	49	15.4
Leg pain	274	85.9	19	6.0	14	4.4	12	3.8
Headache	263	82.4	34	10.7	16	5.0	6	1.9
Fatigue	236	74.0	30	9.4	30	9.4	23	7.2
Dizziness	313	98.1	5	1.6	1	0.3	–	–
Total		79.1		8.5		6.7		28.2

differences in the analysis of physical complaints by areas (stomachache, headache, fatigue, dizziness, and leg pain).

Psychopathology

The presence of internalizing and externalizing symptoms was analyzed. Results are shown in Table 3. Children with recurrent somatic complaints showed more any anxiety symptoms. Analyzing the specific symptoms of anxiety, children defined as cases had more separation anxiety and social phobia. With regard to gender, both boys and girls with recurrent somatic complaints had a higher association with any anxiety symptoms and separation anxiety but not the same applies to girls with respect to social phobia (Table 3).

We also analyzed the presence of the following psychiatric symptoms: attention deficit disorder with hyperactivity, generalized anxiety, specific phobia, depression, dysthymia, conduct disorder, and oppositional defiant disorder. However, there were no significant associations with somatic symptoms. Meaningful analysis between physical complaints and psychiatric symptoms can be seen in Table 4.

Family structure, pediatric visits, and school absences

Children with recurrent physical complaints had higher school absences [25 (25%)] than their peers without the condition [25 (11.4%)], the difference being statistically significant (χ^2=9.58, p=0.002, R=2.58, 95% CI=1.39 to 4.78). Similarly, they visited the pediatrician more often [28 (28%)] than their peers [18 (8.2%)] (χ^2=21.76, p<.001, R=4.34, 95% CI=2.26 to 8.32). With regard to family structure, no significant differences were found among groups.

SMD and aggressiveness

In parents, the difference between means obtained by Student's t test (children with recurrent physical complaints, mean (M)=37.2, SD=6.8; children without recurrent physical complaints, M=35.6, SD=7.0; Δ=1.6, p=0.046, 95% CI=0.03 to 3.32) indicated the presence of variability in the symptoms of SMD, which suggests to be a present manifestation in preschool children. In teachers, there are not statistical difference between means (Δ=−0.12, p=0.864). The mean values for general aggression [parents, M=4.46, SD=0.81; teachers, M=4.30, SD=0.90] and aggression among peers (parents, M=12.06, SD=2.56; teachers, M=11.39, SD=2.6) were similar in both informants.

To verify the association among frequent somatic complaints, SMD, aggressiveness among peers, and general aggressiveness, a binary logistic regression model was carried out. There were no statistically significant associations with the exception of anxiety symptoms (Table 5).

Discussion

Results confirm that recurrent somatic complaints are common in samples of children 3 to 6 years of age. Exclusion in

Table 3 Psychiatric symptoms association with frequent somatization (n=319)

Psychiatric symptoms		Frequent somatization				Pearson's chi-square (χ^2)	$p^{a,b}$	O.R.	CI 95% for OR	
		Yes (N=100) boys (n=54) girls (n=46)		No (N=219) boys (n=137) girls (n=82)						
		Frequency (f)	Percent (%)	Frequency (f)	Percent (%)				Lower	Upper
Any anxiety	Boys	21	38.9	25	18.2	9.02	0.003	2.85	1.41	5.73
	Girls	17	37	16	19.5	4.68	0.030	2.41	1.07	5.43
	Total	38	38	41	18.7	13.69	<0.001	2.66	1.57	4.51
Separation anxiety	Boys	16	29.6	6	4.4	24.23	<0.001	9.19	3.36	25.12
	Girls	12	26.1	8	9.8	5.96	0.015	3.26	1.22	8.72
	Total	28	28	14	6.4	28.03	<0.001	5.69	2.84	11.41
Social phobia	Boys	8	14.8	3	2.2	11.37	0.002	7.76	1.97	30.52
	Girls	3	6.5	1	1.2	2.73	0.132	5.65	.570	55.98
	Total	11	11	4	1.8	12.89	0.001	6.64	2.06	21.42

O.R. odds ratio, *CI* confidence interval

[a] Significance level

[b] Only statistically significant values are showed

Table 4 Psychiatric symptoms association with physical complaints (n=319)

Psychiatric symptoms		Physical complaints				χ^{2a}	$p^{b,c}$	O.R.	CI 95% for O.R.	
		(Yes)		(No)						
		Frequency (f)	Percent (%)	Frequency (f)	Percent (%)				Lower	Upper
Any anxiety	Stomachache	18	36.7	61	22.6	4.45	0.035	1.98	1.04	3.80
	Leg pain	6	50	73	23.8	4.26	0.039	3.20	1.03	10.24
Separation anxiety	Stomachache	15	30.6	27	10	15.41	<0.001	3.9	1.92	8.20
	Leg pain	6	50	36	11.7	14.79	0.002	7.5	2.30	24.59
	Headache	3	50	39	12.5	7.25	0.032	7.02	1.37	36.04
Social phobia	Stomachache	6	12.2	9	3.3	7.35	0.016	4.04	1.37	11.94
	Fatigue	4	17.4	11	3.7	8.90	0.017	5.45	1.58	18.75

O.R. odds ratio, *CI* confidence interval

[a] Pearson's chi-square

[b] Significance level

[c] Only statistically significant values are showed

the analysis of children whose parent questionnaires indicated the presence of chronic diseases and the evaluation of the most common symptoms (stomachache, fatigue, headache, dizziness, and leg pain) suggest that physical complaints are not best explained by a medical condition.

As reported by parents, the prevalence of frequent somatization was 31.3%. Domènech-Llaberia et al. [14] found a prevalence of 20.4%. Zuckerman et al. [47] analyzed recurrent headaches and stomachaches in preschool children and found a rate of 3% and 9%, respectively. Rask et al. [42] claim that 23.2% of children had functional somatic symptoms in which no cause was found. Masi et al. [37] found a prevalence of 69.2%.

It is possible that the discrepancy of results is based on the lack of consistency of instruments and methodologies in the different studies. The assessment of somatic symptoms did not include the same list of symptoms [33], and it was applied to children of different ages and cultures. These differences make it difficult to compare results.

In the case of research by Domènech-Llaberia et al. [14], a more accurate comparison can be made if methodologies and the studied population are similar. However, there is considerable difference in prevalence. Perhaps this is based on the information obtained. It is possible that in our research anxious parents overestimated their children's physical symptoms, which could increase the number of children who met our case definition. Moreover, these studies provide another important difference. Our research used a sample of a city larger than the sample used by Domènech-Llaberia [14]. Characteristics like the lifestyle of children can corroborate greater or lesser presence of somatic symptoms.

Table 5 Effects of aggressiveness and SMD symptoms on frequent somatic symptoms (n=319)

Variables		B	p^a	O.R.	CI 95% for O.R.	
					Lower	Upper
Aggressiveness toward peers	Parents	0.047	0.519	1.048	0.909	1.207
	Teachers	−0.046	0.639	0.955	0.790	1.156
General aggressiveness	Parents	−0.194	0.551	0.824	0.524	1.293
	Teachers	0.083	0.399	1.086	0.632	1.868
SMD[a]	Parents	0.026	0.196	1.026	0.987	1.068
	Teachers	0.002	0.949	1.002	0.954	1.051
Any anxiety symptomatology	Parents	0.854	0.003[b]	2.349	1.348	4.094

SMD severe mood dysregulation, *O.R.* odds ratio, *CI* confidence interval

[a] Significance level

[b] Statistically significant; adjusted for age and sex

According to our study, stomachache (15.4%), fatigue (7.2%), and leg pain (3.8%) were the most frequent physical complaints. This result is in line with previous studies [14, 42]. In other studies, the frequency of stomachache was about 10%, very similar to what has been found in other studies [27, 41]. The gender analysis showed no significant differences, corroborating most previous research [2, 8, 10, 22, 27, 41].

No significant associations with symptoms of SMD were observed, although seems to be a manifestation of preschool children, according parental reports. In analyzing the symptoms that configure SMD, the presence of symptoms such as hyperactivity, difficulty taking turns, tantrum, and irritability [4–6, 32] can be verified. On the other hand, children with frequent somatic symptoms have a higher level of emotional symptoms such as anxiety and neuroticism and a tendency to meet the expectations [11, 45]. Due to their personality traits, these children have no behavioral problems such as those described in SMD, which would justify the lack of association with it.

The same can be interpreted in relation to the lack of positive statistical association between aggressiveness (toward peers or in general) and somatic symptoms. It is known that somatic symptoms are more present in children with fewer juvenile antisocial traits and a tendency to harm avoidance as well as have fewer disciplinary problems in school. Results confirm the literature findings.

Following the findings of previous studies, children with somatization had more frequent school absences and pediatric visits [7, 23, 44]. It is possible that parents or caregivers were concerned with physical complaints and felt the necessity of a medical evaluation. In addition, the greater number of school absences indicate that these physical symptoms can cause functional damage in the activities of these children demonstrating the need for healthcare professionals to be vigilant of them at the time of evaluation.

Confirming the initial hypothesis, a significant association with anxiety symptoms was found. The effect of anxiety symptoms on somatic symptoms also is reflected in the regression model used in Table 5. Results confirm previous research that positively associates anxiety disorders with somatization [20, 21, 23, 29].

Social phobia and separation anxiety were the most frequent comorbidities in the research of Campo et al. [11]. In their study, positive associations with both symptoms were found. It is possible that children have a greater vulnerability to anxiety disorders. Vulnerability might be based on genetic, temperamental, or psychobiologic factors. Also, it might be that somatic symptoms as well as anxiety disorders have shared biological substrates, which act as mediators and justify the associations between them.

Many researchers assert that the effects of anxiety change the perception of somatic sensations. Also, it is known that somatizing children are used to be more attentive to the signs of their bodies. These factors might increase the chance of detecting more physical complaints making children more likely to develop somatic symptoms [29].

On the other hand, an association with externalizing symptoms was not expected. The results are similar to those of other works [10, 37, 44]. Di Lorenzo et al. [12] state that there exists evidence confirming that children with recurrent stomachache do not have high levels of conduct disorder or oppositional defiant disorder compared to healthy children.

Nevertheless, Egger et al. [16, 17] found an association between conduct disorder and headache. Pakalins et al. [39] refers to a significant association between oppositional defiant disorder and somatic symptoms. Egger et al. [16, 17] used a sample of subjects between puberty and adolescence. The literature indicates that hormonal and chemical changes typical of this age influence behavior. Therefore, the presence of externalizing disorders associated with somatization may be linked to this characteristic. Moreover, as in the work of Pakalins et al. [39], the association with somatic symptoms only exists when there is headache. In our analysis, we explored associations with somatic complaints in general and we used a preschool sample.

Our results suggest that in a Spanish sample, children 3 to 6 years of age show a significant frequency of somatic symptoms. These children may be considered a risk group for future emotional distress. The available literature argues that somatoform disorders in adults often begin in early childhood [3, 9, 15, 26]. Children with frequent somatic complaints should be evaluated as soon as possible to avoid future risk of said disorder. In this way, it would be possible to establish preventive work against future psychopathology.

This study has some limitations that should be taken into account when interpreting the results. The classification used for children with frequent somatic complaints was based on parent's reports using symptom items. Since children were not part of a clinical population, a medical diagnosis was not available to confirm that the medical symptoms could not really be explained by any medical condition. This limitation can be largely found in similar studies [14, 42].

According to Leibenluft and colleagues [32], the symptoms of SMD should be persistent for the last 12 months. Overall, the stability of psychiatric symptoms in preschool children is different than in schoolchildren. The symptoms could be not as persistent as in older children. Some authors suggest the need to modify the durability criteria for some disorders before applying it to young children [35]. For this reason, we believe that the lack of durability criteria of symptoms in our work do not

invalidate the results. However, further research is necessary to validate our findings in a larger and more representative sample.

The use of a single informant may produce some bias in the results. The concerns of parents regarding the physical symptoms may not reflect the same concerns of children regarding their own symptoms. The research results could be more potentialized by using multiple informants.

Future research

It would be interesting to investigate to what extent the severity of comorbid anxiety disorders affects the association with somatic symptoms. Studies considering the child's temperament, associations with somatization, and psychiatric disorders help to better understand the phenomenon. It would also be an important source for further information about aggressiveness and SMD in these children.

It would be important that future studies regarding somatization and SMD were centered on early childhood as the possibilities of intervention in the development of psychopathology are higher than in old age subjects. On the other hand, we must take into account the difficulties inherent in being able to distinguish the normal development process in preschool children from psychiatric symptoms [26].

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Conflict of interest The authors declare no conflict of interest related to this work.

References

1. American Psychiatric Association (1994) Diagnostic and statistical manual of mental disorders, 4th edn. American Psychiatric Association, Washington, DC
2. Bakoula C, Kapi A, Veltsista A, Kavadias G, Kolaitis G (2006) Prevalence of recurrent complaints of pain among Greek schoolchildren and associated factors: a population based study. Acta Paediatr 95:947–951. doi:10.1080/08035250600684453
3. Beck JE (2008) A developmental perspective on functional somatic symptoms. J Pediatr Psychol 33:547–562. doi:10.1093/jpepsy/jsm113
4. Boylan K, Eppel A (2008) The severe mood dysregulation phenotype: case description of a female adolescent. J Can Acad Child Adolesc Psychiatry 17:210–211
5. Brotman M, Schmajuk M, Rich B et al (2006) Prevalence, clinical correlates, and longitudinal course of severe mood dysregulation in children. Biol Psychiatry 60:991–997. doi:10.1016/j.biopsych.2006.08.042
6. Brotman M, Kassem L, Reising M et al (2007) Parental diagnoses in youth with narrow phenotype bipolar disorder or severe mood dysregulation. Am J Psychiatry 164:1238–1241. doi:10.1176/appi.ajp.2007.06101619
7. Campo J, Fritsch S (1994) Somatization in children and adolescents. J Am Acad Child Adolesc Psychiatry 33:1223–1235
8. Campo J, Fritz G (2007) Somatoform disorders. In: Martin A, Volkmar F (eds) Lewis's child and adolescent psychiatry, a comprehensive textbook, 4th edn. Lippincott Williams & Wilkins, Philadelphia, pp 633–647
9. Campo JV, Garber J (1998) Somatization. In: Ammerman RT, Campo JV (eds) Handbook of pediatric psychology and psychiatry: psychological and psychiatric issues in the pediatric setting. Allyn & Bacon, Boston, pp 137–161
10. Campo JV, Jansen-McWilliams L, Comer DM, Kelleher KJ (1999) Somatization in pediatric primary care: association with psychopathology, functional impairment and use of services. J Am Acad Child Adolesc Psychiatry 38:1093–1101
11. Campo J, Bridge J, Ehmann M et al (2004) Recurrent abdominal pain, anxiety, and depression in primary care. Pediatrics 113:817–824. doi:10.1542/peds.113.4.817
12. Di Lorenzo C, Colleti RB, Lehman HP et al (2005) Chronic abdominal pain in children. Pediatrics 115:370–381. doi:10.1542/peds.2004-2523
13. Domènech-Llaberia E, Viñas F, Pla E, Jané MC, Mitjavila M, Corbella T, Canals J (2009) Prevalence of major depression in preschool children. Eur Child Adolesc Psychiatry 18:597–604
14. Domènech-Llaberia E, Jané MC, Canals J, Ballespí S, Esparó G, Garralda ME (2004) Parental reports of somatic symptoms in preschool children: prevalence and associations in a Spanish sample. J Am Acad Child Adolesc Psychiatry 43:598–604. doi:10.1097/01.chi.0000117043.35450.bf
15. Egger HL, Angold A (2006) Common emotional and behavioral disorders in preschool children: presentation, nosology, and epidemiology. J Child Psychol Psychiatry 47:313–337. doi:10.1111/j.1469-7610.2006.01618.x
16. Egger HL, Angold A, Costello EJ (1998) Headaches and psychopathology in children and adolescents. J Am Acad Child Adolesc Psychiatry 37:951–958
17. Egger HL, Costello EJ, Erkanli A, Angold A (1999) Somatic complaints and psychopathology in children and adolescents: stomach aches, musculoskeletal pains, and headaches. J Am Acad Child Adolesc Psychiatry 38:852–860
18. Fritz GK, Fritsch S, Hagino O (1997) Somatoform disorders in children and adolescents: a review of the past 10 years. J Am Acad Child Adolesc Psychiatry 36:1329–1338
19. Gadow KD, Sprafkin J (1997) Early childhood inventory-4 norms manual. Checkmate Plus, Stony Brook, New York
20. Galli F, D'Antuoo G, Tarantino S et al (2007) Headache and recurrent abdominal pain: a controlled study by means of the child behaviour checklist (CBCL). Cephalalgia 27:211–219. doi:10.1111/j.1468-2982.2006.01271.x
21. Garber J, Zeman J, Walker LS (1990) Recurrent abdominal pain in children: psychiatric diagnoses and parental psychopathology. J Am Acad Child Adolesc Psychiatry 29:648–656
22. Garber J, Walker L, Zeman J (1991) Somatization symptoms in a community sample of children and adolescents: further validation of the children's somatization inventory. Psychol Assess 3:588–595
23. Garralda ME (1999) Practitioner review: assessment and management of somatisation in childhood and adolescence: a practical perspective. J Child Psychol Psychiatry 40:1159–1167
24. Goodman JE, McGrath PJ (1991) The epidemiology of pain in children and adolescents. Pain 46:247–264
25. Hollingshead AB (1975) Four factor index of social status. Yale University, Department of Sociology, Connecticut
26. Hotopf M, Carr S, Mayou R, Wadsworth M, Wessely S (1998) Why do children have chronic abdominal pain, and what happens to them when they grow up? Population based cohort study. Br Med J 316:1196–1200
27. Huasain K, Browne T, Chalder T (2007) A review of psychological models and interventions for medically unexplained somatic symp-

