

Measures for the assessment of stressful life events in the Spanish adult population: A systematic review

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Título: Instrumentos de evaluación de los eventos vitales estresantes en población española adulta: Una revisión sistemática.

Resumen: *Objetivo:* Este estudio pretende identificar y analizar los instrumentos de evaluación de los eventos vitales estresantes creados/adaptados para su uso con población española adulta, publicados en la literatura nacional e internacional, con especial atención en sus propiedades psicométricas y en su asociación con medidas de problemas de salud. *Métodos:* Se llevó a cabo una revisión sistemática de la literatura de todos los instrumentos publicados a través de los buscadores MEDLINE; ProQuest Health y Medical Complete; ProQuest Psychology Journals; PsycARTICLES; PsycINFO; Psycodoc; OpenSIGLE desde la fecha de inicio hasta el 31 de enero de 2016. Dos investigadores independientes evaluaron la elegibilidad de todos los artículos, extrajeron los datos y evaluaron sus propiedades psicométricas. *Resultados:* Se seleccionaron 12 instrumentos que cumplían los criterios de inclusión en el estudio. Las medidas presentaron una gran heterogeneidad. La mayoría no incluían información sobre sus propiedades psicométricas o necesitaban aportar más datos, ya que eran pocas las que evaluaban su estabilidad test-retest y/o su estructura interna. Los cuestionarios creados o adaptados por González de Rivera y Morena (1983), Sandín y Chorot (1987), Fernández y Mielgo (1992), Gracia y Herrero (2004) y Motrico et al. (2013) mostraron asociaciones significativas con variables de problemas de salud. *Discusión:* Se requieren más estudios sobre la asociación de los instrumentos con variables de problemas de salud mental y física, lo que facilitaría su aplicación clínica. Estos resultados tienen una gran utilidad a la hora de seleccionar un instrumento de evaluación de eventos vitales estresantes en el ámbito clínico y de investigación en España.

Palabras clave: Eventos vitales estresantes; Evaluación; Estrés; Revisión sistemática; Cuestionarios; Escalas.

Abstract: *Objective:* The aim of this research is to identify and analyze the measures for the assessment of stressful life events created/adapted for its use in Spanish adult population, published in national and international literature, with a focus on psychometric properties and its association with health measures. *Methods:* A systematic review was carried out to identify all instruments identified through searches of MEDLINE; ProQuest Health and Medical Complete; ProQuest Psychology Journals; PsycARTICLES; PsycINFO; Psycodoc; OpenSIGLE from inception until 31 January 2016. Two independent researchers assessed the eligibility criteria of all articles, subtracted data and assessed its psychometric properties. *Results:* Twelve measures, which satisfied the inclusion criteria, were selected. The measures showed a large heterogeneity. Most of them did not include any information on its psychometric properties or needed to provide further data, since a few of them assessed its test-retest stability and/or internal structure. The questionnaires created or adapted by González de Rivera y Morena (1983), Sandín y Chorot (1987), Fernández y Mielgo (1992), Gracia y Herrero (2004), and Motrico et al. (2013) showed significant associations with health variables. *Discussion:* Further research is needed to clarify the association of these instruments with mental and physical health measures, which would facilitate its clinical application. These results are very useful in order to select a measure for the assessment of stressful life events in clinical practice and research in Spain.

Keywords: Stressful Life Events; Assessment; Stress; Systematic Review; Questionnaires; Scales.

Introduction

Despite the enormous recognition that stressful events (being fired from work, the death of a close family member, breaking up with a stable partner, etc.) have had in the scientific field, the methodological problems of the instruments for the evaluation of stressful life events are published regularly in the literature (Beards et al., 2013; Dohrenwend, 2006; Monroe, 2008; Sandín, 2003).

Similarly, the authors state that there is some confusion about which theoretical model is most appropriate (normative, subjective, contextual or psychosocial) (Cohen, Kessler, & Gordon, 1995). Scientific advances in the association between stressful life events and mental and physical illnesses potentially related to stress (Cohen, Janicki-Deverts, & Miller, 2007) depend on the selection of tests that have demonstrated reliability and validity according to internationally accepted standards (American Educational Research Association

(AERA), American Psychological Association (APA), & National Council on Measurement in Education (NCME), 1999; Carretero-Dios & Pérez, 2005, 2007).

The lack of knowledge of previously published instruments may make it difficult to select the most appropriate measures, that is, it becomes increasingly necessary to have rigorous information through reviews and updates. Although many studies have been published in Spain including some of the scales that evaluate stressful life events on Spanish population (Fernández, Lasa, & González, 1996; Fernández & Blasco, 2003), no systematic review has been published so far that would facilitate decision-making on the basis of the available evidence.

