Title: Psychometric properties of the List of Threatening Experiences-LTE and its association with psychosocial factors and mental disorders according to the different ~~scores~~ scoring methods.

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ABSTRACT

Background: The List of Threatening Experiences (LTE) questionnaire is frequently used to assess stressful events; however, studies of its psychometric properties are scarce. We examined the LTE's reliability, factorial structure, construct validity and explored the association between LTE scores and psychosocial variables and mental disorders.

Method: This study involved interviewing 5442 primary care attendees from Spain. Associations between four different methods of quantifying LTE scores, psychosocial factors, major depression (CIDI), anxiety disorders (PRIME-MD), alcohol misuse and dependence (AUDIT) were measured.

Results: The LTE showed high test-retest reliability (Kappa range=0.61-0.87) ~~but~~ and low internal consistency (α=0.44). Tetrachoric factorial analysis yielded four factors (spousal and relational problems; employment and financial problems; personal problems; illness and bereavement in close persons). Logistic multilevel regression found a strong association between greater social support and a lower occurrence of stressful events (OR range=0.36-0.79). The association between religious-spiritual beliefs and the LTE~~, however,~~ was weaker. The association between mental disorders and LTE scores was greater for depression (OR range=1.64-2.57) than anxiety (OR range=1.35-1.97), though the highest ORs were obtained with alcohol dependence (OR range=2.86-4.80). The ordinal score (ordinal regression) was more sensitive to detect the strength of association with mental disorders.

Limitations: We are unable to distinguish the direction of the association between stressful events, psychosocial factors and mental disorders, due to ~~the~~ our cross-sectional design of the study.

Conclusions: The LTE is a valid and reliable measure of stress in mental health, ~~but~~ and the strength of association with mental disorders depends on the method of quantifying LTE scores.

Key words: LTE questionnaire; Stress; Primary care; Mental health; Validity; Factor Structure

Word count: ~~250~~ 249

INTRODUCTION

Evidence derived from observational studies has provided support for stressful life events as an important risk factor in mental disorders, particularly for depression and alcohol use (Cohen et al., 2007; Paykel, 2003; Hammen, 2006; Hart and Fazaa, 2004). Recent studies have focused on identifying protective factors (such as religious/spiritual beliefs) that may promote mental health and wellbeing (Kasen et al., 2012), as well as on confirming gene-environment interactions (Cervilla et al., 2007) and refuting them (Risch et al., 2009). However, the lack of psychometric properties of the life events checklist (Dohrenwend, 2006) has meant that different operational measures of life stress have more recently been used (Monroe, 2008; Monroe and Reid, 2008).

The List of Threatening Experiences-LTE is a brief questionnaire which is commonly used to assess stressful life events in epidemiological studies. Although the LTE has been field tested in over 15 languages and 20 different countries, as far as we know and apart from validation studies in the United Kingdom (Brugha et al., 1985, Brugha and Cragg, 1990; Rijsdijk et al., 2001), psychometric data have only been tested in a sample of primary care patients in Holland (Veenstra et al., 2007), a small sample of Malay medical students (Ng et al., 2009) and in a large sample of the general population of Groningen, Holland (Rosmalen et al., 2012). To our knowledge, there is only limited information about the dimensionality or internal structure of the LTE. Rijsdijk et al. (2001) and Veenstra et al. (2007) reduced the 12 items of the LTE to four life event categories, but the information about their factorial analyses was scare. Having data on the factorial structure of the LTE is needed to confirm if appropriate (or suitable) grouped LTE items into categories of stressful events.

The procedure employed to quantify life stress in the LTE questionnaire is highly inconsistent (Monroe and Reid, 2008). Some studies have used the presence or absence of each individual life event item (Hosang et al., 2012; Jordanova et al., 2009); others the sum of the number of life events experienced (Cuijpers et al., 2005); yet others have grouped them into different categories or intervals (for instance “0, 1, 2, ≥ 3 life events”; Zuithoff et al., 2009) or used

several life event thematic categories (Stegenga et al., 2011). This variation affects replication of the studies and, in consequence, increases criticism of the methodological problems concerning the life events checklist (Dohrenwend, 2006; Monroe, 2008).