toms in children. Child Adolesc Ment Health 12:2–7. doi:10.1111/j.1475-3588.2006.00419.x
28. Jané MC, Canals J, Ballespí S, Viñas F, Esparó G, Doménech E (2006) Parents and teachers reports of DSM-IV psychopathological symptoms in preschool children: differences between urban-rural Spanish areas. Soc Psychiatry Psychiatr Epidemiol 41:386–393. doi:10.1007/s00127-006-0038-2
29. Janssens K, Rosmalen J, Ormel J, Van Oort F, Oldehinkel J (2010) Anxiety and depression are risk factors rather than consequences of functional somatic symptoms in a general population of adolescents: the TRAILS study. J Child Psychol Psychiatry 51:304–312. doi:10.1111/j.1469-7610.2009.02174.x
30. Kleinbaum DG, Kupper LL, Morgenstern H (1982) Epidemiologic research. Principles and quantitative methods. Van Nostrand, New York
31. Kleinbaum DG, Kupper LL, Muller KE (1988) Applied regression analysis and other multivariable methods, 2nd edn. PWS-Kent, Boston
32. Leibenluft E, Charney DS, Towbin KE, Bhangoo RK, Pine DS (2003) Defining clinical phenotypes of juvenile mania. Am J Psychiatry 160:430–437. doi:10.1176/appi.ajp.160.3.430
33. Liakopoulou-Kairis M, Alifieraki T, Protagora D et al (2002) Recurrent abdominal pain and headache: psychopathology, life events and family functioning. Eur Child Adolesc Psychiatry 11:115–122. doi:10.1007/s00787-002-0276-0
34. Lipowsky Z (1988) Somatization: the concept and its clinical application. Am J Psychiatry 145:1358–1368
35. Luby J, Mrakotsky C, Heffelfinger A, Brown K, Hessler M, Spitznagel E (2003) Modification of DSM-IV criteria for depressed preschool children. Am J Psychiatry 160:1169–1172
36. Mariel J, Werner RS, Cassidy KW (2006) Early correlates of preschool aggressive behavior according to type of agression and measurement. J Appl Dev Psychol 27:395–410. doi:10.1016/j.appdev.2006.06.008
37. Masi G, Favilla L, Millepidedi S, Mucci M (2000) Somatic symptoms in children and adolescents referred for emotional and behavioral disorders. Psychiatry 63:140–149
38. Ostkirchen GG, Andler F, Hammer F et al (2006) Prevalences of primary headache symptoms at school-entry: a population-based epidemiological survey of preschool children in Germany. J Headache Pain 7:331–340. doi:10.1007/s10194-006-0325-z
39. Pakalnis A, Gibson J, Colvin A (2005) Comorbidity of psychiatric and behavioural disorders in pediatric migraine. Headache 45:590–596. doi:10.1111/j.1526-4610.2005.05113.x
40. Raaijmakers M, Smidts D, Sergeant J, Maassen G et al (2008) Executive functions in preschool children with aggressive behavior: impairments in inhibitory control. J Abnorm Child Psychol 36:1097–1107. doi:10.1007/s10802-008-9235-7
41. Ramchandani PG, Hotopf M, Sandhu B, Stein A, ALSPAC study team (2005) The epidemiology of recurrent abdominal pain from 2 to 6 years of age: results of a large, population-based study. Pediatrics 116:46–50. doi:10.1542/peds.2004-1854
42. Rask UC, Olsen EM, Elberling H et al (2009) Functional somatic symptoms and associated impairment in 5-7-year old children: the Copenhagen Child Cohort 2000. Eur J Epidemiol 24:625–634. doi:10.1007/s10654-009-9366-3
43. Rothman KJ (1987) Epidemiología moderna. Diaz de Santos, Madrid
44. Sandberg S, Stevenson J (2008) Psychiatric aspects of somatic disease. In: Rutter M, Bishop D, Pine D et al (eds) Rutter's child and adolescent psychiatry, 5th edn. Blackwell, Oxford, pp 930–944
45. Schaeffer CM, Petras H, Ialongo N, Poduska J, Kellam S (2003) Modeling growth in boy's aggressive behavior across elementary school: links to later criminal involvement, conduct disorder, and antisocial personality disorder. Dev Psychol 39:1020–1035. doi:10.1037/0012-1649.39.6.1020
46. Sprafkin J, Volpe RJ, Gadow KD, Nolan EE, Kelly K (2002) A DSM-IV referenced screening instrument for preschool children: the early childhood inventory-4. J Am Acad Child Adolesc Psychiatry 41:604–612. doi:10.1097/00004583-200205000-00018
47. Zuckerman B, Stevenson J, Bailey V (1987) Stomachaches and headaches in a community sample of preschool children. Pediatrics 79:677–682

9. Segundo estudio empírico

ADHD and functional somatic symptoms: Structural equations of a conceptual model

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ADHD and functional somatic symptoms: Structural equations of a conceptual model

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Abstract

Background: To examine the effect of anxiety and parental overprotection on functional somatic Symptoms (FSS) in children with Attention deficit hyperactivity disorder (ADHD). **Method:** 76 children and adolescents (aged 6 to 17) with ADHD and their parents completed a clinical interview about psychiatric and somatic symptoms. Parents also reported about parenting styles. Structural equation modeling (SEM) was used. **Results:** The generalized anxiety, overprotection and specific phobia had a direct effect on FSS. **Conclusions:** Anxiety symptoms and parental overprotection may play a role in the development of FSS in children with ADHD. Further research is necessary to corroborate our findings.

Keywords: ADHD, Functional somatic symptoms, Structural equation modeling.

Introduction

Physical complaints and recurrent pain are common in children and adolescents (Beck, 2008; Janssens, Oldehinkel, & Rosmalen, 2009; Vila et al., 2009). Many of these symptoms have an unknown pathology (Dimsdale & Creed, 2009). The term somatization is usually applied to refer to the presence of physical symptoms for which medical evaluations do not prove the existence of any disease or biological process that can explain them. They have also been referred to as functional somatic symptoms (FSS) (Campo & Fritz, 2007).

According to Beck (2008), between 10% and 30% of children and adolescents in the United States have FSS. Similar frequencies have been found in studies of European samples (Serra Giacobo, Jané, Bonillo, Ballespí, & Díaz-Regañon, 2012).

Most research in clinical and general population show that the frequency of FSS is similar in boys and girls until late childhood and puberty. However, girls tend to show higher rates in adolescence (Domènech-Llaberia et al., 2004; Steinhausen & Metzke, 2007).

There is considerable evidence of high levels of psychopathology among children and adolescents with physical symptoms of unknown pathology. The association with anxiety disorders and depression has been widely studied and corroborated by several studies in both clinical and general population samples (Campo et al., 2004; Janssens, Rosmalen, Ormel, van Oort, & Oldehinkel, 2010; Liakopoulou-Kairis et al., 2002).

However, children and adolescents with Attention Deficit Disorder with Hyperactivity (ADHD) also manifest FSS (Cho et al., 2009; Egger, Costello, Erkanli, & Angold, 1999; Rapport, Randall, & Moffitt, 2002). In general samples, some authors have found positive associations between children diagnosed with ADHD and recurrent abdominal pain, sleep problems, and fatigue (Holmberg & Hjern, 2006). The prevalence of physical symptoms in

such children is lower compared with that of children with internalizing symptoms. To our knowledge, specific studies of FSS in children and adolescents with ADHD are limited.

ADHD is a behavioural disorder characterized by excessive inattention-disorganization (difficulty paying attention to detail, making mistakes in home and work tasks or in other activities), and/or hyperactivity/impulsivity (shaking hands or feet, squirming on the seat, difficulty taking turns, etc.). The DSM-IV classifies ADHD into three subtypes: predominantly inattentive, predominantly hyperactive-impulsive, and a combined subtype (American Psychiatric Association, 2000).

Many of the affected children have difficulties in both social and cognitive functioning. Compared with healthy children, adolescents and children with ADHD have higher academic difficulties, poor school performance and reading problems, among others (Biederman, 2005). School performance may be affected not only by attention deficits but also by possible impairment of intelligence (Steinhausen, 2009).

In addition to impairments caused by ADHD, the overall functioning may also be affected by the presence of FSS. It is common that children and adolescents with physical complaints have higher rates of school absenteeism compared with healthy children, which can lead to academic difficulties and limitations in social functioning (Hughes, Lourea-Waddell, & Kendall, 2008). They also use more health services than healthy children. This can lead them to undergo medical procedures or unnecessary use of medication (Beck, 2008; Campo & Fritz, 2007).

Functional somatic symptoms are the result of a multifactorial process in which the contributing factors may relate to cognitive, social, and biological aspects (Husain, Browne, & Chalder, 2007). Among social factors, we can find parenting styles. In previous work, it was found that parents of children and adolescents with physical complaints of unknown

pathology usually show traits of overprotection (Garralda, 2004; Husain et al., 2007; Janssens et al., 2009; Masi, Favilla, Millepiedi, & Mucci, 2000). So far, there is insufficient evidence to claim that parental overprotection is also associated with the presence of functional physical symptoms in children diagnosed with ADHD.

Taking into account the findings in the literature, this study is intended to examine the effect of anxiety, depression, and parental overprotection on FSS shown by children with ADHD. In turn, it is intended to verify whether the FSS are associated with the level of the overall functioning impairment of participants.

The research hypothesis is that these variables are associated with the presence of FSS in children with ADHD in the same manner as in children from general population without this condition. To achieve the objective we created a conceptual model to be tested in a clinical sample of children and adolescents with ADHD. We used structural equation modeling (SEM) to assess possible direct effects of the independent variables on the FSS. We also performed standardized procedures for the construction of the SEM, including the development of a measurement model.

Method

Participants

The non-probabilistic sample consisted of 76 boys/girls and adolescents aged 6 to 17 years (mean = 11.7, SD = 2.3) diagnosed with ADHD by child psychiatrists based on DSM-IV diagnostic criteria. This is a clinical sample of children from the region of Osona (Catalonia, Spain) who requested psychological assistance at the Mental Health Centre for Children and Youth (MHCCY) of the Vic Hospital Consortium (VHC). The ethnic distribution was 88% Caucasian, 5% Hispanic, 4% Maghrebian, and 3% Slavic. The male gender was predominant (84.2%, n = 64). According to parental reports, all participants were medicated. Participants with mental retardation or with developmental disorder were excluded.

Measures

Anxiety disorders, Major depression and presence of functional somatic symptoms

Kiddie-Schedule for Affective Disorders and Schizophrenia, Present and Lifetime Version (K-SADS-PL) (Kaufman et al., 1997). It is a semistructured diagnostic interview designed to determine present episode and lifetime history of psychiatric disorder in childhood and adolescence. Each question was answered on a 3-point severity scale. Scores of 1 suggest the symptom is not present; scores of 2 indicate subthreshold levels of symptomatology, and scores of 3 represent threshold criteria. It applies the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders. This interview has proven to be a reliable and valid tool for psychiatric diagnosis (Kaufman et al., 1997).

Besides of being used for psychopathology measures, this instrument was also used for the development of the variable on functional somatic symptoms. Respondents score to

what extent, during the last six months, they experienced bodily problems without a medical cause. During the clinical interview, to assess the severity of the FSS the interviewer considered the presence of the most frequent complaints in general population (headache, abdominal pain, fatigue etc) (Domènech-Llaberia et al., 2004). Only data from present episode were used.

Overprotection

My memories of upbringing, parent version (EMBU-P) (Castro, de Pablo, Gómez, & Arrindell, 1997). This is a questionnaire for parents that assess parenting styles and classifies them into 4 subscales. Items are scored 1 (never), 2 (sometimes), 3 (often) or 4 (always). To assess parental overprotection the subscale "overprotection / control ¨was used. The EMBU-P is adapted to Spanish population, and has demonstrated good internal consistency in the scales (Castro et al., 1997).

Functional impairment

Children's Global Assessment Scale (CGAS) (Shaffer et al., 1983). It is a scale for evaluating the level of functional impairment caused by psychiatric symptoms. The scores used range from 1 (maximum impairment) to 100 (excellent functioning). Scores above 70 indicate normal functioning. The scale has demonstrated good test-retest reliability and significant correlations with other measures of psychopathology (Ezpeleta, Granero, & de la Osa, 1999).

Procedure

The study was subject to acceptance by the ethics committee of the Vic's Hospital Corporation. All children between 6 and 17 years old treated at the Department of Mental Health for Child and Youth of the Vic's Hospital Consortium, who agreed to participate and

had an ADHD diagnosis, were selected for study. Participation was requested via parents' informed consent and verbal consent of the children involved in the research.

Through a concerted appointment, the diagnostic interview (K-SADS-PL) was administered to children. Simultaneously, another researcher conducted the same interview with the parents. After the interview, both interviewers established the CGAS scale score, considering all the information obtained in the diagnostic interview. Parents of participants were given the other questionnaires used in the study to be completed at home and were returned to the hospital after they were completed.

Statistical analysis

Descriptive statistics were calculated using SPSS version 15.0. To examine the relationships of the variables proposed in the conceptual model (Figure 1), SEM was estimated using the program Mplus version 6.11 (Muthén & Muthén, 1998). The method of maximum likelihood estimation was used because it allows analyzing all valid data, including incomplete responses (Little & Rubin, 2002). The SEM was chosen because of its many benefits on the regression models, path analysis, and factor analysis (Schumacker & Lomax, 2004).