The aim of this research is to identify and analyze the measures used for the assessment of stressful life events for use in the Spanish adult population, published in the national and international literature, with a focus on psychometric properties and their association with health measures.

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Method

A systematic review of the literature has been carried out following the presentation format and the guidelines proposed by the Statement of Transparent Reporting of Systematic Reviews and Meta-Analyses (PRISMA) (Moher, Liberati, Tetzlaff, & Altman, 2009; Urrútia & Bonfill, 2010). Each one of the authors reviewed and approved the search strategy before starting the search and the extraction of the data. It began with clearly defining the object of the search, including all the instruments that evaluate stressful vital events and that are created/adapted for use with the adult Spanish population (Perestelo-Pérez, 2013).

Information sources

Seven national and international databases were consulted (MEDLINE; ProQuest Health and Medical Complete; ProQuest Psychology Journals; PsycARTICLES; PsycINFO; Psycodoc; OpenSIGLE) by two researchers independently (MLRC and EMM) until January 31, 2016. The search included limited studies published in Spanish or English, without restriction on the year of publication or the type of document. In order to carry out an exhaustive search, all the references in the studies selected for full text review and the specialized manuals on the subject were revised manually. In addition, we contacted the authors of the instruments to expand the data obtained in the case of missing information. Finally, to compile information on the construct validity (especially their association with health measures), all other studies that used the instruments in the Spanish population were searched.

Search strategy

Publications were searched in the selected databases using a thesaurus-controlled language with keywords, Boolean operators and truncation, obtaining the following search chain: (stress OR vital events OR stressful vital experience OR stressful vital event OR vital change OR stressor factor OR vital event) AND (inventory * OR questionnaire * OR list OR interview OR scale * OR instrument * OR measure * OR test OR tool *) NOT Child * OR teenager * OR Burn-out OR labor OR work). This search was conducted in duplicate and was checked by combining different descriptors in the singular and in the plural and in all reference groups (title, abstract and keywords) in both Spanish and English. The search strategy was developed and tested initially in

Psycodoc and later adapted and refined for each electronic database.

Study selection criteria

The reviewed instruments shared the following inclusion criteria: (1) assessed stressful life events; and (2) were developed or adapted for use in the adult Spanish population. No restrictions were applied on the type of study because it was intended to analyze all published instruments. The exclusion criteria were: (1) instruments that assessed stressors other than stressful life events, such as traumatic events (e.g., rape or abduction) or minor or everyday life events (e.g., traffic jams), as they differ in their association with health measures (Hatch & Dohrenwend, 2007); (2) publications on the adaptation of an instrument for stressful events in a country other than Spain; and (3) studies on measures targeted at a specific field (e.g., specific stressors of the work setting) or specific population groups (children, young people or the geriatric population) because this was not the subject of this study.

Instrument selection

The selection of the instruments was carried out in three phases: in the first phase, the results of the recovered studies in the search strategy were combined, and the duplicates were eliminated; in the second, the studies were selected based on the title and abstract; and in the third, potentially relevant studies were retrieved for full-text reading. Two investigators (JAG, MLRC) performed the entire selection independently. The kappa statistic measured the inter-judge agreement between the first two reviewers ($\kappa = .81$; 95% CI: .75 – .87). Any discrepancy or doubt was resolved by consulting a third member of the team (JAS). Selection was developed in an iterative process through individual assessments until a consensus was reached.

Information Analysis

The unit of analysis was the instrument of evaluation of stressful life events. The description of the instruments was classified using a table of evidence containing their main characteristics. The psychometric properties were critically evaluated while taking into account the international recommendations that exist in the scientific literature on the characteristics that instruments of measurement in psychology (AERA et al., 1999) and health sciences (Mokkink et al., 2010) should consider, see Table 1.

Table 1. Criteria for the evaluation of the psychometric properties of the instruments.