Our aim was to examine the psychometric properties of the Spanish version of the LTE questionnaire in a large sample of Spanish primary care attendees and to explore associations between the structure and the different methods to quantify life stress with the LTE questionnaire and mental disorder and psychosocial variables.

METHOD

Design

This is a cross-sectional validation study. The PredictD-Spain has been described in detail elsewhere (Bellón et al., 2008; Bellón et al., 2011). The study was approved by the relevant ethics committees in each Spanish province.

Setting

Seven provinces participated with 41 health centres and 231 general practitioners (GP) distributed throughout Spain: Malaga and Granada in southern Spain; Saragossa and La Rioja in northern Spain; Madrid, capital of Spain, situated in the centre; Las Palmas in the Canary Islands; and Majorca in the Balearic Islands. Each health centre covers a population of 15,000 to 30,000 inhabitants from a geographically defined area. The physicians in each health centre work as a group, with extensive primary care teams. The Spanish National Health Service provides free medical cover to 100% of the population. The health centres taking part cover urban and rural settings in each province.

Sample and exclusion criteria

In each province systematic random samples of between 4 and 6 attendees were taken at regular intervals from the family doctors' appointment lists at random starting points for each day. The

GPs introduced the study to the selected patients and requested permission before contacting the assistant researcher. Participants who gave informed consent undertook a research interview within two weeks. The study population was recruited between October 2005 and February 2006; except in Malaga, where it was recruited between October 2003 and February 2004 as it was already participating in the predictD-International study (King et al., 2006). Exclusion criteria for all participants were: age under 18 or over 75 years; inability to understand or speak Spanish; psychosis, bipolar disorder, dementia, or terminal illness; and persons (representatives) who attended the surgery on behalf of the person who had the appointment.

Variables

Dependent variables

The dependent variable was the LTE questionnaire (Brugha et al., 1985), which consists of 12 questions, with dichotomous responses (i.e. yes / no), about the occurrence of 12 prevalent major stressful events in the preceding 6 months. In order to achieve the equivalence between the original version and the translated version of the LTE, the questionnaire was translated into Spanish by a bilingual translator, and this translation was back-translated into English by another independent bilingual translator (the Spanish version is listed in the Appendix) (Bellón et al., 2008). No discrepancies were found between the translation and its back-translation. We analyzed four different methods to quantify life stress with the LTE questionnaire:

(1) Individual LTE items: the absence or presence of each of 12 individual stressful events (no= 0, yes=1).

(2) LTE factors: the absence or presence of one or more stressful events in the factors or dimensions (see the "factor structure" paragraph below) of the LTE (0, ≥1).

(3) Dichotomous LTE global score: we examined the number of stressful events experienced and categorized them into none or one or more events (0, ≥1).

(4) Ordinal LTE global score: we examined the number of stressful events experienced and categorized them into none, one, and two or more events (0, 1, ≥2).

Independent variables

We selected the most important variables related with life stress in a review of the literature (Cohen et al., 2007; Dohrenwend, 2006; Monroe, 2008) and evaluated in the PredictD-Spain study. The independent variables and measures utilized were the following:

- Socio-demographic factors: province, sex, age, marital status, employment status, country of birth, educational level, income (Bellón et al., 2008).