Development of the model

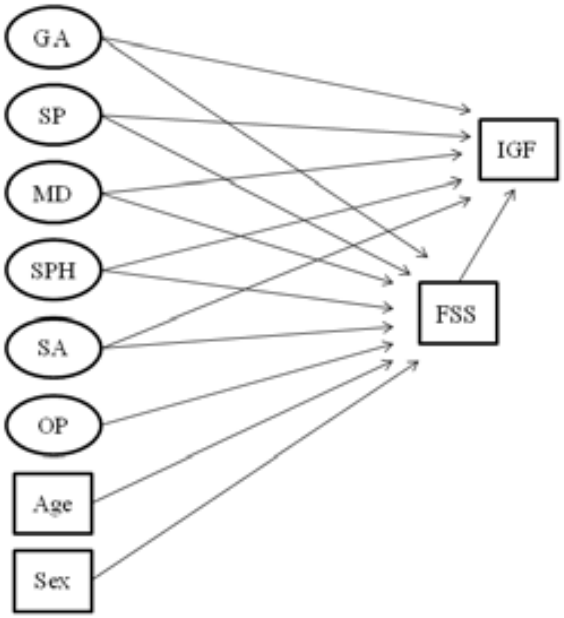
In order to use the SEM method, it is necessary to develop a conceptual model based on the theoretical framework of the study. Based on the research objectives, we constructed latent variables that gave rise to the conceptual model (Figure 1). The latent variables relating to psychopathology (generalized anxiety, separation anxiety, specific phobia, social phobia, major depression) were developed from the K-SADS-PL items present in the specific

sections of each disorder. To avoid spurious results, the question on physical complaints was not used in the construction of the latent variable generalized anxiety.

In turn, the latent variable overprotection was originated from the items of the subscale overprotection/control of the EMBU-P.

It is worth noting that two models were constructed according to the informants of diagnostic interview: one based on the information of children and one based on responses from parents. The decision to develop two models was because there is very limited evidence concerning who is the better informant for functional somatic symptoms (Steinhausen & Metzke, 2007). In general, it is quite common discrepancies between parents and children reports (Campo & Fritz, 2007). Therefore, we decided to make two models to detect and compare possible differences in our results. Furthermore, we can assess the fit (the validity) of the conceptual model even with data provided by two informants.

Figure 1. Conceptual Model



Note: GA = Generalized Anxiety. SP = Social Phobia. MD = Major Depression, SPH = Specific Phobia. SA = Separation Anxiety. OP = Overprotection. FSS = Functional Somatic Symptoms. IGF = Impairment of General Functioning.

After defining the latent constructs, that is, the measurement model, we assessed its fit with a Confirmatory Factor Analysis (CFA), before testing the final models (structural model). CFA is frequently used as a first step to assess the proposed measurement model in a structural equation model (Muthén & Muthén, 1998).

The fit of the final models and the measurement was considered adequate when the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) were higher than .90, and when the Root Mean Square Error of Approximation (RMSEA) was less than .05 (Hoyle,

1995). Besides the above values, the chi-square (x^2) should not be significant (p> .05). Guided by the Mplus program, in the final models of parents and children we performed correlations between some variables to improve the fit indices of the model. The coefficients shown in the figures are standardized.

Results

Table 1. Demographic data and main psychiatric disorders according to the presence of FSS by children and parents.

	Functional Somatic Symptoms			
	Children		Parents	
	Yes	No	Yes	No
	25 (32.9%)	51 (67.1%)	30 (39.5%)	46 (60.5%)
Gender				
Male	18 (28.1%)	46 (71.9%)	22 (34.4%)	42 (65.6%)
Female	7 (58.3%)	5 (41.7)	8 (67%)	4 (33.3%)
Age (Years/SD)	11.4 / 2.15	11.8 / 2.48	11.5 / 2.18	11.9 / 2.49
Ethnicity				
Caucasian	22 (32.8%)	45 (67.2%)	26 (38.8%)	41 (61.2%)
Hispanic	1 (25%)	3 (75%)	2 (50%)	2 (50%)
Maghrebian	1 (33.3%)	2 (66.7%)	1 (33.3%)	2 (66.7%)
Slave	1 (50%)	1 (50%)	1 (50%)	1 (50%)
GAD	10 (100%)	-	3 (60%)	2 (40%)
SAD	3 (100%)	-	1 (100%)	-
SPD	6 (85.7%)	1 (14.3%)	2 (100%)	-
DD	-	1 (100%)	1 (100%)	-
ODD	1 (33.3%)	2 (66.7%)	3 (75%)	1 (25%)
TD	1 (25%)	3 (75%)	1 (50%)	1 (50%)

Note: GAD = Generalized Anxiety Disorder. SAD = Separation Anxiety Disorder. SPD = Specific Phobia Disorder. DD = Disocial Disorder. ODD = Oppositional Defiant Disorder. TD = Tourette Disorder. Psychiatric disorders were measured by the diagnostic interview K-SADS-PL using standardized procedures.

Conceptual Model

When performing the CFA, we obtained good fit indices for latent variables generalized anxiety, specific phobia, separation anxiety, and overprotection. However, the constructs major depression and social phobia did not show valid fit values due to the lack of variability in the sample. For this reason, the two variables were removed from the final structural models.

Child Model

In order to facilitate their interpretation, the results of the analysis of structural models according to the report of children are shown in Figure 2. Considering the statistical indices, the model fit was optimal (model fit: χ^2 (df = 153) = 157.6, p = .38, CFI = .98, TLI = .98, RMSEA = .02).

According to the model (see Figure 2), the latent construct generalized anxiety had a strong predictive relationship over FSS (β = 1.51, t = 3.1, p <.01). That is, for each unit (standard deviations) that increases generalized anxiety, FSS increase 1.51 units (also in standard deviations).

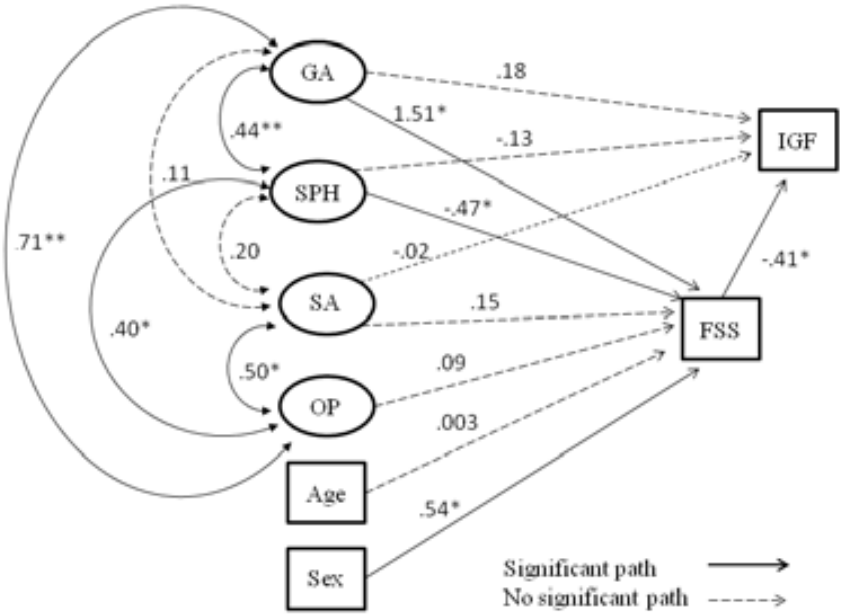
The latent variable specific phobia was also significantly associated with FSS, but with a negative effect (β = - .47, t = -2.7, p <.01). In addition, female gender had a direct effect on FSS (β = .54, t = 2.8, p <.01). In turn, FSS had a statistically significant association with the level of impairment of general functioning (β = - .41, t = -3.4, p <.01).

The results revealed that the ratios between some proposed relationships were not significant. Specifically, the latent variables separation anxiety and overprotection did not show a statistically significant estimated parameter on FSS.

The constructs generalized anxiety, separation anxiety, and specific phobia did not exert a significant direct effect on the general functioning of participants. In addition, age did not show a direct relation with FSS.

We calculated the indirect effects of latent variables generalized anxiety, specific phobia, and separation anxiety on the level of impairment of general functioning of participants. These effects were mediated by FSS. Results not shown in Figure 2 indicated a significant indirect effect only between the construct generalized anxiety and the level of impairment of general functioning (β = - .62, t = -1.9, p <.05).

Figure 2. Child Structural Equation Prediction Model



Note: GA = Generalized Anxiety. SPH = Specific Phobia. SA = Separation Anxiety. OP = Overprotection. FSS = Functional Somatic Symptoms. IGF = Impairment of General Functioning.

* = p < .01. ** = p < .001.

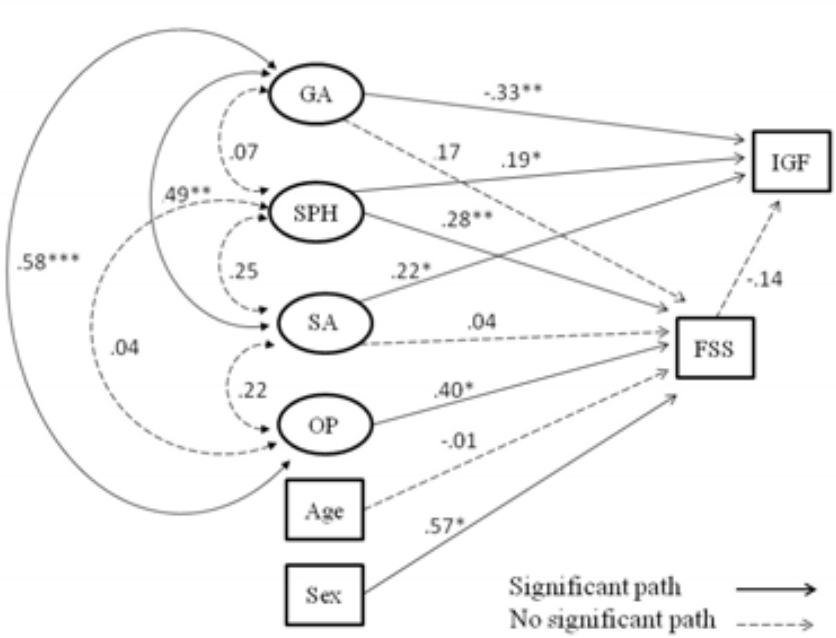
Parent Model

Results obtained in the analysis as reported by parents are shown in Figure 3. According to the statistical indices evaluated, the model also provided an excellent fit (model fit: χ^2 (df = 156) = 184.3, p = .06, CFI = .91, TLI = .91, RMSEA = .04).

The latent variable specific phobia had a statistically significant direct effect on FSS (β = .28; t =3.1; p < .01). The predictive effect was also verified between the construct overprotection (β = .40, t = 2.4, p <.05) and females (β = .57, t = 2.4, p <.05) on FSS. Other variables evaluated did not show a significant direct effect on FSS.

In parent model no indirect effect on the level of impairment of general functioning was observed. However, it was observed a direct effect of the latent variable generalized anxiety (β = - .33, t = -2.9, p <.01), specific phobia (β = .19, t = 2.3, p <.05), and separation anxiety (β = .22, t = 2.2, p <.05). The FSS, in turn, had no predictive effect on the level of impairment of general functioning.

Figure 3. Parent Structural Equation Prediction Model



Note: GA = Generalized Anxiety. SPH = Specific Phobia. SA = Separation Anxiety. OP = Overprotection. FSS = Functional Somatic Symptoms. IGF = Impairment of General Functioning.

* = $p < .05$. ** = $p < .01$. * * * = $p < .001$.

Discussion

In the present study we found that children and adolescents with ADHD show functional somatic symptoms (FSS) as indicated by previous studies (Cho et al., 2009; Holmberg & Hjern, 2006). According to parents' report, no participant showed a chronic illness at the time of the study. This suggests that FSS are not better explained by a medical condition.

Since it was a clinical sample, most participants were receiving drug therapy (methylphenidate) for ADHD symptoms. This could explain somatic complaints as a possible side effect. However, in a pharmacological study it was found that no physical complaints increased as a function of medication, but decreased even when using high doses of the drug (Rapport et al., 2002). Based on these findings, it is shown that the use of methylphenidate does not explain the presence of FSS in the studied sample.

According to the indices that we used, both structural equation models (children and parents) had an excellent fit to the data. However, the results suggest some differences that will be commented throughout the discussion.

As shown in the children model, the latent variable generalized anxiety exerted a direct effect on somatic symptoms. The finding is consistent with previous studies (Janssens et al., 2010; Liakopoulou-Kairis et al., 2002). Specifically, Campo et al., (2004) verified a positive association between children and adolescents with recurrent abdominal pain and generalized anxiety disorder. Also, other studies obtained significant associations between somatic symptoms and generalized anxiety disorder (Domènech-Llaberia et al., 2004; Egger et al., 1999).

Our first consideration is that children with ADHD who show functional somatic symptoms at the same time may show symptoms of anxiety. It is possible that, depending on anxiety, these children have increased vulnerability to functional somatic symptoms. The vulnerability could be based on genetic, temperamental, or psychobiological factors (Serra Giacobo et al., 2012).

Another hypothesis would be that this anxiety in children might change the perception of body alterations. A high sensitivity and concern over body changes would culminate in an amplification of them, which in turn is one of the processes involved in the development of somatic symptoms (Beck, 2008). This is a hypothesis that still needs to be further investigated to provide more scientific evidence. It would be interesting to consider it as a question for future research.

The same effect was not obtained in the parent model, but we found a significant association between social phobia and FSS. Many previous studies do not discriminate between the various anxiety disorders associated with the presence of physical symptoms (Liakopoulou-Kairis et al., 2002; Masi et al., 2000). For this reason, it is difficult to make comparisons with previous studies.

Considering that this is one of the anxiety disorders, it is possible that phobic children have temperamental characteristics or an information-processing pattern towards the symptoms similar to those of children with other anxiety disorders. These characteristics may explain the effect found in our study.

In the children model the effect of overprotection on functional somatic symptoms was not statistically significant. However, in the parent model a direct effect between both variables was verified. This finding is consistent with previous research (Janssens et al., 2009).

In clinical practice, parents of children with FSS tend to be overprotective, because they see their children as "vulnerable" (Campo & Fritz, 2007; Masi et al., 2000). Overprotective parents are characterized by an excessive attempt to control and protect the child in various situations. Such attempts are based on an extreme concern of parents that something negative might happen. Some authors claim that the extreme concern could be extended to children's physical symptoms, culminating in a reinforcement of the symptom and acting as a maintenance factor of it (Garralda, 2004; Husain et al., 2007).

It is also interesting to note that there has been a high, positive, and significant correlation between the latent variables overprotection and generalized anxiety ($r = 0.71$) in the children model, which suggests that both factors are interrelated. In other words, parental overprotection may contribute to increase symptoms of generalized anxiety, which in turn has a direct and important effect on FSS. At clinical level health professionals should assess both anxiety symptoms and paternal overprotection, since the correlation of both factors may be involved in an increase in functional physical complaints.

In the parent model we also found a positive correlation between generalized anxiety and overprotection, but there was no significant direct effect of generalized anxiety on FSS.

According to the SEM analysis, in the children model it was verified a direct effect of FSS on the level of impairment of general functioning. This indicates that physical symptoms were associated with increased functional impairment of children. The result is consistent with previous research (Beck, 2008). In the same model, we also found a statistically significant indirect effect between the latent variable generalized anxiety and the level of impairment of general functioning, with the FSS as the mediating variable.

The findings support the initial hypothesis of the study and warn about the possibility that children and adolescents with ADHD may have their general functioning, usually

characterized by academic difficulties (Biederman, 2005), even more affected. Situations such as school absences due to physical complaints could increase such difficulties (Hughes et al., 2008).

In the parent model we have not found direct or indirect effects of FSS on the level of impairment of general functioning. Perhaps this is because the significant direct effects of the latent variables generalized anxiety, specific phobia, and separation anxiety on impairment are sufficient to explain the level of functional impairment of the participants in the parent model.