Grading Criteria	
Internal consistency	
+	One-dimensional measure and Cronbach's alpha $\geq .70$.
?	Not reported.
-	Evaluated but did not meet the rating standard.
Test-retest stability	
+	Evaluated with <i>Kappa</i> $\geq .70$ or Pearson's <i>r</i> $\geq .70$.
?	Not reported.
-	Evaluated but did not meet the rating standard.
Internal reliability	
+	Evaluated factors explain $\geq 50\%$ of the variance, saturation values are $> .40$ and results interpretation is consistent.
?	Not reported.
-	Evaluated but does not meet the rating standard.
Construct validity	
+	Association with other constructs $\geq .50$ or at least 75% of the results in accordance with the authors' starting hypotheses. The correlation is higher with similar constructs than with constructs that are not expected to be related.
?	Not reported.
-	Evaluated but does not meet the rating standard.
Sensitivity to change	
+	Ratio of instrument scores to changes expected $\geq .50$, or at least 75% of the results are in accordance with the authors' starting hypotheses, or the area under the ROC curve is $\geq .50$. The correlation with expected changes is higher than that obtained with changes that are not expected to be related.
?	Not reported.
-	Evaluated but does not meet the rating standard.
Cross-cultural adaptation	
+	Agrees with the recommendations of international organizations, and there is sufficient information on the adaptation process.
?	Not reported. There is not enough information or it has not been performed (literal translation to Spanish without cross-cultural adaptation).
-	Cross-cultural adaptation has not followed the recommendations of international organizations.

With respect to the synthesis of the available evidence, in the case of several studies for the same measure, the results were synthesized by combining them based on the number and method quality of the studies and the consistency of the results according to these standards (Mokkink et al., 2010), see Table 2.

Table 2. Levels of evidence for the overall quality of the instruments' psychometric properties.

Level	Grading	Criteria
<i>High</i>	+ + + or - - -	Findings consistent with multiple studies of good methodological quality studies or in one study of excellent methodological quality.
<i>Mild</i>	+ + or - -	Findings consistent with multiple studies of reasonable methodological quality or in one study of good methodological quality.
<i>Low</i>	+ or -	A study of acceptable methodological quality.
<i>Controversial</i> + / -		Studies with controversial results.
<i>Not informed</i> ?		No information or only in low methodological quality studies.

Note: (+) indicates positive rating, (?) indeterminate score and (-) negative rating.

Two reviewers extracted data from full-text publications and reviewed the psychometric properties of the instruments independently (EM and PMP). The protocol criteria were verified until reaching a consensus to resolve any doubts or disagreements between the two reviewers. The instruments included in the review were ordered according to their date of publication.

Results

Identification and selection of the instruments

The process for the identification and selection of the instruments is displayed in the PRISMA flow diagram (see Figure 1). In the combined search strategy, once the duplications were eliminated, 688 potentially relevant articles were obtained. From them, 669 articles were excluded based on their title and abstract. The remaining 19 manuscripts were reviewed in full. Finally, 12 articles were subject to the present review: Stressful Life Events Scale (ESV) (González de Rivera & Morera, 1983b), Life Changes Questionnaire

(CCV) (Castillón, Campo, Linares, Pericay, & Tejedor, 1984), Life Events Scale-PERI Modified (Fernández-Ballesteros, Vizcarro, Souto, Izal, & Troconi, 1987), Life Event Scale-Spanish Version (Barrón, 1989b), Stress Assessment Scales (EAE) (Fernández & Mielgo, 1992), Scale of Stress Evoking Events (EAPE) (Caballo, 1994), Straordinary Stress Events Scale (ESEE) (Labrador, 1996), Life Events

Questionnaire (CSV) (Sandín, 1999a), Questionnaire of Impactful Evens (CAI) (Fierro & Jiménez, 1998a), Inventory of Personality Interrelationships with Vital Occurrences and Social References (IPSVPR) (Clemente & Gimeno, 2000), Unwanted Vital Events (EVND) (Gracia & Herrero, 2004a) y List of Threatening Experiences – Spanish version (Motrico et al., 2013).