- Psychosocial factors: nature and strength of spiritual beliefs (King et al., 1995) assessed by two questions from The Royal Free Interview for Spiritual and Religious Beliefs (King et al., 2001). The first question assesses religious or spiritual beliefs ("would you say that you have a religious or spiritual understanding of your life?") and responses are classified as: 1) neither religious nor spiritual, 2) spiritual, or 3) religious. Subjects responding that they are religious or spiritual underwent a second question, which assesses the intensity of their religious or spiritual beliefs ("How strongly do you hold to your religious or spiritual view of life") on a Likert scale of 1-6, where 1 is a weakly held view and 6 is a strongly held view. The answers were recoded into 1) neither religious nor spiritual, 2) weak (1-3 points), and 3) strong (4-6 points). Adequacy, availability and sources of social support from family and friends (Blaxter, 1990). This consists of seven items measuring the subject's perception of support from family and friends. Responses were classified into three options: false, sometimes and true. The answers were recoded into 1) low (3-6 points), and 2) good (7-21 points). These two questionnaires have previously shown good validity and reliability in Spain (Bellón et al., 2008).

- Mental disorders: Major depression (DSM-IV diagnosis), assessed using the depression section of the Composite International Diagnostic Interview (CIDI) (Robins et al., 1988; Rubio-Stipec et al., 1991; WHO, 1997), and alcohol use disorders, assessed by the Alcohol Use Disorders Identification Test (AUDIT) (Barbor et al., 1989). Alcohol misuse and dependence were defined by an AUDIT score ≥8 in men and ≥5 in women (Pérula-de Torres et al., 2005) and ≥12 in men and women, respectively (Rubio-Valladolid et al., 1998); and anxiety disorders using the anxiety section of the Primary Care Evaluation of Mental Disorders (PRIME-MD) (Spitzer et al., 1999). The Spanish version of the PRIME-MD can classify patients who test positive for panic attack, generalized anxiety disorder and other anxiety disorders (Baca et al., 1999).

Statistical analyses

We conducted all analyses using the Statistical Package for Social Sciences (SPSS) version 15.0 and STATA, release 10.

Factor analysis

Since the items of the LTE were scored dichotomously, an exploratory factor analysis was conducted using tetrachoric correlation coefficients (Cassano et al., 2009; Copeland et al., 2005). These coefficients measure the association between dichotomous items and are based on the assumption that the response to any particular item can be thought of in terms of the crossing of a threshold on an underlying latent continuous distribution (Streiner and Norman, 2008). Firstly, the suitability of the data factor analysis was evaluated through the Kaiser-Mayer-Olkin Measure of Sampling Adequacy. The Barlett's test of Sphericity was also applied to examine the extent to which the correlation matrices departed from orthogonality. Secondly, Factor Analysis was performed with an Exploratory Principal Component Analysis and both oblique (oblimin) and orthogonal (varimax) rotation. To determine the optimal number of factors to retain in the

analysis, the interpretability of the factor loadings, the Kaiser criterion (retention of factors with eigenvalues greater than 1.0; Kaiser, 1974), and the Cattell scree plot (Catell, 1988). Tabachnick and Fidell (2007) suggest that, in exploratory factor analysis, an item forms part of a factor if its factor loading on that factor is at least 0.32. Finally, in order to test the goodness-of-fit of the factorial model selected, we analyzed the percentage of residuals greater than 0.05 in absolute value for this factor solution.

Reliability

For the test-retest analysis, we selected a random sample of 401 patients stratified by province from the total sample; 251 completed researcher-administered and 150 self-administered questionnaires. The mean number of days between test and retest was 11.0 (95% CI, 10.2–11.8; standard deviation=7.5) (Bellón et al., 2008). We calculated the test-retest concordance of individual LTE items using the Kappa statistic and the agreement of the sum of the LTE items using the intra-class correlation coefficient (ICC). The Cronbach's alpha was computed to evaluate the internal consistency of the instrument. Corrected item-total correlations were calculated to examine how each item contributed to the overall scale. We recalculated the Cronbach's alpha with each of the items deleted in turn, in order to assess whether its removal might increase internal consistency.

Construct Validity

The construct validity was evaluated by testing the association between the LTE scores and the psychosocial factors and mental disorders, adjusting for socio-demographics and the other psychosocial factors and mental health disorders when appropriate.