Most previous research indicate that girls are more likely than boys to suffer from somatic complaints (Steinhausen & Metzke, 2007; Vila et al., 2009). In fact, in both models the results confirm the literature. The direct effect of females on FSS indicates that girls were more likely to suffer from such complaints than boys.

Some characteristics such as coping mechanisms, lifestyle, temperament, and physiological (hormonal) differences between genders might explain the association we found (Campo et al., 2004). In addition, there are cultural differences that might influence the manifestation of the FSS (Steinhausen, 2009). Traditionally, girls are encouraged to express feelings and pain, while boys are encouraged to repress them. In short, all the factors discussed in this study may play an important role in the gender differences that we found.

According to SEM results, both models are valid, although they present important differences between them. In the literature is quite common for parents and children to present different reports (Campo & Fritz, 2007). However, if we consider both models, our findings suggest that the constructs generalized anxiety, specific phobia, and female gender can have a significant effect on functional somatic symptoms in children and adolescents with ADHD. In the clinical context, children with ADHD and anxiety symptoms should be

considered a group at risk of showing FSS. They also would be subject to possible functional impairment, which can happen depending on physical complaints.

In addition, parental overprotection, as reported by parents, was a predictor of FSS. It would be important that parents of children with FSS might be oriented with respect to their educational style. Being overprotective can stimulate the maintenance of symptoms. Learning to use other strategies may be helpful in the prevention and treatment of FSS.

Strengths and Limitations

One of the strengths of the study was the use of a diagnostic interview to measure psychiatric disorders and the presence of FSS instead of screening instruments as in most studies (Janssens et al., 2010; Steinhausen & Metzke, 2007), which contributes to a better measurement quality. Mathematically, structural equation models are more complex to estimate than other models such as linear regression. For this reason, the use of a reliable instrument is very important to determine how well the model fits the data. It is also important to note that SEM analysis allows both confirmatory and exploratory modeling, which is an advantage over other methods (Schumacker & Lomax, 2004).

On the other hand, the study has some limitations that should be considered when interpreting the results. First, the sample was limited mostly to Caucasian individuals, which means that the results are not directly generalizable to other ethnic groups.

A second limitation was the small sample size for the SEM analysis. However, the use of structural equation modeling in small samples is a valid method according to the literature (Baker, 2007; Bentler & Yuan, 1999). It is also important to consider that TLI and RMSEA indices tend to falsely reject models when the sample size is small (Hu & Bentler, 1999). In our study, TLI and RMSEA indices showed a good fit to the data, which confirms the validity

of the two proposed models. Nevertheless, further research is necessary to verify our findings in a larger and more representative sample.

Third, although it was a clinical sample, there was not a medical diagnosis to confirm that medical symptoms really could not be explained by any medical condition. This is a limitation that is found in most of related research. Finally, the cross-sectional study design does not allow to interpret the findings as causal effects between variables.

Future research

It would be interesting to replicate the study in a larger sample and with different ethnic groups, thus making possible generalization of the findings to different cultures. It would also be important to add to the conceptual model the variable temperament, which would contribute to a more complete SEM model.

Regarding the methodological procedures, the use a diagnostic interview would be an important aspect to consider in future studies. These instruments provide a more reliable measure if compared with screening instruments. This is an essential condition for SEM analysis.

Finally, longitudinal studies would provide a stability analysis of functional somatic symptoms over time. In addition, the results could be seen from a completely causal perspective.

Disclosure: The authors declare no conflicts of interest.

References

American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders: DSM-IV* (4th ed.). Washington: American Psychiatric Association.

Baker, S. R. (2007). Testing a conceptual model of oral health: a structural equation modeling approach. *Journal of Dental Research*, *86*, 708–712.

Beck, J. E. (2008). A developmental perspective on functional somatic symptoms. *Journal of Pediatric Psychology*, *33*, 547–562.

Bentler, P. M., & Yuan, K. H. (1999). Structural Equation Modeling with Small Samples: Test Statistics. *Multivariate Behavioral Research*, *34*, 181–197.

Biederman, J. (2005). Attention-Deficit/Hyperactivity Disorder: A Selective Overview. *Biological Psychiatry*, *57*, 1215–1220.

Campo, J. V., Bridge, J., Ehmann, M., Altman, S., Lucas, A., Birmaher, B., Lorenzo, C. D., et al. (2004). Recurrent Abdominal Pain, Anxiety, and Depression in Primary Care. *Pediatrics*, *113*, 817–824.

Campo J., Fritz G. (2007). Somatoform disorders. In: Martin, A., Volkmar, F. R., & Lewis, M. (Eds.), *Lewis's child and adolescent psychiatry: a comprehensive textbook* (pp.633-647). Philadelphia: Lippincott Williams & Wilkins.

Castro, J., de Pablo, J., Gómez, J., & Arrindell, W. A. (1997). Assessing reading behaviour from the perspective of the parents: A new form of the EMBU. *Social Psychiatry and Psychiatric Epidemiology*, *32*, 230–235.

Cho, S. C., Kim, B. N., Kim, J. W., Rohde, L. A., Hwang, J. W., Chungh, D. S., Shin, M. S., et al. (2009). Full syndrome and subthreshold attention-deficit/hyperactivity disorder in a Korean community sample: Comorbidity and temperament findings. *European Child & Adolescent Psychiatry*, *18*, 447–457.

Dimsdale, J., & Creed, F. (2009). The proposed diagnosis of somatic symptom disorders in DSM-V to replace somatoform disorders in DSM-IV—A preliminary report. *Journal of Psychosomatic Research*, *66*, 473–476.

Domènech-Llaberia, E., Jané, C., Canals, J., Ballespí, S., Esparó, G., & Garralda, E. (2004). Parental reports of somatic symptoms in preschool children: Prevalence and associations in a Spanish sample. *Journal of the American Academy of Child & Adolescent Psychiatry*, *43*, 598–604.

Egger, H. L., Costello, E. J., Erkanli, A., & Angold, A. (1999). Somatic complaints and psychopathology in children and adolescents: stomach aches, musculoskeletal pains, and headaches. *Journal of the American Academy of Child and Adolescent Psychiatry*, *38*, 852–860.

Ezpeleta, L., Granero, R., & de la Osa, N. (1999). Evaluación del deterioro en niños y adolescentes a través de la Children's Global Assessment Scale (CGAS). *Revista de Psiquiatría Infanto-Juvenil*, *1*, 18–26.

Garralda, M. E. (2004). The Interface Between Physical and Mental Health Problems and Medical Help Seeking in Children and Adolescents: A Research Perspective. *Child and Adolescent Mental Health*, *9*, 146–155.

Holmberg, K., & Hjern, A. (2006). Health complaints in children with attention-deficit/hyperactivity disorder. *Acta Paediatrica*, *95*, 664–670.

Hoyle, R. H. (1995). *Structural equation modeling: concepts, issues, and applications*. Thousand Oaks: SAGE.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*, 1–55.

Hughes, A. A., Lourea-Waddell, B., & Kendall, P. C. (2008). Somatic complaints in children with anxiety disorders and their unique prediction of poorer academic performance. *Child Psychiatry and Human Development*, *39*, 211–220.

Husain, K., Browne, T., & Chalder, T. (2007). A Review of Psychological Models and Interventions for Medically Unexplained Somatic Symptoms in Children. *Child and Adolescent Mental Health*, *12*, 2–7.

Janssens, K. A. M., Oldehinkel, A. J., & Rosmalen, J. G. M. (2009). Parental overprotection predicts the development of functional somatic symptoms in young adolescents. *The Journal of Pediatrics*, *154*, 918–923.

Janssens, K. A. M., Rosmalen, J. G. M., Ormel, J., van Oort, F. V. A., & Oldehinkel, A. J. (2010). Anxiety and depression are risk factors rather than consequences of functional somatic symptoms in a general population of adolescents: the TRAILS study. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *51*, 304–312.

Kaufman, J., Birmaher, B., Brent, D., Rao, U., Flynn, C., Moreci, P., Williamson, D., et al. (1997). Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL): initial reliability and validity data. *Journal of the American Academy of Child and Adolescent Psychiatry*, *36*, 980–988.

Liakopoulou-Kairis, M., Alifieraki, T., Protagora, D., Korpa, T., Kondyli, K., Dimosthenous, E., Christopoulos, G., et al. (2002). Recurrent abdominal pain and headache--psychopathology, life events and family functioning. *European Child & Adolescent Psychiatry*, *11*, 115–122.

Little, R. J. A., & Rubin, D. B. (2002). *Statistical Analysis with Missing Data* (2nd ed.). New York: Wiley-Interscience.

Masi, G., Favilla, L., Millepiedi, S., & Mucci, M. (2000). Somatic symptoms in children and adolescents referred for emotional and behavioral disorders. *Psychiatry: Interpersonal and Biological Processes*, *63*, 140–149.

Muthén, L. K., & Muthén, B. O. (1998). *Mplus User's Guide* (Sixth Edition.). Los Angeles: Muthén & Muthén.

Rapport, M. D., Randall, R., & Moffitt, C. (2002). Attention-Deficit/Hyperactivity Disorder and Methylphenidate: A dose-response analysis and parent-child comparison of somatic complaints. *Journal of Attention Disorders*, *6*, 15 –24.

Schumacker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling*. New Jersey: Routledge.

Serra Giacobo, R., Jané, M. C., Bonillo, A., Ballespí, S., & Díaz-Regañon, N. (2012). Somatic symptoms, severe mood dysregulation, and aggressiveness in preschool children. *European Journal of Pediatrics*, *171*, 111–119.

Shaffer, D., Gould, M. S., Brasic, J., Ambrosini, P., Fisher, P., Bird, H., & Aluwahlia, S. (1983). A Children's Global Assessment Scale (CGAS). *Archives of General Psychiatry*, *40*, 1228–1231.

Steinhausen, H. C. (2009). The heterogeneity of causes and courses of attention-deficit/hyperactivity disorder. *Acta Psychiatrica Scandinavica*, *120*, 392–399.

Steinhausen, H. C., & Metzke, C. W. (2007). Continuity of functional-somatic symptoms from late childhood to young adulthood in a community sample. *Journal of Child Psychology and Psychiatry*, *48*, 508–513.

Vila, M., Kramer, T., Hickey, N., Dattani, M., Jefferis, H., Singh, M., & Garralda, M. E. (2009). Assessment of somatic symptoms in British secondary school children using the Children's Somatization Inventory (CSI). *Journal of Pediatric Psychology*, *34*, 989–998.

10. Tercer estudio empírico

Functional somatic symptoms: Structural equations of a conceptual model in a Spanish sample

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Running head: Functional somatic symptoms: Structural equations of a conceptual model

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Abstract

Objective: Functional somatic symptoms (FSSs) are quite common among children. Data suggest an important association with anxiety, parental overprotection and high rates of psychiatric disorders and physical complaints in parents. The aim of this study is to verify the effect of these variables on FSSs manifested by children through a structural equation model. **Methods:** Data were analyzed from a sample of 672 children aged 6 to 8 years who were enrolled in the first and second years of elementary school in Osona (Catalonia, Spain). Parents informed about the presence of FSS in children, child and parental psychiatric symptoms, absences from school and pediatric visits. They also reported about parental overprotection and parental physical complaints. Structural equation modeling (SEM) was used. **Results:** The final model showed an excellent fit (model fit: χ^2 (df = 542) = 851.7, p = < .001; CFI = .91; TLI = .91; RMSEA = .02). The variables separation anxiety, specific phobia, parental somatic symptoms and female gender had a direct effect on FSSs. **Conclusion:** The results of SEM suggest that separation anxiety, specific phobia, somatic symptoms in a family member, and female gender should be considered important factors for understanding the presence of FSSs in children aged 6 to 8 years. In clinical practice, pediatricians and child mental health specialists should assess these aspects in children with FSSs. Future research should clarify the nature of the relationship between anxiety and FSSs, which would increase understanding of the etiology of FSSs in childhood.

Keywords: Children; Functional somatic symptoms; Psychopathology; Structural equation modeling.

Introduction

Functional somatic symptoms (FSSs) are physical symptoms that have unknown pathology [1,2]. FSSs are quite common during childhood and adolescence and are the cause of a significant number of visits to child care centers [3,4].

Various FSSs are common among children, including recurrent complaints of pain, especially headache, abdominal pain, backache, and fatigue. It is common for children with these symptoms to have an increased number of school absences, which may lead to academic difficulties [5,6].

Age and gender may influence the occurrence and course of FSSs. Most research on general and clinical populations shows a marked tendency for girls to present higher rates of FSSs with increasing age into adolescence [7,8].

In many studies, FSSs have been associated with the presence of psychopathology. Several studies confirm a significant association of FSSs with anxiety disorders and depression [9-12]. However, the prevalence of FSSs in children with externalizing disorders is lower compared to that of children with internalizing disorders [13,14].

The literature suggests that FSSs are the result of an interaction between environmental factors and child-specific factors [15]. Possible environmental factors include high rates of psychiatric disorders in parents (most commonly anxiety disorders and depression) [14] and the presence of physical symptoms in a family member [16].

In addition to the above factors, parental overprotection is one of the social factors that may play an important role in the development of FSSs [17]. Previous work, has found that parents of children with FSSs usually show overprotective traits [1,18,19].

The aim of this study is to verify the effect of anxiety and depression in children and parents on FSSs manifested by children through a structural equation model. In addition, we intend to verify whether FSSs are associated with parental physical complaints and parental overprotection. Finally, we will verify whether FSSs are associated with school absences and visits to the pediatrician. According to the reviewed literature and based on these objectives, these described variables are expected to be associated with FSSs.

Method

Participants

The non-probabilistic sample consisted of 672 children aged 6 to 8 years who were enrolled in the first and second years of elementary school in Osona (Catalonia, Spain). Most participants were Caucasian (91.7%). Children with a mental handicap or a developmental disorder or those who suffered from a chronic disease were excluded from the study.

Instruments

Functional somatic symptoms

Qüestionari Pels Pares [20] [Questionnaire for Parents]. This questionnaire collects general information about the child and his/her family environment. In the physical functional symptoms section, parents were asked about the presence and frequency of the main FSSs in children during the two weeks prior to the study. The assessed symptoms were abdominal pain, headache, fatigue, dizziness and leg pain. According to previous studies [21], these symptoms are quite common in children. The questionnaire also seeks information about the number of visits to the pediatrician and school absences related to FSSs. The *Four-Factor Index of Social Status* was used to measure the socioeconomic status of families [22].

Psychiatric symptoms

The Child Symptom Inventory-4, parent version (CSI-4) was used to assess psychiatric symptoms [23]. This screening instrument is based on the DSM-IV diagnostic criteria [24] that assess major psychiatric disorders in children aged 5 to 12 years during the preceding six months. Items are scored in 2 ways: symptom count (number of symptoms criteria) and symptom severity (dimensional). To determine symptom severity, items are scored (never=0,

sometimes=1, often=2, and very often=3) and summed separately for each category. The CSI-4 has good test-retest reliability and good predictive validity [23].

Parental overprotection

The My Memories of Upbringing, parent version (EMBU-P) questionnaire assesses parenting styles and classifies the styles into 4 subscales [25]. To assess parental overprotection, the subscale "overprotection / control" was used. Items are answered on a four-point Likert-type scale (1: never; 2: sometimes; 3: often; 4: always). The EMBU-P has been adapted for the Spanish population and has good internal consistency on the scales [25].

Anxiety, depression, and somatic symptoms of parents

The General Health Questionnaire (GHQ-28) is a self-report questionnaire that has been used extensively in the general adult population to assess mental health over the previous two weeks [26]. The questionnaire is divided into 4 subscales: somatic symptoms, anxiety and insomnia, social dysfunction, and depression. The instrument has good validity and reliability. The validity of the Spanish version has also been demonstrated [27].