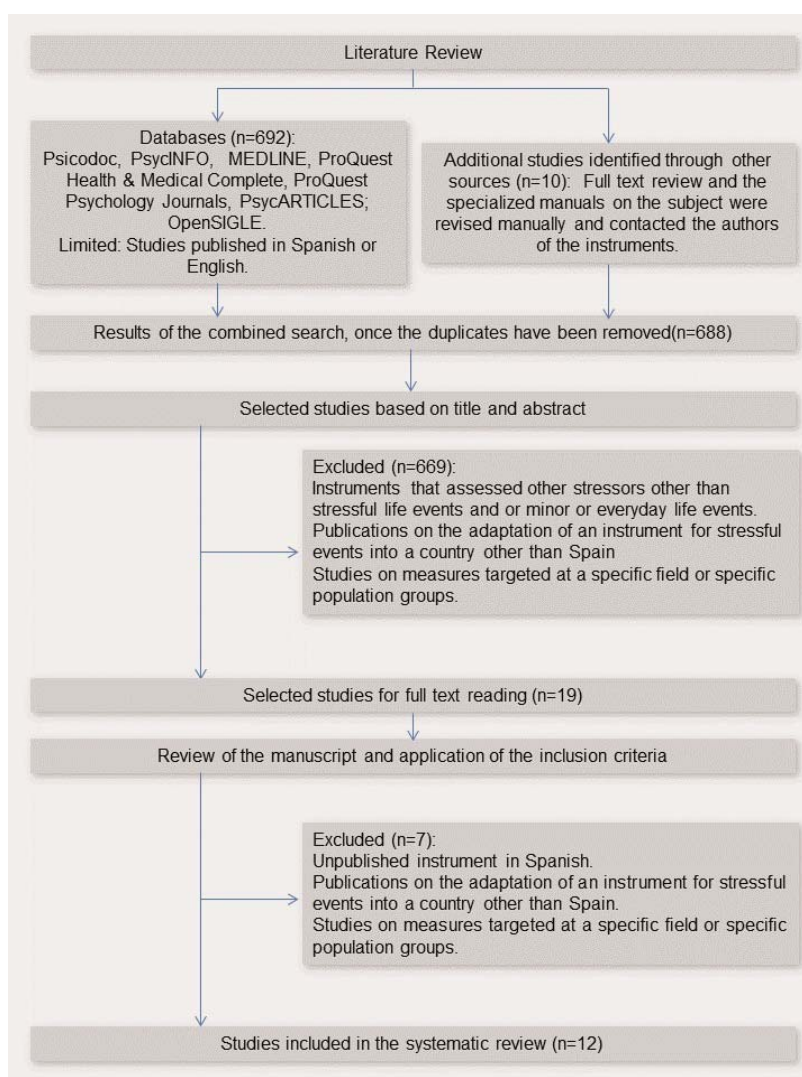


Figure 1. Process of identification and selection of instruments for evaluation of stressful life events (PRISMA flow diagram).

General description

Concerning the characteristics of the 12 instruments selected, 8 were developed in Spain, and 4 were developed for the Spanish population. With the exception of the questionnaire prepared by Gracia and Herrero (2004a) and the instrument adapted by Motrico et al (2013), the rest of the tests were created or adapted in the 80s and 90s. Seven instruments (Barrón, 1989; Caballo, 1994; Clemente & Gimeno, 2000; Fierro & Jiménez, 1998a; Gracia & Herrero, 2004;

Sandín, 1999; Vizcarro, 1987b) followed the subjective stress assessment model, two followed the normative model (Castillón et al., 1984; González de Rivera & Morera, 1983b), and two considered both perspectives (Fernández & Mielgo, 1992; Labrador, 1996). One assessed stress from a contextual point of view (Motrico et al., 2013). Regarding the administration method of the tests, all but one instrument are questionnaires (auto or hetero-administered), and the other is administered by interview (Clemente & Gimeno, 2000). In the questionnaires, the number of items was between 9 and

102. Seven instruments grouped the items by domains, subscales or categories comprising different scopes of psychosocial stress (Caballo, 1994; Castellón et al., 1984; Clemente & Gimeno, 2000; Fernández & Mielgo, 1992; Motrico et al., 2013; Sandín, 1999; Vizcarro, 1987b). The final rating was

obtained from the sum of the reported events (in the total of the test or in their scales) or of the assessments obtained in the scale. More information on the characteristics of the scales can be found in the Table 3.

Table 3. Characteristics of the instruments.