LTE score as dichotomized variable

We used multilevel logistic regression for the three types of dichotomous LTE score (individual LTE items, LTE factors and dichotomous LTE global score) because there was a hierarchical structure in the data. Firstly, we compared the null models between the usual and the multilevel logistic regression including the health centre as a random factor, and likelihood ratio tests were statistically significant for all models. Secondly, we compared these models versus those that included the health centre and GP as random factor. In this case the likelihood ratio tests were only significant for item 2, item 8, item 11, factor 2, factor 4 and the dichotomized LTE global score.

LTE score as ordinal variable

We used the ordinal LTE global score as the dependent variable in an ordinal logistic regression. We applied the clustered robust error to control for the intracluster correlation of the health centre. The Brant test (Brant, 1990) for proportional odds was assessed to provide evidence that the parallel assumption had not been violated.

RESULTS

Participant profile

A total of 6526 people in the seven Spanish provinces were asked to take part in the study. The response to recruitment was 83.4%; 5442 were interviewed and 1084 refused to participate at baseline. The participants ranged in age from 18 to 75 years (Mean=48.49; SD=15.63) and 67.7% of the sample were female, 5.3% were born outside Spain, 64.7% were married or living with a partner, 66.6% had primary education or less, 42% were employed, 44.3% had an annual income (after taxes) of less than 15000€, 12.2% reported little support from family and friends, and 82% declared religious or spiritual beliefs; 14% ~~suffered~~ met criteria for major depression, 18% anxiety disorders, and 5.8% alcohol misuse or dependence, see Table 1.

[Table 1, here]

Life threatening events

The number of stressful events experienced by each participant ranged from 0 to 9 (mean=1.24; SD=1.30); 65.2% of the participants reported at least one stressful event in the preceding 6 months. Approximately one third of the participants (33.6%) reported no events, another third (32.3%) one event, and another third (32.9%) two or more stressful events. About 1 in every 4 reported 'serious illness, injury or assault to close relative' (27.8%), 'close friend or other relative died' (24.7%), or 'serious illness, injury or assault to self' (21.8%), see **Table 2**.

Reliability

Test-retest

The test-retest LTE reliability was good to excellent (Fleiss, 1986). The ICC was 0.86 (95% CI 0.83 – 0.89) for the LTE questionnaire as a whole and 0.83 (95% CI 0.79 – 0.87) and 0.91 (95% CI 0.87 – 0.93) for the researcher-administered and self-administered questionnaires, respectively. Also, for both methods of administration, most of the reliability Kappa coefficients for individual LTE items were good or excellent. However, the item "something valuable was lost or stolen" had moderate agreement only for the self-administered method (Kappa= 0.50), see **Table 2**.

Internal consistency

The internal consistency for the LTE questionnaire was low, Cronbach's α=0.44. The Cronbach's alpha recalculated after suppressing each item from the scale ranged from 0.38 to 0.44. The corrected item-total correlations ranged from 0.11 to 0.27, see **Table 2**.

[Table 2, here]

Factor structure

The KMO measure of sampling adequacy was 0.63 and the Bartlett's Test was significant [$\chi 2$ (66)= 2999,67; p <0.0001], indicating that the data were suitable for factor analysis. The Principal Component Analysis yielded four factors with eigenvalues greater than 1.0, accounting for 61% of the total variance. Also, by inspecting the Cattell scree plot, a change in the curvature was observed after the 4th factor, suggesting that 4 factors are sufficient to summarize the variance of the items in a parsimonious way and that the subsequent factors are nuisance factors. In our case, all factor loadings were greater than ≥ 0.32. After comparing Varimax and the Oblimin method, an Oblimin factor solution was selected. The highest and intermediate factor loadings were similar in both solutions, but the solution by the Oblimin method showed slightly higher factor loadings on those items with lower factor loadings. Factor 1 “Spousal and relational problems”, including items 5 and 6, accounted for 19.7% of the variance; the other three factors “Employment and financial problems” (items 8, 9 and 10), “Personal problems” (items 2, 3, and 4) and “Illness and bereavement in close persons” (items 1, 7, and 12) accounted for 18.2%, 14.1%, and 11.7% of the variance, respectively. The factor loadings obtained using Oblimin rotation are shown in **Table 3**. The percentage of residuals greater than 0.05 in absolute value for this factor solution was 38%; therefore the factorial model fit the data well. The correlations between factors ranged between 0.067 and 0.153 and all were statistically significant (p<0.001).