Procedure

The study was subject to approval by the *Departament d'Ensenyament de la Generalitat de Catalunya* (the government department responsible for the education system in Catalonia, Spain). After the research was authorized, participating schools were contacted through Osona's Advisory and Counselling Team (ACT).

In each school, parents were invited to a meeting in which the study objectives were explained. Parents completed questionnaires either during the meeting or at home. Absent parents were informed and invited to participate. All parent participants signed informed consent.

Statistical analysis

Descriptive statistics were calculated using SPSS version 18.0. Structural equation modeling (SEM) was used to estimate the possible direct effects of the independent variables on FSSs using the program Mplus version 6.11 [28]. SEM was chosen because it has many advantages over regression models, path analysis, and factor analysis [29].

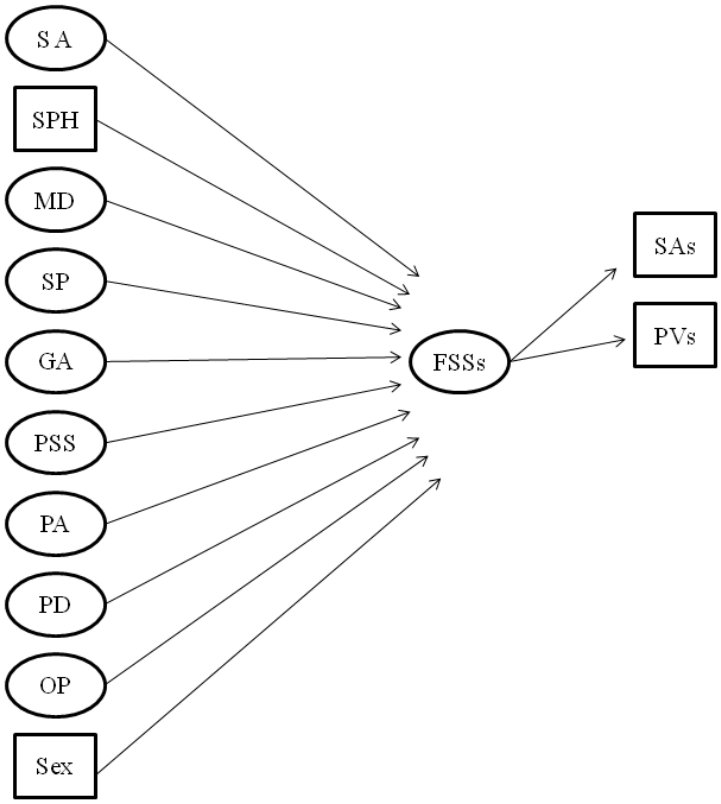
Development of the model

Based on the objectives of our research, we constructed latent variables to develop the conceptual model (Figure 1). The latent variables relating to psychopathology of children (separation anxiety, generalized anxiety, social phobia, depression) were developed from the CSI-4 questionnaire with the respective categories for each disorder. The question about physical complaints was not used in the construction of the generalized anxiety latent variable to avoid spurious results.

The latent variables relating to parental psychopathology (anxiety, depression, and somatic symptoms) were constructed from the respective subscales of the GHQ-28. The latent variable of parental overprotection originated from the EMBU-P subscale items for overprotection/control.

The construct of the FSSs of children was developed from the section of the Questionnaire for Parents regarding functional physical symptoms. It is worth noting that the age of the participants was not taken into account in the conceptual model because of the low variability of the participants' age ranges.

Figure 1: Conceptual model



Note: SA = separation anxiety. SPH = specific phobia. MD = major depression. SP = social phobia. GA = generalized anxiety. PSS = parental somatic symptoms. PA = parental anxiety. PD = parental depression. OP = parental overprotection. FSSs = functional somatic symptoms. SAs = school absences. PVs = pediatric visits.

After defining the latent constructs (the measurement model), the fit was assessed using Confirmatory Factor Analysis (CFA) before testing the final models (structural model). CFA is frequently used as a first step to assess the proposed measurement model in a structural equation model [28].

The adjustment of the final and measurement models was considered adequate when the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) were higher than .90 [30] and the Root Mean Square Error of Approximation (RMSEA) was lower than .05 [31].

The chi-square (x^2) should not be significant ($p > .05$), but large samples increase the likelihood of significant *p* values [32]. In the final model, correlations between variables were performed to improve the model fit indices, following the guidelines of the program Mplus. The coefficients that are shown are standardized.

Results

Table I: Demographic data and main psychiatric symptoms

	Description of participants (n=672)
Gender	
Male	331 (49.3%)
Female	341 (50.7%)
Age	
(Mean/SD)	7.24/0.67
First grade courses	
First	325 (48.4%)
Second	347 (51.6%)
SES	
High	178 (26.5%)
Middle	372 (55.4%)
Low	117 (17.4%)
Psychiatric symptoms	
GAD	15 (2.2%)
SAD	12 (1.8%)
SP	22 (3.3%)
SPH	9 (1.3%)
CD	21 (3.1%)
ODD	28 (4.2%)
ADHD	73 (10.9%)

Note: SES = Socioeconomic Status. GAD = Symptoms of Generalized Anxiety Disorder. SAD = Symptoms of Separation Anxiety Disorder. SP = Symptoms of Social Phobia. SPH = Symptoms of Specific Phobia. CD = Symptoms of Conduct Disorder. ODD = Symptoms of Oppositional Defiant Disorder. ADHD = Symptoms of Attention Deficit Hyperactivity Disorder.

Table II: Types and distribution of FSSs reported by parents (n=672).

Type	Never		Once		2-3 times		+3times	
	Count	%	Count	%	Count	%	Count	%
Abdominal pain	430	64	119	17.7	77	11.5	46	6.8
Leg Pain	552	82.1	60	8.9	38	5.7	22	3.3
Headache	498	74.1	99	14.7	53	7.9	22	3.3
Fatigue	555	82.6	47	7.0	54	8.0	16	2.4
Dizziness	648	96.5	15	2.2	7	1.0	2	0.3

Note: FSSs = Functional Somatic Symptoms

Conceptual model

Two analyses were performed before the final model. The first SEM included all of the variables that were proposed in the conceptual model (Figure 1). To purge this model, we developed a new model that contained only statistically significant variables in the first analysis (Figure 2). The following variables were used to develop the final model: separation anxiety, specific phobia, somatic symptoms of parents, parental depression, parental overprotection, sex, visits to the pediatrician, and school absenteeism. The CFA analyses indicated good fit indices for all of the latent variables that were proposed in the conceptual model.

Final model

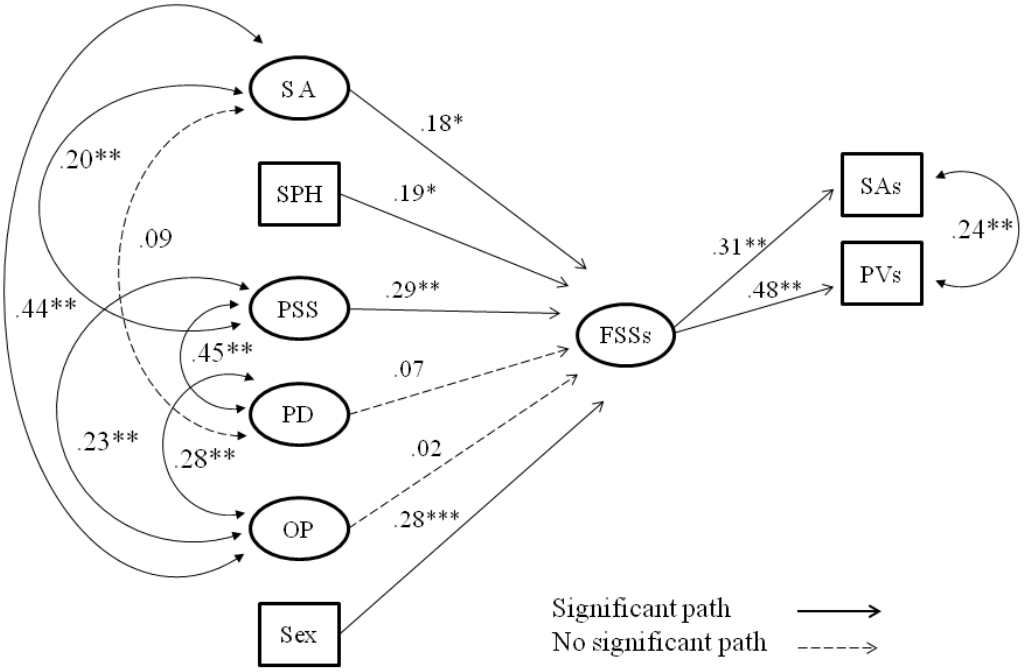
Considering the statistical indices that were evaluated, the final model showed an excellent fit (model fit: χ^2 (df = 542) = 851.7, p = < .001; CFI = .91; TLI = .91; RMSEA = .02).

Figure 2 shows the results of the structural model analyses. According to the statistical indices that were evaluated, the separation anxiety latent variable had a direct effect on FSSs ($\beta = .18$; $t = 2.2$; $p < .05$). In other words, for each unit of standard deviation that is increased by separation anxiety, functional somatic symptoms increase by .18 units (also in units of standard deviation).

In addition, there was a statistically significant direct effect of the following variables on the FSSs: specific phobia ($\beta = .19$, $t = 2.5$; $p < .05$), parental somatic symptoms ($\beta = .29$, $t = 3.9$; $p < .001$), and female gender ($\beta = .28$, $t = 3.1$; $p = .001$).

In turn, FSSs had a direct effect on the number of visits to the pediatrician ($\beta = .48$; $t = 10$; $p < .001$) and school absences ($\beta = .31$; $t = 5.6$; $p < .001$).

Figure 2: Final model



Note: SA = separation anxiety. SPH = specific phobia. PSS = parental somatic symptoms. PD = parental depression. OP = parental overprotection. FSSs = functional somatic symptoms. SAs = school absences. PVs = pediatric visits. * = $p < .05$. ** = $p < .001$. *** = $p = .001$.

Discussion

In this study, we verified that functional somatic symptoms (FSSs) are common in a Spanish sample of children aged 6 to 8 years. The exclusion from the analysis of children whose questionnaires indicated the presence of chronic diseases, together with the assessment of common functional complaints (abdominal pain, fatigue, headache, dizziness, and leg pain), suggest that physical complaints are of unknown pathology.

The results showed a direct effect of parental somatic symptoms on FSSs. The presence of physical symptoms in a family member may encourage a style of behavior in children that is similar to that of their parents [16]. In other words, the experience of parental physical complaints serves as a model, and the FSSs results from this learned behavior. According to social learning theory [1], the expression of FSSs may be reinforced by special attention from parents or from being excused from tasks, such as a test at school [13,19].

Consistent with previous studies [9,10], we observed a predictive effect of anxiety on FSSs, specifically separation anxiety and specific phobia. In Campo and colleagues' work [11], separation anxiety disorder was associated with recurrent abdominal pain in children.

Currently, studies are inconclusive when analyzing the nature of this association. It is possible that children show greater vulnerability to FSSs due to anxiety. This vulnerability may be based on psychobiological, genetic or temperamental factors. It is also possible that both anxiety disorders and FSSs share biological substrates that act as mediators between them.

Furthermore, anxious children are more focused on bodily signals than are children without this condition [12]. High sensitivity and concern over body changes, which are caused by

anxiety, can culminate in an amplification of these concerns. According to the literature, this may be one of the processes involved in the development of FSSs [3].

However, in previous research, specific phobia is less often associated with FSSs [10]. Phobias are quite common in children who are between 6 and 8 years of age and may be the first symptoms leading to other anxiety disorders. Children with specific phobias may have temperamental characteristics that are similar to those of children with other anxiety disorders and are usually more closely associated with FSSs. These characteristics may explain the effect that we found.

According to our analyses, female gender had a direct effect on FSSs; girls had more FSSs than did boys. Most previous research corroborates this result [7,8]. Features such as lifestyle, temperamental traits, increased predisposition to react to stress with physical complaints or some coping mechanisms used by girls may contribute to this difference [3].

Confirming the initial hypothesis, we found a positive statistical association between FSSs and the number of visits to the pediatrician. These results corroborate previous studies [3,4]. Constant visits to the doctor contribute to the increased use of health services. In addition, children may be subjected to tests and/or unnecessary treatments that may generate stressful situations for the child and his/her family [14].

FSSs were also associated with school absenteeism. Poor academic performance may not be the only consequence of school absenteeism; a higher frequency of absenteeism may cause negative feelings in the child, such as fear of losing peer relationships [5,6].

Refuting the initial hypothesis, parental overprotection did not exert a direct effect on FSSs, as seen in previous work [17]. The fact that we used a different statistical method may help to explain the difference in our results compared to previous research.

In the study by Janssens and colleagues [17], statistical analysis was performed only between parental overprotection and FSSs. However, our work developed a structural model that included parental overprotection, among other independent variables. In other words, when analyzing parental overprotection in a structural model, the direct effect on FSSs was through other variables. In this case, separation anxiety, specific phobia, parental somatic symptoms, and female gender exerted a direct effect on FSS. For the same reason, in contrast to previous studies, we believe that parental depression is not associated with FSSs [18].

Figure 2 shows that parental overprotection is positively and significantly correlated with separation anxiety. This finding indicates that overprotection may contribute to an increase in symptoms of separation anxiety, which, in turn, exerts a direct effect on FSSs. The same could be said about the positive and significant correlation between parental somatic symptoms and separation anxiety. These are important findings that can only be detected in a structural model.

The results of SEM indicate that separation anxiety, specific phobia, somatic symptoms in a family member, and female gender should be considered important factors for understanding the presence of FSSs in children aged 6 to 8 years. In clinical practice, pediatricians and child mental health specialists should assess these aspects in children with FSSs. It would be useful to consider these findings in future research. A better understanding of the phenomenon could help in prescribing treatment and preventing FSSs.

Limitations

This study has limitations that should be considered when interpreting the results. The assessment of FSSs was based on parent-reported symptoms rather than medical evaluation. Because the children were not part of a clinical population, a medical diagnosis was not

available to confirm that the medical symptoms could not be explained by a medical condition. This limitation can be found in many similar studies [8,20].

We should also consider that a cross-sectional study design does not allow for the interpretation of the findings as causal inferences. Finally, our study sample was mainly Caucasian, which means that the results are not directly generalizable to other ethnic groups.

Future research

It is important for future research to clarify the nature of the relationship between anxiety and FSSs. Genetic studies of parents and children with FSSs would also be interesting to verify the existence of genetic similarities, which would increase understanding of the etiology of FSSs in childhood.

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References

[1] Husain K, Browne T, Chalder T. A review of psychological models and interventions for medically unexplained somatic symptoms in children. Child Adolesc Ment Health 2007; 12(1):2–7.

[2] Dimsdale J, Creed F. The proposed diagnosis of somatic symptom disorders in DSMV to replace somatoform disorders in DSM-IV—A preliminary report. J Psychosom Res 2009; 66(6):473–76.

[3] Beck JE. A developmental perspective on functional somatic symptoms. J Pediatr Psychol 2008; 33(5):547–62.

[4] Serra Giacobo R, Jané MC, Bonillo A, Ballespí S, Díaz-Regañon N. Somatic symptoms, severe mood dysregulation, and aggressiveness in preschool children. Eur J Pediatr 2012; 171(1):111–19.

[5] Garralda ME. Practitioner review: assessment and management of somatisation in childhood and adolescence: a practical perspective. J Child Psychol Psychiatry 1999; 40(8):1159–167.