Instrument ¹	Authors	Adaptation	Assessment method	Admin method ²	Dimensions, categories or subscales ³	No of items	Type of answer	Final rating	Time-span	Admin time
<i>Stressful Life Events Scale (Escala de Sucesos Vitales (ESV))</i>	González de Rivera & Morera	Adaptation of Holmes & Rahe (1967)	Normative	Questionnaire		61	Scale from 1 to 100 according to stress potential	Sum of normative rating	To be determined by the researcher	3-5 min
<i>Life Changes Questionnaire (Cuestionario de Cambios Vitales-CCV)</i>	Castellón et al.	Not applicable	Normative	Questionnaire	Economics, family, labor, culture, relationships & others	73	Yes/No. Intensity (0 to 3 points)	Sum of normative rating	Last year	5-10 min
<i>Life Events Scale PERI-modified (Escala de Acontecimientos Vitales-PERI Modificado)</i>	Vizcarro	Adaptation of PERI (Dohrenwend, Askenasy, Krasnoff & Dohrenwend, 1978)	Subjective	Questionnaire	Academics, labor, love and marriage, children, residence, legal issues, finances, social activities & others	102	4 areas (subjective change, desirability, foresight and control): 1 to 5 points	Sum of scores by category	To be determined by the researcher	15-20 min
<i>Life Event Stress (LES-Spanish version)</i>	Barrón	Adaptation of LES (Sarason & Johnson & Siegel, 1978)	Subjective	Questionnaire		57	Desirability (7-point Likert scale) and predictability (1-4 points)	Sum of scores of desirable and undesirable stress events	Last 6 months	5-10 min
<i>Stress Assessment Scales (Escala de Apreciación del Estrés-EAE)</i>	Fernández & Mielgo	Not applicable	Normative Subjective	Questionnaire	General (G): personal situation & contextual events; Elderly people (A): Loss and confrontation in new situations; Social & labor (S): Work, labor context & relation with the work; And Driving (C): relation with external factors & other users	53 (G), 51 (A), 50 (S), 35 (C).	Yes/No; Intensity (0-3) and validity (past / current)	Sum of scores by scales	Lifetime	20-30 min (each subscale)
<i>Scale of Stress-Evoking Events (Escala de Acontecimientos Productores de Estrés-EAPE)</i>	Caballo	Not applicable	Subjective	Questionnaire	Personal aggression; Positive events; Withdrawal of basic rights; Problems with others; Poor health / death of others; Outside social group; Victim of abuse / sexual abuse; Occupation / residence change; Physical aggression; Lacking resources; Lack of economic resources; Negative events with others, killing someone / difficulties at work; important changes	52	Likert scale of 1 to 10 points	Sum of scores by subscales		10 min

Instrument ¹	Authors	Adaptation	Assessment method	Admin method ²	Dimensions, categories or subscales ³	No of items	Type of answer	Final rating	Time-span	Admin time
<i>Extraordinary Stress Events Scale (Escala Sucesos Estresantes Extraordinarios-ESEE)</i>	Labrador	Not applicable	Normative Subjective	Questionnaire		57	Level of subjective importance: 0-4 points	Sum of normative rating multiplied by the sum of the subjective rating. Interpretation: ≥ 1000 points = above average stress; between 500-800 points = similar to average stress; ≤ 500 under the average stress	Last two years	3-5 min
<i>Life Events Questionnaire (Cuestionario de Sucesos Vitales-CV)</i>	Sandín	Not applicable	Subjective	Questionnaire	Work, health, love, marriage / romantic, family, children, social, legal, finance, residence and academic; Health, loss, threat / danger / damage	62	Yes/No; Stress self-perceived (1-4); assessment: positive / negative & expected / unexpected	Sum of scores	Last year	5-10 min
<i>Questionnaire of Impactful Events (Cuestionario de Acontecimientos Impactantes-CAI)</i>	Fierro y Jiménez	Not applicable	Subjective	Questionnaire		9	Presence of the event (Yes/No), stress level (1-9)	Sum of scores	Lifetime	3-5 min
<i>Inventory of Personality Interrelationships with Vital Occurrences and Social References (Inventario de Interrelaciones de Personalidad con Sucesos Vitales y Personas Relevantes-IPSVPR)</i>	Clemente & Gimeno	Not applicable	Subjective	Interview	Physical (general health), economic (increases and losses of income and wealth), labor (impact of loss, deterioration or improvement of labor stability), personal (personal maturity, autonomy and development of one's identity), social (relationships of friendship, professional or group) and affect (emotional level and in relationships of friendship, whether family or romantic)	24	Influence level: 1-7 points; Assessment: positive / negative & normative / non-normative	Sum of scores	Past (until previous year), present (year of the interview) and the future	30-60 min
<i>Unwanted Vital Events (Eventos Vitales No Deseados-EVND)</i>	Gracia y Herrero	Not applicable	Subjective	Questionnaire		33	Yes/No	Sum of items	Last 6 months	3-5 min
<i>List of Threatening Experiences (LTE-Spanish version)</i>	Motrico et al.	Adaptation of LTE-Q (Brugha, Bebbington, Tennant & Harry, 1985)	Contextual	Questionnaire	Romantic troubles; Labor and financial problems; Personal problems; Illness in others and losses	12	Yes/No	Individual score of the items (yes/no); Sub-scales score (yes/no); Total score (0, ≥ 1 ; 0, 1, ≥ 2)	Last 6 months	2-3 min

Psychometric properties

The internal consistency was evaluated through three tests with scores $\alpha = .70$ (Barrón, 1989), $\alpha = .49-.62$ (Sandín, 1999) and $\alpha = .44$ (Motrico et al., 2013). Two studies provid-

ed data on stability over time (test-retest reliability) and received a positive rating according to the standard used: $r = .62-.83$ (Fernández & Mielgo, 1992) and $k = .71-.75$ (Motrico et al., 2013), see Table 4.