[Table 3, here]

LTE, family and friends support and religious-spiritual beliefs

Greater social support, after the adjustment, was significantly associated with the lower occurrence of six of the twelve LTE items, and with lower global scores. While religious beliefs, compared to the absence of beliefs, was associated with a lower frequency of item 2 and factor 2 (employment and financial problems), spiritual beliefs was associated with a greater presence of item 7 and factor 3 (personal problems). Weak and strong religious-spiritual intensity was associated with a lower frequency of item 2 and factor 2, respectively. Neither spiritual-religious beliefs nor intensity was significantly associated with the LTE global scores (dichotomous or ordinal), see **Table 4**.

[Table 4, here]

LTE and mental disorders

As shown in **Table 5,** the four types of LTE scores were significant, moderately and positively associated with mental disorders. That association was greater for depression (OR range=1.64-2.57) than anxiety (OR range=1.35-1.97), though the highest ORs were obtained with alcohol dependence (OR range=2.86-4.80).

Concerning the factor structure of the LTE questionnaire, “personal problems” (Factor 3) had statistically significant relationships with all the mental health problems studied, “unemployment and financial problems” (Factor 2) with major depression and anxiety disorders, “spousal and relational problems” (Factor 1) only with major depression, and “illness events and bereavement in close persons” (Factor 4) only with anxiety disorders.

Both the LTE global scores, dichotomous and ordinal, were significantly related with all the mental disorders studied (except other anxiety disorders for the dichotomous score and misuse of alcohol for both); however, when used in the form of three ordinal categories, the association was, in general, stronger. For example, patients who suffered panic attacks were

51% (LTE-dichotomous) and 80% (LTE-ordinal) more likely to have experienced one stressful event.

[Table 5, here]

DISCUSSION

The Spanish version of the LTE questionnaire has good test-retest reliability ~~but~~ and a low internal consistency, noting a four-factor factorial structure. A clear association was found between less social support and greater occurrence of stressful events. However, the association between religious-spiritual beliefs and stressful events was weaker. The association between the LTE and mental disorders varied depending on the stressful event, the different LTE scores and the specific mental disorder; being greater in depression than in anxiety, while the highest ORs were obtained in alcohol dependence. When the score of the LTE questionnaire is used as an ordinal variable, the strength of the association with mental disorder is slightly higher than when it is used as a dichotomous variable.

We experienced very few refusals to participate and had a large sample, likely to be reasonably representative of primary care attendees in Spain. We recruited a systematic random sample of primary care attendees and used a criterion of stratification to include urban and rural health centres in each province, as well as including provinces from different geographical areas in both mainland Spain (north, central and south) and the Spanish islands.

A singularity of our study with respect to previously published studies is that we used four different methods of scoring the LTE (individual LTE items, LTE factors, dichotomous and ordinal LTE global score), showing that they differ in their association with psychosocial factors and mental disorders and also in the magnitude of this association.

Another contribution of our study was the application of factor analysis in a tetrachoric correlation matrix for dichotomous/binary variables. Tetrachoric factor analysis is more appropriate (Kubinger, 2003; StataCorp, 2009) and, although not without its problems (Streiner and Norman, 2008), it is the most used for dichotomous variables (Benazzi, 2008; Caci et al., 2003; Cassano et al., 2009; Copeland et al., 2005; Oliveira et al., 2009). Of note among the strengths was the use of multilevel regressions, highlighting the need to use this type of analysis in future studies about stressful events in primary care. Finally, we adjusted for a large number of variables associated with stressful events, though we cannot rule out a certain degree of residual confounding as we did not include in the models other important variables, as for example neuroticism (Middeldorp et al., 2008) and coping style (Veenstra et al., 2007).