[6] Hughes AA, Lourea-Waddell B, Kendall PC. Somatic complaints in children with anxiety disorders and their unique prediction of poorer academic performance. Child Psychiatry Hum Dev 2008; 39(2):211–20.

[7] Galli F, D'Antuono G, Tarantino S, Viviano F, Borrelli O, Chirumbolo A, et al. Headache and recurrent abdominal pain: a controlled study by the means of the child behaviour checklist (CBCL). Cephalalgia 2007; 27(3):211–19.

[8] Steinhausen HC, Metzke CW. Continuity of functional-somatic symptoms from late childhood to young adulthood in a community sample. J Child Psychol Psychiatry 2007; 48(5):508–13.

[9] Vila M, Kramer T, Hickey N, Dattani M, Jefferis H, Singh M, et al. Assessment of somatic symptoms in british secondary school children using the children's somatization inventory (CSI). J Pediatr Psychol 2009; 34(9):989–98.

[10] Liakopoulou-Kairis M, Alifieraki T, Protagora D, Korpa T, Kondyli K, Dimosthenous E, et al. Recurrent abdominal pain and headache-psychopathology, life events and family functioning. Eur Child Adolesc Psychiatry 2002; 11(3):115–22.

[11] Campo JV, Bridge J, Ehmann M, Altman S, Lucas A, Birmaher B, et al. Recurrent abdominal pain, anxiety, and depression in primary care. Pediatrics 2004; 113(4):817-24.

[12] Janssens KAM, Rosmalen JGM, Ormel J, van Oort FVA, Oldehinkel AJ. Anxiety and depression are risk factors rather than consequences of functional somatic symptoms in a general population of adolescents: the TRAILS study. J Child Psychol Psychiatry 2010; 51(3):304–12.

[13] Campo J, Fritz K. Somatoform Disorders. In: Martin A, Volkmar FR, editors. Lewis's child and adolescent psychiatry: a comprehensive textbook. 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2007, p. 633-47.

[14] Sandberg S, Stevenson J. Psychiatric Aspects of Somatic Disease. In: Rutter M, Bishop D, Pine D, Scott S, Sevenson J, Taylor E, et al, editors. Rutter's Child and Adolescent Psychiatry. 5th ed. Oxforfd: Blackwell Scientific Publications; 2008, p. 930-944.

[15] Gillespie NA, Zhu G, Heath AC, Hickie IB, Martin NG. The genetic aetiology of somatic distress. Psychol Med 2000; 30(5):1051–61.

[16] Hotopf M. Childhood experience of illness as a risk factor for medically unexplained symptoms. Scand J Psychol 2002; 43(2):139–46.

[17] Janssens KAM, Oldehinkel AJ, Rosmalen JGM. Parental overprotection predicts the development of functional somatic symptoms in young adolescents. J Pediatr 2009; 154(6):918–23.

[18] Masi G, Favilla L, Millepiedi S, Mucci M. Somatic symptoms in children and adolescents referred for emotional and behavioral disorders. Psychiatry 2000; 63(2):140–49.

[19] Garralda ME. The interface between physical and mental health problems and medical help seeking in children and adolescents: a research perspective. Child Adolesc Ment Health 2004; 9(4):146–55.

[20] Domènech-Llaberia E, Jané C, Canals J, Ballespí S, Esparó G, Garralda E. Parental reports of somatic symptoms in preschool children: Prevalence and associations in a Spanish sample. J Am Acad Child Adolesc Psychiatry 2004; 43(5):598–04.

[21] Garber J, Walker LS, Zeman J. Somatization symptoms in a community sample of children and adolescents: further validation of the children's somatization inventory. Psychol Assess 1991; 3(4):588–95.

[22] Hollingshead AB. Four factor index of social status. New Haven: Yale University, Department of Sociology; 1975.

[23] Gadow KD, Sprafkin J. Child symptom inventory 4: Screening and norms manual. Stony Brook: Checkmate Plus; 2002.

[24] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders - DSM-IV-TR. 4th ed. Washington, DC: American Psychiatric Association; 2000.

[25] Castro J, de Pablo J, Gómez J, Arrindell WA. Assessing reading behaviour from the perspective of the parents: A new form of the EMBU. Soc Psychiatry and Psychiatr Epidemiol 1997; 32(4):230–35.

[26] Goldberg D. Manual of the general health questionnaire. Windsor: NFER Publishing; 1978.

[27] Lobo A, Pérez-Echeverría MJ, Artal J. Validity of the scaled version of the general

health questionnaire (GHQ-28) in a Spanish population. Psychol Med 1986; 16(1):135–40.

[28] Muthén LK, Muthén BO. Mplus User's Guide. 6th ed. Los Angeles: Muthén & Muthén; 1998.

[29] Schumacker RE, Lomax RG. A Beginner's Guide to Structural Equation Modeling. 3rd ed. New Jersey: Routledge Academic; 2010.

[30] Hoyle RH. Structural equation modeling: concepts, issues, and applications. Thousand Oaks: SAGE; 1995.

[31] Bollen KA, Long JS. Testing structural equation models. Thousand Oaks: SAGE; 1993.

[32] Bentler PM. Comparative fit indexes in structural models. Psychol Bull 1990; 107(2): 238–46.

11. Discusión General

Los resultados obtenidos en los tres estudios empíricos demuestran que las somatizaciones infantiles son un fenómeno clínico importante. En los tres estudios se detectó una frecuencia relevante de quejas físicas de patología desconocida. La manifestación de SSF puede repercutir en diferentes contextos: en el desarrollo del niño, en su ambiente social, familiar o incluso tener repercusiones económicas para los sistemas de salud.

Se ha visto en el primer y tercer estudio empírico que las quejas físicas están asociadas al aumento de las visitas al pediatra. La consecuencia directa es que un mayor número de consultas implicaría en un aumento de los gastos públicos de los servicios sanitarios. No obstante, también es importante considerar el efecto de las constantes visitas médicas para la familia y el propio niño.

El niño podría ser enviado a diferentes especialistas en busca de causas orgánicas para sus molestias y realizar exámenes médicos innecesarios. Dichos procedimientos pueden generar situaciones estresantes para toda la familia. Además, es posible que frente a una condición de estrés el niño manifieste más SSF, culminando en un círculo de retroalimentación.

Uno de los riesgos inherentes en este proceso es que, en un dado momento, la afirmación del médico de que no se encontró ninguna enfermedad (biomédica) pueda significar para la familia que a su hijo no le pasa nada, cuando en realidad hay un problema.

Por otro lado, el niño (según su edad y desarrollo cognitivo) y sus cuidadores pueden tener la sensación de que el médico no realizó todos los procedimientos necesarios para encontrar el motivo de las quejas somáticas y de que, probablemente, una ¨posible

enfermedad¨ no ha sido detectada. Un riesgo aún mayor es que el niño se sienta culpable por manifestar quejas supuestamente ¨imaginarias¨, afectando su autoestima.

A pesar de que, en el contexto académico, la salud se entienda como una construcción unitaria entre los procesos físicos y mentales, los sistemas de asistencia sanitaria suelen utilizar diferentes estándares en la práctica diaria, separando lo que es el físico del paciente de la condición mental. Esto es bastante frecuente en los centros de atención primaria y es particularmente perjudicial para los niños y adolescentes con SSF y con síntomas psiquiátricos asociados como la ansiedad o depresión (Campo, 2012).

Otro aspecto corroborado en los estudios es el mayor número de ausencias escolares de los niños con SSF, lo que podría resultar en dificultades académicas, interpersonales y sociales. Las dificultades académicas pueden ser aún mayores ya que hay una gran probabilidad de que dichos niños presenten algún trastorno o síntomas de ansiedad. La presencia de sintomatología ansiosa puede generar dificultades de concentración o una cierta inquietud, perjudicando así el rendimiento académico.

El hecho de manifestar algún trastorno de ansiedad contribuye para que los niños con SSF sean más proclives, si son comparados con niños sanos, a manifestar comorbilidades con otros trastornos. Por ejemplo, está bastante documentado que los trastornos de ansiedad presentan una elevada comorbilidad con la depresión o hasta con el mismo TDAH. La presencia de otros trastornos psiquiátricos aumenta la probabilidad de que el funcionamiento general del niño sea aún más afectado.

Por lo tanto, la presencia de SSF en la infancia y adolescencia es un fenómeno complejo si se realiza un análisis amplio y dinámico de todos los procesos implicados. También es cierto que ni todos los niños y adolescentes con SSF presentarán comorbilidades psiquiátricas o perjuicios en diferentes áreas de su vida. Sin embargo, hay un riesgo

considerable de que muchos de estos niños, principalmente los que presentan síntomas psiquiátricos, y su entorno familiar tengan sus vidas afectadas.

11.1 Implicaciones Clínicas

Las asociaciones observadas entre los SSF y los trastornos ansiedad generan implicaciones clínicas importantes. Sería fundamental que los médicos considerasen la existencia de trastornos psiquiátricos, en particular la ansiedad y depresión, en niños y adolescentes que presentan SSF, intentando garantizarles una evaluación y tratamiento adecuado. El segundo estudio también demuestra la importancia de examinar posibles trastornos de ansiedad en niños y adolescentes con TDAH que presentan SSF.

Lamentablemente, a menudo los trastornos de ansiedad y depresión no son diagnosticados en los centros de atención primaria. Aproximadamente, uno de cada cinco adolescentes afectados son detectados en los centros de salud (Richardson, Russo, Lozano, McCauley, & Katon, 2010). Sería muy importante que los médicos evitasen un enfoque excesivo en la búsqueda de una causa orgánica para las quejas físicas, ampliando su evaluación hacia la detección precoz de trastornos psiquiátricos. Por otro lado, los niños y adolescentes con trastornos emocionales diagnosticados deberían de ser evaluados cuidadosamente para los SSF, para que también reciban el tratamiento adecuado a sus necesidades.

No obstante, para que esta praxis sea una realidad, es necesario aplicar el concepto académico de salud en la práctica clínica. Sería fundamental que el pensamiento dualista, tradicional en la medicina occidental, fuera substituido por una perspectiva donde los procesos mentales y físicos sean considerados una unidad dinámica y en constante interrelación.

Actualmente, los psiquiatras de la infancia y adolescencia debaten sobre la necesidad de ofrecer tratamiento a los niños cuyos rasgos temperamentales favorecen el futuro desarrollo de algún trastorno psiquiátrico. En otras palabras, realizar un trabajo preventivo.

Al esperar que el trastorno se consolide y que los síntomas presentados cumplan los criterios necesarios del DSM-IV para el diagnóstico, puede que hayan pasado muchos años en la vida del niño y que los perjuicios causados sean muy importantes. Además, se argumenta que cuanto más tiempo se tarda para empezar el tratamiento más difícil será ponerlo en práctica y peor el pronóstico.

En el caso de niños con SSF el tratamiento precoz sería de gran importancia para que se reduzcan futuros deterioros funcionales. Los estudios previos demuestran que las características temperamentales como la inhibición conductual, la evitación del daño, neuroticismo, la ansiedad como rasgo y el afecto negativo fueron asociadas con niños y adolescentes con SSF (Boz et al., 2004; Campo et al., 2004; Davison, Faull, & Nicol, 1986).

El trabajo preventivo de los profesionales con este grupo de niños ayudaría a detectar de manera precoz a los niños potencialmente somatizadores, lo que permitiría realizar intervenciones preventivas. Además, ayudaría a reducir el riesgo de desarrollo para los trastornos de ansiedad, una vez que estos rasgos temperamentales también favorecen la manifestación de los cuadros de ansiedad.

Los padres de los niños y adolescentes con síntomas somáticos también deberían de recibir orientación y apoyo de los profesionales de salud. No sólo porque algunos de ellos presentan rasgos de sobreprotección que podrían favorecer la manifestación de los SSF (en niños con vulnerabilidad biológica), pero también porque están sometidos a muchas situaciones de estrés en función de todas las implicaciones decurrentes de tener un hijo con frecuentes quejas físicas; como podrían ser las constantes visitas médicas, temores frente a la

posibilidad de que algo realmente serio esté pasando con su hijo, o dificultades para afrontar el problema.

Como línea de base, el tratamiento para los síntomas físicos debería fundamentarse en apoyo al niño y ofrecerle estrategias para afrontar su problema; enseñar a los padres un estilo parental afectivo y adecuado a las necesidades del niño y que refuerce la relación padre-hijo, como también dar soporte a los propios padres para que puedan superar las situaciones de estrés.

11.2 Futuros campos de investigación

Desde el punto de vista de la investigación, Campo (2012) defiende la necesidad de que los estudios puedan aclarar la relación entre ansiedad, depresión y los SSF. Para el autor, no queda claro si los SSF integran los trastornos de ansiedad o depresión, formando un diagnóstico único, o constituyen una nosología aparte. Hasta el momento, se sabe que como mínimo comparten factores de riesgo semejantes como el género femenino, los rasgos temperamentales o la sobreprotección de los padres.

Los estudios longitudinales permitirían establecer relaciones temporales entre ansiedad, depresión y los SSF. También sería importante estudiar factores genéticos comunes entre los familiares y relaciones psicobiológicas con la ansiedad o depresión. Los hallazgos ayudarían a comprender mejor el significado de las asociaciones observadas y ampliarían el conocimiento sobre la etiología de las somatizaciones.

Por otro lado, también hay una necesidad de realizar estudios que clarifiquen las posibles influencias de la cultura en el desarrollo de los SSF, una vez que se reconoce que son aspectos que pueden ser influentes (Campo & Fritz, 2007).

11.3 Contribuciones de la tesis doctoral

Esta tesis es una contribución más a un ámbito de estudio que necesita un mayor número de investigaciones, y tiene como objetivo ayudar a entender y a ampliar los conocimientos de los SSF en población española. Las investigaciones que integran la tesis doctoral, así como la revisión teórica, fueron elaboradas a partir de esta perspectiva.

El primer estudio empírico se realizó con población preescolar debido a la escasa literatura existente, sobretodo en población española. En general, se percibe una tendencia a que los investigadores orienten su trabajo hacia los niños más pequeños, dada la importancia de esta edad en el inicio de problemas psicológicos. Además, los hallazgos encontrados sirven de base para establecer tratamientos preventivos contra estos problemas.

Por otro lado, también es importante resaltar el uso de ecuaciones estructurales en el segundo y tercer estudio empírico. Metodológicamente, se trata de una técnica estadística que permite evaluar el efecto de un grupo de variables independientes sobre la variable dependiente, lo que posibilita detectar cuáles de estas variables tienen mayor importancia y resultan ser estadísticamente significativas en el modelo, además de verificar las posibles relaciones entre ellas.

Para finalizar, es importante resaltar las implicaciones clínicas decurrentes del estudio de los SSF. Para comprender las somatizaciones es necesario establecer relaciones entre los aspectos psicológicos y físicos de los niños y adolescentes. En otras palabras, esta particularidad invita a la reflexión sobre la práctica clínica y la necesidad de trabajar a partir de un concepto integrado del ser humano.

12. Conclusiones

En base a la literatura revisada y a los resultados obtenidos en los tres estudios empíricos se pueden establecer las siguientes conclusiones:

1. Los SSF son comunes en los niños y adolescentes que participaron en las investigaciones.

2. Las principales quejas físicas manifestadas en los niños preescolares investigados fueron los dolores de barriga, cansancio y dolor de cabeza. A su vez, los niños de 6 a 8 años presentaron una mayor incidencia de dolor de barriga, seguidas de dolor de cabeza y cansancio.

3. Los SSF no se asociaron al *Severe Mood Dysregulation* ni a la agresividad en la muestra de niños preescolares. Por otro lado, se confirma la existencia de una importante asociación entre los SSF y la ansiedad.