Table 4. Analysis of psychometric properties.

Instrument	Validation analysis		Reliability		Validity		Sensitivity to change	Adaptation process	Studies reviewed
	Participants (N; % Women)	Geographical area	Internal consistency	Test-retest reliability	Internal reliability	Construct			
<i>Stressful Life Events Scale (Escala de Sucesos Vitales (E.SV))</i>	Patients and companions in hospital (397)	Tenerife	?	?	?	+	+	-	Blasco-Fontecilla et al., 2012; González de Rivera, 1989; *González de Rivera & Morera, 1983a; González de Rivera & Morera, 1983b; González de Rivera, Morera & Monterrey, 1989; Mayorga-Buiza et al., 2010; Menendez-Villalva et al., 2004; Morera & González de Rivera, 1983.
<i>Life changes questionnaire (Cuestionario de Cambios Vitales-CCV)</i>	General population (100), somatic patients (100) and psychiatric patients (100)	Barcelona, Cataluña and other non-specified Spanish cities	?	?	?	?	?	NA	*(Castillón et al., 1984; Medialdea, 2004.
<i>Life Events Scale PERI-Modified (Escala de Acontecimientos Vitales-PERI Modificado)</i>	?	?	?	?	?	++	?	?	García-Hurtado, Fernández-Ballesteros, Montero & Heiby, 1995; *Vizcarro, 1997 (cited in Fernández-Ballesteros et al., 1997).
<i>Life event stress (LES-Spanish version)</i>	General population (74; 100%)	Aranjuez	+	?	?	++	?	-	*Barrón, 1989a; Barrón 1989b; Barrón & Chacón, 1992.
<i>Stress Assessment Scales (Escala de Apreciación del Estrés-EAE)</i>	General scale (327), elderly scale (286), social-labor scale (214) and driving scale (275)	?	?	+	+	+++	?	NA	*Fernández & Mielgo, 1992; Godoy, Godoy, López-Chicheri, Martínez, Gutiérrez & Vázquez, 2008; Hidalgo, Peralta, Robles, Vilar & Pérez, 2009; Moreira & Álvarez, 2002; Martín, 2007.
<i>Scale of Stress-evoking Events (Escala de Acontecimientos Productores de Estrés-EAPE)</i>	University students (465; 64%)	?	?	?	+	?	?	NA	*Caballo, 1994; Caballo, Aguilar & Marinho, 1996; Caballo & Cardeña, 1997.
<i>Extraordinary Stress Events Scale (Escala Sucesos Estresantes Extraordinarios-ESEE)</i>	?	?	?	?	?	-	?	NA	(Pérez, Martín, Borda, & del Río, 2003).

Instrument	Validation analysis		Reliability		Validity		Sensitivity	Adaptation process	Studies reviewed
	Participants (N; % Women)	Geographical area	Internal consistency	Test-retest reliability	Internal reliability	Construct to change			
<i>Life Events Questionnaire (Cuestionario de Sucesos Vitales-CSV)</i>	General population	?	-	?	?	+++	?	NA	Chorot & Sandín, 1994; Olmedilla, Prieto & Blas, 2011; Lozano, Ortiz & González, 2011; Sandín & Chorot, 1993; Sandín, Chorot, Jiménez & Santed, 1994; (Sandín et al., 2004; Valiente, Sandín, Chorot, Santed, & González de Rivera, 1996); (Sandín & Chorot, 1993; Sandín et al., 2006); SanJuan & Magallares, 2006.
<i>Questionnaire of Impactful Events (Cuestionario de Acontecimientos Impactantes-CAI)</i>	University students (306) and adults (216)	Málaga	?	?	?	+	?	NA	*Fierro & Jiménez, 1998; Fierro-Hernández & Jiménez, 1999; Fierro-Hernández & Jiménez, 2002.
<i>Inventory of Personality Interrelationships with Vital Occurrences and Social References (Inventario de Interrelaciones de Personalidad con Sucesos Vitales y Personas Relevantes-IPSVPR)</i>	General population (489; 65%)	?	?	?	?	+	?	NA	*Clemente & Gimeno, 2000; Clemente, Córdoba & Gimeno 2003; Albiñana, Doménech, Sitges & Van der Hofstadt 2001
<i>Unwanted Vital Events (Eventos Vitales No Deseados-EVND)</i>	General population	?	?	?	?	+++	?	NA	Catalá-Miñana et al., 2013; *Gracia & Herrero, 2004a; Gracia & Herrero, 2004b; Gracia a Herrero, 2006; Herrero & Gracia, 2004; Herrero, Fuente & Gracia, 2011; Lila, Gracia, et al., 2013; Lila, Oliver, et al., 2013
<i>List of Threatening Experiences (LTE-Spanish version)</i>	Primary care patients (5442; 68%)	Málaga, Granada, Madrid, Zaragoza, Tenerife, Mallorca, La Rioja.	-	+	+	+++	?	+	Ayuso-Mateos et al., 2007; Casey et al., 2006; Cervilla et al., 2007; Dalgard et al., 2006; Gutiérrez et al., 2014; *Motrico et al., 2013;