The main limitation of this study is that, due to its cross-sectional design, we are unable to distinguish the direction of the association between mental disorders, psychosocial factors and stressful events. Another limitation is that we did not use a structured clinical interview to assess anxiety disorders and alcohol dependence. Although we assessed only recent stressful events and excluded primary care attendees who had dementia, we cannot rule out the possibility that mild cognitive impairment may have influenced the recalling of life events in those who were older. This may have led to an underestimation of life events in the oldest group and possibly to a weaker effect on the association with mental health problems (Dohrenwend, 2006).

Several limitations can be noted with respect to the dimensionality of the Spanish version of the LTE. First, the loadings of the items in each factor, even though they exceed the criteria recommended in the literature (Tabachnick and Fidell, 2007), were low (Streiner and Norman, 2008), especially in the case of item 7 "serious problems with close friend, neighbour or relative", item 10 "major financial crisis" and item 11 "problems with the police and court appearance", which do not reach 0.40. This is explained because the correlation coefficients between binary variables are relative with respect to the maximum that can be obtained, considering that this

maximum is always significantly less than 1 (Shih and Huang, 1992). From this point of view, the factor loadings obtained would be higher in reality than they appear. Second, item 11, "problems with the police and court appearance", has similar loadings on both the factor “spousal and relational problems” and the factor “personal problems”. It is likely that those who are in divorce proceedings have to appear in court to enforce the legal part of the procedure. In this study we thought the best option was for the factor “spousal and relational problems” to be composed of just the items strictly related to issues with the partner (Rijsdijk et al., 2001; Veenstra et al., 2007), though other options are possible. Finally, our results should be interpreted with caution because we tested multiple hypotheses for the association of each item and score of the LTE with psychosocial factors and mental disorders, so the danger exists of finding a significant association by chance.

The high prevalence of stressful events experienced (65.2% reported at least one event) was comparable to that reported in previous studies with primary care patients using the LTE questionnaire (Saltini et al., 2004; Zuithoff et al., 2009). Nonetheless, we obtained higher percentages for the event “serious illness, injury or assault to self’ than in other studies with the LTE (Rijsdijk et al., 2001). This finding shows that specific life events, such as threats to health, have particular salience in primary care attendees.

The methodological difficulties related to the small number of items in the questionnaire have shown up the criticisms that have been made to the brevity of the LTE (Dohrenwend, 2006; Paykel, 1997 and 2001). In our opinion, the small number of items is just one of the advantages of the LTE. This brief questionnaire is especially useful in clinical practice and in epidemiological studies, because it is much more economical (easy administration and coding) and has the same predictive power for mental disorders as intensive interview or narrative rating procedures (Monroe, 2008). However, other authors (Dohrenwend, 2006) criticize the use of checklist measures because they only cover a limited number of stressful events and also because

positive responses in the questionnaire can cover very different stressful experiences; for instance, “serious illness, injury or assault to self” could range from episodes of flu to severe heart attacks. This problem is named “intracategory variability” and more usually underlies a recognized lack of reliability and validity in traditional life events checklists (Dohrenwend, 2006).

Both the researcher-administered and the self-administered versions of the LTE questionnaire appear to give a reliable measure of major life events. We were interested in testing the questionnaire using both methods of administration since, for cultural reasons, questionnaires administered to primary care attendees in Spain are almost always researcher-administered, especially to persons with a low educational level. The good or excellent ICC and Kappa indices suggest that item stability over time is satisfactory. However, item 12 "something valuable lost or stolen" obtained a rating well below the average (Kappa = .50) in the self-administered questionnaire, though within an acceptable range in the literature (Streiner and Norman, 2008). This finding agrees with results obtained in the test-retest reliability of the original version of the LTE, where this item also showed a lower score than the other items (Brugha and Cragg, 1990).