4. El tipo de ansiedad asociada a los SSF puede ser distinta según la edad del niño. En edad preescolar se observó una asociación entre las quejas físicas funcionales, la ansiedad de separación y la fobia social. A su vez, en los niños de 6 a 8 años, los SSF se asociaron a la ansiedad de separación y a la fobia específica.

5. La presencia de SSF en niños y adolescentes con TDAH estuvo fuertemente asociada al Trastorno de ansiedad generalizada. La existencia de pocos estudios específicos sobre SSF en esta población demuestra la necesidad de realizar un mayor número de investigaciones para corroborar los hallazgos encontrados.

6. Hay una importante necesidad de que los futuros estudios ayuden a comprender la naturaleza de la relación entre los SSF y la ansiedad.

7. Los niños y adolescentes con SSF deberían de ser considerados un grupo de riesgo para el desarrollo de psicopatología, principalmente de ansiedad y depresión. El trabajo preventivo y la detección precoz de posibles trastornos son vitales para que el niño reciba el tratamiento adecuado y pueda seguir con su desarrollo normal.

8. Las niñas presentaron más SSF que los niños en edad escolar, lo que sugiere que el género femenino sea un factor de riesgo para el desarrollo de SSF. En la edad preescolar no se constataron diferencias significativas entre chicos y chicas respecto a la presencia de SSF.

9. Se observó que los niños con SSF presentaron un mayor número de ausencias escolares y visitas al pediatra, lo que indica que los SSF pueden interferir en sus actividades diarias. En población clínica de niños y adolescentes con TDAH, también se constató que los síntomas físicos funcionales ejercieron un efecto importante sobre el funcionamiento general.

10. La presencia de síntomas físicos en un miembro familiar puede contribuir con la manifestación de los SSF en la infancia. Es importante destacar el papel fundamental que ejercen los padres con alguna queja física, a través de la imitación, el refuerzo y la identificación. Sin embargo, todavía no hay suficiente evidencia científica que explique la naturaleza de esta asociación. Los futuros estudios que investiguen similitudes genéticas o biológicas entre padres e hijos pueden ofrecer importantes hallazgos para ampliar el conocimiento existente hasta el momento.

11. En la investigación con población clínica pediátrica de TDAH, los modelos estructurales (padres y niños) presentaron resultados divergentes respecto a la asociación entre sobreprotección paterna y los SSF. Sin embargo, en el tercer estudio empírico no se observó asociación significativa entre ambos constructos. Los hallazgos sugieren la necesidad de un mayor número de investigaciones que permitan clarificar los resultados obtenidos.

12. La vulnerabilidad al estrés es considerada por muchos investigadores uno de los factores desencadenantes de los SSF. Sin embargo se hace necesario investigar cuáles factores contribuyen para esta vulnerabilidad.

13. Referencias

Abu-Arafeh, I. & Russell, G. (1995). Prevalence and clinical features of abdominal migraine compared with those of migraine headache. *Archives of Disease in Childhood*, *72*(5), 413–417.

American Psychiatric Association. (1987). *Diagnostic and Statistical Manual of Mental Disorders: DSM-III-R*. Washington: American Psychiatric Association.

American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders: DSM-IV-TR* (4th ed.). Washington: American Psychiatric Association.

Apley, J. (1958). A Common Denominator in the Recurrent Pains of Childhood. *Proceedings of the Royal Society of Medicine*, *51*(12), 1023–1024.

Apley, J. & Naish, N. (1958). Recurrent Abdominal Pains: A Field Survey of 1,000 School Children. *Archives of Disease in Childhood*, *33*(168), 165–170.

Apley, J. (1975). *The child with abdominal pains* (2nd ed.). J. B. Lippincott.

Aro, H. (1987). Life stress and psychosomatic symptoms among 14 to 16-year old Finnish adolescents. *Psychological Medicine*, *17*(1), 191–201.

Aro, H., Hänninen, V. & Paronen, O. (1989). Social support, life events and psychosomatic symptoms among 14-16-year-old adolescents. *Social Science & Medicine (1982)*, *29*(9), 1051–1056.

Aro, H. (1989). Stress, development and psychosomatic symptoms in adolescence: A comparison of the sexes. *Psychiatria Fennica*, *20*, 101–109.

Aromaa, M., Sillanpää, M., Rautava, P. & Helenius, H. (2000). Pain experience of children with headache and their families: A controlled study. *Pediatrics*, *106*(2 Pt 1), 270–275.

Bakoula, C., Kapi, A., Veltsista, A., Kavadias, G. & Kolaitis, G. (2006). Prevalence of recurrent complaints of pain among Greek schoolchildren and associated factors: A population-based study. *Acta Paediatrica*, *95*(8), 947–951. doi:10.1080/08035250600684453

Bandell-Hoekstra, I. E. N. G., Abu-Saad, H. H., Passchier, J., Frederiks, C. M. A., Feron, F. J. M. & Knipschild, P. (2002). Coping and Quality of Life in relation to headache in Dutch schoolchildren. *European Journal of Pain*, *6*(4), 315–321.

Bandura, A. (1976). *Social Learning Theory* (1.ª ed.). Prentice Hall.

Barsky, A. J., Goodson, J. D., Lane, R. S. & Cleary, P. D. (1988). The amplification of somatic symptoms. *Psychosomatic Medicine*, *50*(5), 510–519.

Beck, J. E. (2008). A developmental perspective on functional somatic symptoms. *Journal of Pediatric Psychology*, *33*(5), 547–562. doi:10.1093/jpepsy/jsm113

Belmaker, E., Espinoza, R. & Pogrund, R. (1985). Use of Medical Services by Adolescents with Non-Specific Somatic Symptoms. *International Journal of Adolescent Medicine and Health*, *1*(1-2), 149–156. doi:10.1515/IJAMH.1985.1.1-2.149

Bernstein, G. A., Massie, E. D., Thuras, P. D., Perwien, A. R., Borchardt, C. M. & Crosby, R. D. (1997). Somatic symptoms in anxious-depressed school refusers. *Journal of the American Academy of Child and Adolescent Psychiatry*, *36*(5), 661–668. doi:10.1097/00004583-199705000-00017

Boey, C. C. & Goh, K. L. (2001). The significance of life-events as contributing factors in childhood recurrent abdominal pain in an urban community in Malaysia. *Journal of Psychosomatic Research*, *51*(4), 559–562.

Bowlby, J. (1973). *Attachment and loss: Attachment*. New York: Basic Books.

Boyer, M. C., Compas, B. E., Stanger, C., Colletti, R. B., Konik, B. S., Morrow, S. B. & Thomsen, A. H. (2006). Attentional Biases to Pain and Social Threat in Children with Recurrent Abdominal Pain. *Journal of Pediatric Psychology*, *31*(2), 209 –220. doi:10.1093/jpepsy/jsj015

Boz, C., Velioglu, S., Ozmenoglu, M., Sayar, K., Alioglu, Z., Yalman, B., & Topbas, M. (2004). Temperament and character profiles of patients with tension-type headache and migraine. *Psychiatry and Clinical Neurosciences*, *58*(5), 536–543. doi:10.1111/j.1440-1819.2004.01297.x

Campo, J. V. & Fritsch, S. L. (1994). Somatization in children and adolescents. *Journal Of The American Academy Of Child And Adolescent Psychiatry*, *33*(9), 1223–1235.

Campo, J. V., Jansen-McWilliams, L., Comer, D. M. & Kelleher, K. J. (1999). Somatization in pediatric primary care: association with psychopathology, functional impairment, and use of services. *Journal Of The American Academy Of Child And Adolescent Psychiatry*, *38*(9), 1093–1101.

Campo, J. V., Bridge, J., Ehmann, M., Altman, S., Lucas, A., Birmaher, B., Lorenzo, C. D., et al. (2004). Recurrent Abdominal Pain, Anxiety, and Depression in Primary Care. *Pediatrics*, *113*(4), 817–824.

Campo, J. V., Bridge, J., Lucas, A., Savorelli, S., Walker, L., Di Lorenzo, C., Iyengar, S., et al. (2007). Physical and emotional health of mothers of youth with functional abdominal pain. *Archives of Pediatrics & Adolescent Medicine*, *161*(2), 131–137. doi:10.1001/archpedi.161.2.131

Campo, J. V. & Fritz, G. (2007). Somatoform disorders. In A. Martin & F. Volkmar (Eds), *Lewis's child and adolescent psychiatry, a comprehensive textbook* (pp 633–647). Philadelphia: Lippincott Williams & Wilkins.

Campo, J. V. (2012). Annual Research Review: Functional somatic symptoms and associated anxiety and depression – developmental psychopathology in pediatric practice. *Journal of Child Psychology and Psychiatry*, *53*(5), 575–592. doi:10.1111/j.1469-7610.2012.02535.x

Compas, B. E., Connor-Smith, J. K., Saltzman, H., Thomsen, A. H. & Wadsworth, M. E. (2001). Coping with stress during childhood and adolescence: problems, progress, and potential in theory and research. *Psychological Bulletin*, *127*(1), 87–127.

Craig, T. K., Boardman, A. P., Mills, K., Daly-Jones, O. & Drake, H. (1993). The South London Somatisation Study. I: Longitudinal course and the influence of early life experiences. *The British Journal of Psychiatry*, *163*(5), 579–588. doi:10.1192/bjp.163.5.579

Craig, T. K. J., Cox, A. D. & Klein, K. (2002). Intergenerational Transmission of Somatization Behaviour: A Study of Chronic Somatizers and Their Children. *Psychological Medicine*, *32*(05), 805–816. doi:10.1017/S0033291702005846

Cummings, M. E., Davies, P. T. & Campbell, S. B. (2002). *Developmental Psychopathology and Family Process: Theory, Research, and Clinical Implications* (1.ª ed.). New York: The Guilford Press.

Davison, I. S., Faull, C. & Nicol, A. R. (1986). Research note: temperament and behaviour in six-year-olds with recurrent abdominal pain: a follow up. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *27*(4), 539–544.

De Gucht, V., & Fischler, B. (2002). Somatization: a critical review of conceptual and methodological issues. *Psychosomatics*, *43*(1), 1–9. doi:10.1176/appi.psy.43.1.1

Dhossche, D., Ferdinand, R., van der Ende, J. & Verhulst, F. (2001). Outcome of self-reported functional-somatic symptoms in a community sample of adolescents. *Annals of Clinical Psychiatry*, *13*(4), 191–199.

Domènech-Llaberia, E., Jané, C., Canals, J., Ballespí, S., Esparó, G. & Garralda, E. (2004). Parental reports of somatic symptoms in preschool children: Prevalence and associations in a Spanish sample. *Journal of the American Academy of Child & Adolescent Psychiatry*, *43*(5), 598–604. doi:10.1097/00004583-200405000-00013

Egger, H. L., Angold, A. & Costello, E. J. (1998). Headaches and psychopathology in children and adolescents. *Journal Of The American Academy Of Child And Adolescent Psychiatry*, *37*(9), 951–958.

Egger, H. L., Costello, E. J., Erkanli, A. & Angold, A. (1999). Somatic complaints and psychopathology in children and adolescents: stomach aches, musculoskeletal pains, and headaches. *Journal of the American Academy of Child and Adolescent Psychiatry*, *38*(7), 852–860. doi:10.1097/00004583-199907000-00015

Eminson, D. M. (2001). Somatising in children and adolescents. 1. Clinical presentations and aetiological factors. *Advances in Psychiatric Treatment*, *7*(4), 266 –274. doi:10.1192/apt.7.4.266

Eminson, M., Benjamin, S., Shortall, A., Woods, T. & Faragher, B. (1996). Physical Symptoms and Illness Attitudes in Adolescents: An Epidemiological Study. *Journal of Child Psychology and Psychiatry*, *37*(5), 519–528. doi:10.1111/j.1469-7610.1996.tb01438.x

Erkolahti, R., Ilonen, T., Saarijärvi, S. & Terho, P. (2003). Self-image and depressive symptoms among adolescents in a non-clinical sample. *Nordic Journal of Psychiatry*, *57*(6), 447–451. doi:10.1080/08039480310003461

Fabrega, H. Jr. (1990). The concept of somatization as a cultural and historical product of Western medicine. *Psychosomatic Medicine*, *52*(6), 653–672.

Fichtel, A. & Larsson, B. (2002). Psychosocial impact of headache and comorbidity with other pains among Swedish school adolescents. *Headache*, *42*(8), 766–775.

Frare, M., Axia, G. & Battistella, P. A. (2002). Quality of life, coping strategies, and family routines in children with headache. *Headache*, *42*(10), 953–962.

Freud, S. (1962). The Aetiology of Histerya. In J. Strachey (Ed.), *The standard edition of the complete psychological works of Sigmund Freud.* (pp.191-221). London: Hogarth Press.

Galli, F., D'Antuono, G., Tarantino, S., Viviano, F., Borrelli, O., Chirumbolo, A., Cucchiara, S., et al. (2007). Headache and recurrent abdominal pain: a controlled study by the means of the Child Behaviour Checklist (CBCL). *Cephalalgia*, *27*(3), 211–219.

Garber, J, Zeman, J. & Walker, L. S. (1990). Recurrent abdominal pain in children: psychiatric diagnoses and parental psychopathology. *Journal of The American Academy Of Child And Adolescent Psychiatry*, *29*(4), 648–656.

Garber, J., Walker, L. S. & Zeman, J. (1991). Somatization Symptoms in a Community Sample of Children and Adolescents: Further Validation of the Children's Somatization Inventory. *Psychological Assessment*, *3*(4), 588–595.

Garralda, M. E. (1996). Somatisation in Children. *Journal of Child Psychology and Psychiatry*, *37*(1), 13–33. doi:10.1111/j.1469-7610.1996.tb01378.x

Garralda, M. E. (1999). Practitioner review: Assessment and management of somatisation in childhood and adolescence: a practical perspective. *Journal of Child Psychology And Psychiatry, And Allied Disciplines*, *40*(8), 1159–1167.

Garralda, M. E. (2004). The Interface Between Physical and Mental Health Problems and Medical Help Seeking in Children and Adolescents: A Research Perspective. *Child and Adolescent Mental Health*, *9*(4), 146–155. doi:10.1111/j.1475-3588.2004.00098.x

Gillespie, N. A., Zhu, G., Heath, A. C., Hickie, I. B. & Martin, N. G. (2000). The genetic aetiology of somatic distress. *Psychological Medicine*, *30*(5), 1051–1061.

Ginsburg, G. S., Riddle, M. A. & Davies, M. (2006). Somatic symptoms in children and adolescents with anxiety disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, *45*(10), 1179–1187. doi:10.1097/01.chi.0000231974.43966.6e

Goodman, J. E. & McGrath, P. J. (1991). The epidemiology of pain in children and adolescents: a review. *Pain*, *46*(3), 247–264.

Grattan-Smith, P., Fairley, M. & Procopis, P. (1988). Clinical features of conversion disorder. *Archives of Disease in Childhood*, *63*(4), 408–414.

Haugaard, J. J. (2004). Recognizing and treating uncommon behavioral and emotional disorders in children and adolescents who have been severely maltreated: somatization and other somatoform disorders. *Child Maltreatment*, *9*(2), 169–176. doi:10.1177/1077559504264318

Hodges, K., Kline, J. J., Barbero, G. & Flanery, R. (1985). Depressive symptoms in children with recurrent abdominal pain and in their families. *The Journal of Pediatrics*, *107*(4), 622–626.

Hodges, K., Kline, J. J., Barbero, G. & Woodruff, C. (1985). Anxiety in children with recurrent abdominal pain and their parents. *Psychosomatics*, *26*(11), 859, 862–866.

Holmberg, K. (2010). The association of bullying and health complaints in children with attention-deficit/hyperactivity disorder. *Postgraduate Medicine*, *122*(5), 62–68.