Note. NA = Not applicable. (+) positive rating, (?) indeterminate rating and (-) negative rating. (*) Validity study.

Concerning validity, three instruments examined the internal structure of the test through exploratory factorial analysis (principal component analysis) with a positive rating according to the standard used. The EAE scales (Fernández & Mielgo, 1992) were grouped into two (scale S) and three factors (scales G, A and C). The EAPE scales (Caballo & Cardaña, 1997) were grouped into 14 factors that explained 63% of the variance, and the Spanish version of LTE (Motrico et al., 2013) was grouped into four factors that ex-

plained 61% of the variance. Additionally, the construct validity was analyzed by the association with the other variables with a positive rating according to the standard used in 9 instruments. However, only 7 instruments showed a relationship with health measures. The ESV scale showed a significant relationship with suicide attempts (Blasco-Fontecilla et al., 2012); the PERI-modified and the Spanish version of the LES were associated with depression (Barrón & Chacón, 1992; García-Hurtado, Fernández-Ballesteros, Montero, &

Heiby, 1995); the EAE-G was associated with physical problems and body ache in women (Hidalgo, Peralta, Robles, Vilar, & Pérez, 2009); the CSV questionnaire was associated with depressive symptoms (Sanjuán Suárez & Magallares Sanjuán, 2006) and distinguished patients with anxiety disorders (Sandín & Chorot, 1993; Sandín, Chorot, Santed, & Valiente, 2004; Sandín, Rodero, Santed, & García-Campayo, 2006) and patients with cancer and cardiovascular diseases (Chorot & Sandín, 1994); the EVND scale distinguished risky alcohol consumption (Catalá-Miñana, Lila, & Oliver, 2013) and was also associated with depressive symptomatology (Lila, Gracia, & Murgui, 2013); and the Spanish version of the LTE was associated with major depression, anxiety and alcohol dependence (Cervilla et al., 2007; Gutiérrez et al., 2014; Motrico et al., 2013).

Finally, considering the 4 instruments derived from other measures, one reported on an appropriate process of adaptation (Motrico et al., 2013), two did not appropriately follow the internationally accepted standards (Barrón, 1989b; González de Rivera & Morera, 1983a), and one did not develop the adaptation process because it was a literal translation into Spanish (Fernández-Ballesteros et al., 1987).

Discussion and conclusions

To the best of our knowledge, this is the first systematic review that analyzes the measures created/adapted for use in the Spanish adult population that assess stressful life events, with a focus on psychometric properties and its association with health measures. After a thorough search process, we selected 12 measures that satisfied the inclusion criteria. The measures showed substantial heterogeneity. Most of them did not include any information on psychometric properties or required further data because few of them assessed test-retest stability and/or internal structure. Further studies are needed on the association of the instruments with mental and physical health measures, thus facilitating their clinical application. These results are very useful for selecting an instrument for the evaluation of stressful life events in clinical and research settings in Spain.

This systematic review presents a number of limitations that must be considered. First, the characteristics of most of the reviewed studies (design, scope, sample size, etc.) are not provided. Also, the risk of bias of each instrument included in this review has not been evaluated. Differences in the scientific quality of the reviewed studies may incorporate biases in establishing associations with variables of health problems. Second, the search strategy used excludes studies on children and adolescents and those in the workplace. By making this specification in the search and not manually reviewing them, it is possible that some relevant studies may have been excluded. However, the number of databases reviewed and the different strategies used (reviewing references, consulting experts, etc.) minimizes this possible bias. And third, the grey literature database, used to address publication bias, is limited to European grey literature (Open-

SIGLE). However, considering that the review's aim is the instruments created/adapted to the Spanish population, the possibility of not identifying relevant studies is also minimal.