The internal consistency of the Spanish version of the LTE was low. Veenstra et al. (2007) obtained a slightly higher result (α=0.56), though in both cases it is still low. This is consistent with the findings of various studies (Mokkink et al., 2010; Streiner, 2003, a, b) that have shown that measures of internal consistency are not relevant for evaluating the psychometric properties of the items of life-event checklists. Although the items together form a construct (Streiner and Norman, 2008), these items do not need to be correlated; each item assesses different situations or events that might lead to stress. Indeed, such correlation suggests measurement errors (e.g., redundancy in reporting events; Mokkink et al., 2010; Monroe and Reid, 2008).

The Malay version of the LTE has shown satisfactory test-retest reliability for 7 out of the 12 event categories, because 3 event categories were not reported (Ng et al., 2009). The Dutch version of the LTE has shown stability of the retrospective reporting and positive associations with psychological distress, depressive and anxiety symptoms, and neuroticism (Rosmalen et al., 2012). However, neither of the two studies provided information about the internal consistency and internal structure of the LTE.

The grouping of items in the four factors of our factor analysis was identical to that described by Rijsdijk with British primary care attendees (Rijsdijk et al., 2001), and could indicate that the LTE works similarly in both the UK and in Spain; however, because no details and figures were described in Rijsdijk's analysis, this should be interpreted with caution. Of the four factors obtained by Veenstra in Holland (Veenstra et al., 2007), our study only agrees in one ("spousal and relational problems"). Consequently, it cannot be ruled out that the internal structure of the LTE varies between countries.

We did find support for the convergent validity of the Spanish version of the LTE. Our finding that people with low family and social support showed higher scores on the instrument adds to a growing body of studies showing a strong link between social support and stressful life events (Dalgard et al., 2006; Thoits, 1986). We did not find any support for the association between religious-spiritual beliefs and LTE global scores. Although we found a significant association between religious-spiritual beliefs and intensity and some specific items and factors on the LTE questionnaire, this association appeared weak and isolated. Our results are in line with recent studies showing a link between spiritual understanding of life and vulnerability to mental disorders (King et al., 2013; Leurent et al., 2013) and with the body of evidence that links religious beliefs and protection to mental disorders. However, the buffering effect of religious and spiritual beliefs on mental disorders after a major life event is still unclear in the literature (Leurent et al., 2013). As had been hypothesized, major depression, anxiety and alcohol use disorders were

significantly associated with LTE stress scores (Cohen et al., 2007). However, this study did not find the traditional association between depression and significant losses (Paykel, 2003) because of the exclusion of bereavement for the diagnosis of major depression by the DSM-IV. The controversy of whether depressive symptoms after the loss of a loved one should be classified as major depression or as bereavement continues (Maj, 2008; Zisook et al., 2007). In line with the literature (Dalgard et al., 2006; Dawson et al., 2005; Rijsdijk et al., 2001), we found that the strength of association between stressful events and mental disorders depends on the subject area of stress evaluated. Associations were strongest with depression for spousal and relational problems (Hosang et al., 2012; Jordanova et al., 2007), with alcohol use disorders for the event "problems with police or court appearance" and personal problems (Veenstra et al., 2007), and with anxiety for illness and bereavement in close persons (Jordanova et al., 2007). In addition, some LTE items individually have a strong association with mental disorders, such as "serious problems with a close friend, neighbour or relative" with major depression and alcohol dependence.

In conclusion, the LTE is a brief and simple to administer questionnaire that shows promise as a reliable and valid measure of recent life stress among primary care attendees. Assessing the LTE global score is useful for clinicians and researches interested in stress accumulation. ~~Furthermore, it might be useful to use the four factors of the questionnaire rather than the individual events of the LTE when using small samples, as the factors comprise 2 or 4 items that can be scored in the same factor.~~ Whatever the case, the method used to quantify stress in the LTE questionnaire has different implications.

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