Holmberg, K., & Hjern, A. (2006). Health complaints in children with attention deficit/hyperactivity disorder. *Acta Paediatrica*, *95*(6), 664–670.

Hotopf, M. (2002). Childhood experience of illness as a risk factor for medically unexplained symptoms. *Scandinavian Journal of Psychology*, *43*(2), 139–146.

Hotopf, M., Carr, S., Mayou, R., Wadsworth, M. & Wessely, S. (1998). Why do children have chronic abdominal pain, and what happens to them when they grow up? Population based cohort study. *British Medical Journal*, *316*(7139), 1196 –1200.

Husain, K., Browne, T. & Chalder, T. (2007). A Review of Psychological Models and Interventions for Medically Unexplained Somatic Symptoms in Children. *Child and Adolescent Mental Health*, *12*(1), 2–7. doi:10.1111/j.1475-3588.2006.00419.x

Janssens, K. A. M., Oldehinkel, A. J. & Rosmalen, J. G. M. (2009). Parental overprotection predicts the development of functional somatic symptoms in young adolescents. *The Journal of Pediatrics*, *154*(6), 918–923. doi:10.1016/j.jpeds.2008.12.023

Janssens, K. A. M., Rosmalen, J. G. M., Ormel, J., van Oort, F. V. A. & Oldehinkel, A. J. (2010). Anxiety and depression are risk factors rather than consequences of functional somatic symptoms in a general population of adolescents: the TRAILS study. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *51*(3), 304–312. doi:10.1111/j.1469-7610.2009.02174.x

Kashani, J. H., Lababidi, Z. & Jones, R. S. (1982). Depression in Children and Adolescents with Cardiovascular Symptomatology: The Significance of Chest Pain. *Journal of the American Academy of Child Psychiatry*, *21*(2), 187–189. doi:10.1016/S0002-7138(09)60918-3

Kellner, R. (1991). *Psychosomatic syndromes and somatic symptoms*. Washington, DC: American Psychiatric Pub.

Kendler, K. S., Walters, E. E., Truett, K. R., Heath, A. C., Neale, M. C., Martin, N. G. & Eaves, L. J. (1995). A twin-family study of self-report symptoms of panic-phobia and somatization. *Behavior Genetics*, *25*(6), 499–515.

Konijnenberg, A. Y., Uiterwaal, C. S. P. M., Kimpen, J. L. L., van der Hoeven, J., Buitelaar, J. K. & de Graeff-Meeder, E. R. (2005). Children with unexplained chronic pain: substantial impairment in everyday life. *Archives of Disease in Childhood*, *90*(7), 680–686. doi:10.1136/adc.2004.056820

Kowal, A. & Pritchard, D. (1990). Psychological Characteristics of Children who Suffer from Headache: A Research Note. *Journal of Child Psychology and Psychiatry*, *31*(4), 637–649. doi:10.1111/j.1469-7610.1990.tb00803.x

Lavigne, J. V., Schulein, M. J. & Hahn, Y. S. (1986). Psychological aspects of painful medical conditions in children. I. Developmental aspects and assessment. *Pain*, *27*(2), 133–146.

Leibenluft, E., Charney, D. S., Towbin, K. E., Bhangoo, R. K. & Pine, D. S. (2003). Defining clinical phenotypes of juvenile mania. *The American Journal of Psychiatry*, *160*(3), 430–437. doi:10.1176/appi.ajp.160.3.430

Liakopoulou-Kairis, M., Alifieraki, T., Protagora, D., Korpa, T., Kondyli, K., Dimosthenous, E., Christopoulos, G., et al. (2002). Recurrent abdominal pain and headache-psychopathology, life events and family functioning. *European Child & Adolescent Psychiatry*, *11*(3), 115–122.

Lieb, R., Zimmermann, P., Friis, R. H., Höfler, M., Tholen, S. & Wittchen, H. U. (2002). The natural course of DSM-IV somatoform disorders and syndromes among adolescents and young adults: a prospective-longitudinal community study. *European Psychiatry*, *17*(6), 321–331. doi:10.1016/S0924-9338(02)00686-7

Lipowski, Z. J. (1988). Somatization: The concept and its clinical application. *The American Journal of Psychiatry*, *145*(11), 1358–1368.

Maloney, M. J. (1980). Diagnosing hysterical conversion reactions in children. *The Journal of Pediatrics*, *97*(6), 1016–1020.

Martin, A., Volkmar, F. R. & Lewis, M. (2007). *Lewis's child and adolescent psychiatry: a comprehensive textbook*. Philadelphia: Lippincott Williams & Wilkins.

Masi, G., Favilla, L., Millepiedi, S. & Mucci, M. (2000). Somatic symptoms in children and adolescents referred for emotional and behavioral disorders. *Psychiatry: Interpersonal and Biological Processes*, *63*(2), 140–149.

Mikkelsson, M., Sourander, A., Piha, J. & Salminen, J. J. (1997). Psychiatric Symptoms in Preadolescents With Musculoskeletal Pain and Fibromyalgia. *Pediatrics*, *100*(2), 220 –227. doi:10.1542/peds.100.2.220

Mulvaney, S., Lambert, E. W., Garber, J. & Walker, L. S. (2006). Trajectories of symptoms and impairment for pediatric patients with functional abdominal pain: a 5-year longitudinal study. *Journal of the American Academy of Child and Adolescent Psychiatry*, *45*(6), 737–744. doi:10.1097/10.chi.0000214192.57993.06

Muris, P. & Meesters, C. (2004). Children's somatization symptoms: correlations with trait anxiety, anxiety sensitivity, and learning experiences. *Psychological Reports*, *94*(3), 1269–1275.

Netherton, S. D., Holmes, D. & Walker, C. E. (1999). *Child and Adolescent Psychological Disorders: A Comprehensive Textbook* (1.ª ed.). New York: Oxford University Press.

Nigg, J. T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *47*(3-4), 395–422. doi:10.1111/j.1469-7610.2006.01612.x

Offord, D. R., Boyle, M. H., Szatmari, P. & Rae-Grant, N. I. (1987). Ontario Child Health Study: II. Six-month prevalence of disorder and rates of service utilization. *Archives of General Psychiatry*, *44*(9), 832–836.

Osborne, R. B., Hatcher, J. W. & Richtsmeier, A. J. (1989). The role of social modeling in unexplained pediatric pain. *Journal of Pediatric Psychology*, *14*(1), 43–61.

Ostkirchen, G. G., Andler, F., Hammer, F., Pöhler, K. D., Snyder-Schendel, E., Werner, N. K., Markett, S., et al. (2006). Prevalences of primary headache symptoms at school-entry: a population-based epidemiological survey of preschool children in Germany. *The Journal of Headache and Pain*, *7*(5), 331–340. doi:10.1007/s10194-006-0325-z

Pereira, A. I. F., Canavarro, C., Cardoso, M. F. & Mendonça, D. (2009). Patterns of parental rearing styles and child behaviour problems among Portuguese school-aged children. *Journal of Child and Family Studies*, *18*(4), 454–464. doi:10.1007/s10826-008-9249-3

Perkonigg, A., Pfister, H., Stein, M. B., Höfler, M., Lieb, R., Maercker, A. & Wittchen, H. U. (2005). Longitudinal course of posttraumatic stress disorder and posttraumatic stress disorder symptoms in a community sample of adolescents and young adults. *The American Journal of Psychiatry*, *162*(7), 1320–1327. doi:10.1176/appi.ajp.162.7.1320

Poikolainen, K., Kanerva, R. & Lönnqvist, J. (1995). Life Events and Other Risk Factors for Somatic Symptoms in Adolescence. *Pediatrics*, *96*(1), 59 –63.

Ramchandani, P. G., Hotopf, M., Sandhu, B., Stein, A. & the ALSPAC Study Team. (2005). The Epidemiology of Recurrent Abdominal Pain From 2 to 6 Years of Age: Results of a Large, Population-Based Study. *Pediatrics*, *116*(1), 46 –50. doi:10.1542/peds.2004-1854

Rask, C. U., Christensen, M. F., Borg, C., Søndergaard, C., Thomsen, P. H. & Fink, P. (2009a). The Soma Assessment Interview: New parent interview on functional somatic symptoms in children. *Journal of Psychosomatic Research*, *66*(5), 455–464. doi:10.1016/j.jpsychores.2008.10.012

Rask, C. U., Olsen, E. M., Elberling, H., Christensen, M. F., Ornbøl, E., Fink, P., Thomsen, P. H., et al. (2009b). Functional somatic symptoms and associated impairment in 5-7-year-old children: the Copenhagen Child Cohort 2000. *European Journal of Epidemiology*, *24*(10), 625–634.

Richardson, L. P., Russo, J. E., Lozano, P., McCauley, E., & Katon, W. (2010). Factors Associated with Detection and Receipt of Treatment for Adolescents with Depression and Anxiety Disorders. *Academic pediatrics*, *10*(1), 36–40. doi:10.1016/j.acap.2009.09.011

Rief, W., Shaw, R. & Fichter, M. (1998). Elevated levels of psychophysiological arousal and cortisol in patients with somatization syndrome. *Psychosomatic Medicine*, *60*(2), 198 –203.

Rimsza, M. E., Berg, R. A. & Locke, C. (1988). Sexual abuse: somatic and emotional reactions. *Child Abuse & Neglect*, *12*(2), 201–208.

Robinson, J. O., Alverez, J. H. & Dodge, J. A. (1990). Life events and family history in children with recurrent abdominal pain. *Journal of Psychosomatic Research*, *34*(2), 171–181.

Rocha, E. M., Prkachin, K. M., Beaumont, S. L., Hardy, C. L. & Zumbo, B. D. (2003). Pain reactivity and somatization in kindergarten-age children. *Journal of Pediatric Psychology*, *28*(1), 47–57. doi:10.1093/jpepsy/28.1.47

Roth-Isigkeit, A., Thyen, U., Stöven, H., Schwarzenberger, J. & Schmucker, P. (2005). Pain among children and adolescents: restrictions in daily living and triggering factors. *Pediatrics*, *115*(2), e152–162. doi:10.1542/peds.2004-0682

Sandberg, S. & Stevenson, J. (2008). Psychiatric aspects of somatic disease. In M. Rutter, D. Bishop, D. Pine, S. Scott, J. Stevenson, E. A. Taylor & A. Thapar (Eds.), *Rutter's child and adolescent psychiatry* (pp.930-944). Oxford: Blackwell Scientific Publications. doi:10.1002/9781444300895.ch57

Sanders, M. R., Rebgetz, M., Morrison, M., Bor, W., Gordon, A., Dadds, M. & Shepherd, R. (1989). Cognitive-behavioral treatment of recurrent nonspecific abdominal pain in children: an analysis of generalization, maintenance, and side effects. *Journal of Consulting and Clinical Psychology*, *57*(2), 294–300.

Silber, T. J. & Pao, M. (2003). Somatization Disorders in Children and Adolescents. *Pediatrics in Review*, *24*(8), 255 –264. doi:10.1542/pir.24-8-255

Sillanpää, M., Piekkala, P. & Kero, P. (1991). Prevalence of headache at preschool age in an unselected child population. *Cephalalgia*, *11*(5), 239–242.

Spierings, C., Poels, P. J., Sijben, N., Gabreëls, F. J. & Renier, W. O. (1990). Conversion disorders in childhood: a retrospective follow-up study of 84 inpatients. *Developmental Medicine and Child Neurology*, *32*(10), 865–871.

Steinhausen, H. C., von Aster, M., Pfeiffer, E. & Göbel, D. (1989). Comparative studies of conversion disorders in childhood and adolescence. *Journal of Child Psychology and Psychiatry, 30*(4), 615–621.

Steinhausen, H. C. & Metzke, C. W. (2007). Continuity of functional-somatic symptoms from late childhood to young adulthood in a community sample. *Journal of Child Psychology and Psychiatry*, *48*(5), 508–513. doi:10.1111/j.1469-7610.2006.01721.x

Stevenson, J., Simpson, J. & Bailey, V. (1988). Research note: recurrent headaches and stomachaches in preschool children. *Journal of Child Psychology and Psychiatry*, *29*(6), 897–900.

Strine, T. W., Okoro, C. A., McGuire, L. C. & Balluz, L. S. (2006). The associations among childhood headaches, emotional and behavioral difficulties, and health care use. *Pediatrics*, *117*(5), 1728–1735. doi:10.1542/peds.2005-1024

Taylor, D. C., Szatmari, P., Boyle, M. H. & Offord, D. R. (1996). Somatization and the Vocabulary of Everyday Bodily Experiences and Concerns: A Community Study of Adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, *35*(4), 491–499. doi:10.1097/00004583-199604000-00015

Torgersen, S. (1986). Genetics of somatoform disorders. *Archives of General Psychiatry*, *43*(5), 502–505.

Vila, M., Kramer, T., Hickey, N., Dattani, M., Jefferis, H., Singh, M. & Garralda, M. E. (2009). Assessment of somatic symptoms in British secondary school children using the Children's Somatization Inventory (CSI). *Journal of Pediatric Psychology*, *34*(9), 989–998. doi:10.1093/jpepsy/jsp005

Walker, L. S., Garber, J. & Greene, J. W. (1991). Somatization symptoms in pediatric abdominal pain patients: relation to chronicity of abdominal pain and parent somatization. *Journal of Abnormal Child Psychology*, *19*(4), 379–394.

Walker, L. S., Garber, J. & Greene, J. W. (1993). Psychosocial correlates of recurrent childhood pain: a comparison of pediatric patients with recurrent abdominal pain, organic illness, and psychiatric disorders. *Journal of Abnormal Psychology*, *102*(2), 248–258.

Walker, L. S., Garber, J. & Greene, J. W. (1994). Somatic complaints in pediatric patients: a prospective study of the role of negative life events, child social and academic competence, and parental somatic symptoms. *Journal of Consulting and Clinical Psychology*, *62*(6), 1213–1221.

Walker, L. S. & Greene, J. W. (1989). Children with Recurrent Abdominal Pain and Their Parents: More Somatic Complaints, Anxiety, and Depression than Other Patient Families? *Journal of Pediatric Psychology*, *14*(2), 231–243. doi:10.1093/jpepsy/14.2.231

Walker, L. S. & Greene, J. (1991). Negative life events and symptom resolution in pediatric abdominal pain patients. *Journal of Pediatric Psychology*, *16*(3), 341–360.

Walker, L. S., Claar, R. L. & Garber, J. (2002). Social consequences of children's pain: when do they encourage symptom maintenance? *Journal of Pediatric Psychology*, *27*(8), 689–698.

Walker, L. S., Williams, S. E., Smith, C. A., Garber, J., Van Slyke, D. A. & Lipani, T. A. (2006). Parent attention versus distraction: impact on symptom complaints by children with and without chronic functional abdominal pain. *Pain*, *122*(1-2), 43–52. doi:10.1016/j.pain.2005.12.020

Walker, L. S., Smith, C. A., Garber, J. & Claar, R. L. (2007). Appraisal and Coping with Daily Stressors by Pediatric Patients with Chronic Abdominal Pain. *Journal of Pediatric Pychology*, *32*(2), 206–216. doi:10.1093/jpepsy/jsj124

World Health Organization. (1992). *The ICD-10 Classification of Mental and Behavioural Disorders: Clinical Descriptions and Diagnostic Guidelines* (1.ª ed.). World Health Organization.

Zuckerman, B., Stevenson, J. & Bailey, V. (1987). Stomachaches and headaches in a community sample of preschool children. *Pediatrics*, *79*(5), 677–682.

Zwaigenbaum, L., Szatmari, P., Boyle, M. H. & Offord, D. R. (1999). Highly somatizing young adolescents and the risk of depression. *Pediatrics*, *103*(6), 1203–1209.