Measures are based on different conceptual models and ways of assessing stressful life events, as has been shown in previous studies (Dohrenwend, 2006; Monroe, 2008). This may explain, in part, the variety of stressors assessed and the dimensions or categories into which they are grouped, as well as the types of response that are obtained from the questionnaire. Therefore, depending on the purpose of the study, some instruments (and the scores obtained) may be more suitable than others (Cohen et al., 1995).

A large proportion of the reviewed measures do not show reliable data (Caballo, 1994; Castellón et al., 1984; Clemente, 1994; Fernández-Ballesteros et al., 1987; Fierro & Jiménez, 1998b; González de Rivera & Morera, 1983a; Labrador, 1996; Sánchez & Giráldez, 1983). Those that evaluate reliability in terms of internal consistency show moderate Cronbach's alpha coefficients (Barrón, 1989) or low coefficient values (Sandín, 1999; Sandín & Chorot, 1996) that do not exceed, in this latter case, the international standards recommended. When interpreting these results, some authors (Streiner, 2003) affirm that the Cronbach's alpha coefficient is an imperfect indicator of the internal consistency of the measures of evaluation of the stressful life events because it is heavily influenced by the number of items in the instruments for assessing stressful events, which can be independent of each other. Therefore, this result can be interpreted as confirmation that we are faced as a multicomponent construct rather than as a limitation of the instrument (Carretero-Dios & Pérez, 2005, 2007).

Although seven instruments group the items into categories, only three have empirically verified the internal structure of the test, obtaining factors explaining $\geq 50\%$ of the variance (Caballo, 1994; Fernández & Mielgo, 1992; Motrico et al., 2013). This point is related to the relevance of analyzing the internal structure of the stressful life event questionnaires using factor analysis (Monroe & Reid, 2008). Some authors warn that because a high correlation between the items is not expected, traditional factor analysis, according to the classical theory of the test, is not an appropriate method. In addition, any deletion of an item from the test would result in reduced validity (Bagozzi, 2007; Streiner, 2003). Although the debate still exists, and although confirmatory factor analyses would be necessary to corroborate the internal structure of the revised measures, the proposed dimensions or subscales can be very useful to substantiate the differential association between the different thematic areas of psychosocial stress and mental health problems that recent studies consider (Motrico et al., 2013; Sandín et al., 2006).

To obtain evidence of construct validity, most of the instruments analyzed have compared measures of stressful life events between two or more extreme groups (Barrón, 1989; Barrón & Chacón, 1992; Caballo, de los Riscos, & Araque, 1995; Castellón et al., 1984; Clemente, Córdoba, & Gimeno, 2003; Sandín et al., 2004). However, according to interna-

tional standards (AERA et al., 1999), these data do not provide sufficient information on the relationship between the construct and the variable of interest and cannot be considered evidence of validity. This systematic review revealed that half of the instruments have not provided evidence of their association with health problems (Caballo, 1994; Castellón et al., 1984; Clemente & Gimeno, 2000; Fierro & Jiménez, 1998a; Labrador, 1996). Therefore, for clinical utility, more studies are needed to show an association with physical and/or mental health variables. It should also be noted that we only found one instrument that assesses sensitivity to change (Menéndez Villalva et al., 2004). Assessment of sensitivity to change is of increasing interest, especially in clinical trials, when evaluating the effectiveness of an intervention. Therefore, the need to continue working on the improvement of this field of study and specifically, its methodological quality, is evident.

This systematic review provides a description of the instruments which have been created or adapted for use with the adult Spanish population. This knowledge may allow clinics and researchers to identify rigorously the instrument

more adapted to their needs. As a result of this study, it is possible to choose an instrument prioritizing aspects such as brevity, psychometric properties, reference time period, dimensions, population for which has been created or adapted (general population, hospital users, primary care users), etc. Maybe, in the context of primary care where the available time is limited, it is more appropriate to use a briefer and simpler instrument in order to obtain a general view of the stressful life events and their association with health problems. However, in the context of a clinic visit, this is likely to give more priority to the psychometric properties, in order to obtain a more reliable and valid measure, over the administration time since the availability of time is longer in this context. Finally, in the research context, balance between the psychometric properties and the administration time is possibly necessary, although in this case the latter will be determined by the objective of the study. Besides, this review highlights the necessity of providing more information on the psychometric properties of the instruments and carrying out further studies on the association between the instruments and variables on physical and mental illnesses.

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