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Life Adversity in depressed and non-depressed older adults: A cross-sectional comparison of the brief LTE-Q questionnaire and Life Events and Difficulties Interview as part of the CASPER Study

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Short-title: Life Adversity and Depression in Older Adults

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Abstract: *250w*

Background: There is a paucity of research on the nature of life adversity in depressed and nondepressed older adults. Early life events work used in-depth interviews; however, larger epidemiological trials investigate life adversity using brief questionnaires. This study investigates the type of life adversity experienced in later life and its association with depression and compares adversity captured using a brief (LTE-Q) and in-depth (LEDS) measure.

Methods: 960 participants over 65 years were recruited in UK primary care to complete the PHQ-9 and LTE-Q. A sub-sample (n=19) completed the LEDS and a question exploring the subjective experience of the LTE-Q and LEDS.

Results: Important life adversity was reported on the LTE-Q in 48% of the sample. In the LTE-Q sample the prevalence of depression (PHQ-9 ≥10) was 12%. Exposure to recent adversity was associated with doubling of the odds of depression. The LTE-Q only captured a proportion of adversity measured by the LEDS (42% vs 84%). Both measures showed health, bereavement and relationship events were most common.

Limitations: The cross-sectional design limits the extent to which inferences can be drawn around the direction of causality between adversity and depression. Recall in older adults is questionable.

Conclusions: UK older adults face adversity in areas of health, bereavement and relationships which are associated with depression. This has clinical relevance for psychological interventions for older adults to consider social context and social support. It helps identify the strengths and weaknesses of a brief adversity measure in large scale research. Further research is needed to explore the mechanisms of onset and direction of causality.

Keywords: Depression, Life events, Adversity, Older Adults

1. **Introduction:**

Several studies have investigated the types of adversity experienced in older adult life, which include personal illness, loneliness, bereavement (Hardy, Concato, & Gill, 2002; Prince, Harwood, Blizard, Thomas, & Mann, 1997), diminished social relationships, (Kaji, Mishima, Kitamura et al., 2010), forced change of residence, major negative revelations, marital difficulties (Murphy, 1982), divorce of children (Grimby & Svanborg, 1996) and loss of mobility and leisure activities (Hermans & Evenhuis, 2012). Research also suggests that expected events that are described as 'on-time', such as employment transitions around the age of retirement, are associated with mental health decline (Carmichael, Hulme, & Porcellato, 2013).

Experiences of adversity have been associated with depression in older adults across several countries, for example; England (Murphy, 1982) Sweden (Grimby & Svanborg, 1996) Holland (Hermans & Evenhuis, 2012) Japan (Kaji et al., 2010) and America (Norris & Murrell, 1987). Prospective longitudinal research has suggested a dose response relationship between the severity of discrete life events and depressive symptoms (Sale, Gignac, & Hawker, 2008). However in other research in older adults, the frequency of daily hassles has shown to be a stronger correlate of wellbeing than major life events (Landreville & Vezina, 1992).

This association is important to elucidate because depression accounts for the greatest burden of disease amongst all mental health conditions (Murray & Lopez, 1996). In the UK, an estimated 15% of adults aged over 65 years experience symptoms of depression; a prevalence rate that is relatively consistent across countries and cultures (Beekman, Copeland, & Prince, 1999; Braam, Copeland, Delespaul et al., 2014). In older adults depression is associated with greater medical illness, disability, functional decline, and is the leading cause of suicide in this age group (Baldwin, Anderson, Black et al., 2003).

In-depth interview measures are seen as the gold standard for capturing life adversity. For example the Life Events and Difficulties schedule (Brown & Harris, 1978b) captures both discrete life events and ongoing difficulties. However, the research exploring adversity and depression in older adults has been limited by a lack of standardised interview measures, largely due to time and cost constraints. With the exception of early works by (Davies, 1994b; Murphy, 1982) studies have used brief or unvalidated questionnaire measures (Norris & Murrell, 1987; Sale et al., 2008) over short time intervals (Kaji et al., 2010) most of which are unable to differentiate events and difficulties. It is therefore important to investigate how well commonly used, brief questionnaire formats such as the
List of Threatening Experiences Questionnaire (LTE-Q) perform against in-depth measures like the Life Events and Difficulties Schedule (LEDS).

The current study aims are 1) to investigate the nature of life adversity reported in older adults and its association with current symptoms of clinical depression 2) to compare the adversity captured using a brief life events questionnaire (L-TEQ) compared with the in-depth Life Events and Difficulties Schedule (LEDS) 3) to explore the experience of having life adversity measured using the LTE-Q and LEDS.

In the context of this research, "life adversity" is used as an umbrella term to encompass the life events, difficulties and hassles of everyday life. Within this term "life events" are defined as discrete episodes of

adversity such as a bereavement, "difficulties" are defined as ongoing adverse situations such as marital tension or financial problems, and "hassles" as trivial events or difficulties in daily life such as frustration with housework.

2. **Methods:**

2.1 Participants and Procedure

This research was conducted as a sub-study within the recruitment of the CASPER study. A programme of work including two multi-centred randomised controlled trials within a larger cohort, evaluating the effectiveness and cost effectiveness of collaborative care with behavioural activation for both sub-threshold (CASPER) and clinical depression (CASPER Plus) in older adults. The CASPER study is led by Professor Simon Gilbody at The University of York and funded by the Health

Technology Assessment (HTA) Programme. For further information about the trial (ISRCTN 02202951) please see the website at: http://www.york.ac.uk/healthsciences/research/mentalhealth/projects/casper/.

Participants were recruited through selected primary care practices across the North of England (Leeds, York, Durham, Hull, Newcastle), between July 2013 and August 2014. This involved a database screening approach, whereby all older adults aged over 65 years were invited to participate, excluding those with known alcohol dependency, psychotic symptoms or cognitive impairment. Those who consented were sent baseline questionnaires to return by post or online, which included the PHQ-9 and LTE-Q.

Participants who completed baseline questionnaires and consented to 'take part in other research studies' from the Leeds site were invited by HD to take part in the LEDS interviews. A purposive sampling frame (Table 1) was used to ensure diversity in terms of depression and life events, as determined by LTE-Q and PHQ-9 scores. The LTE-Q data was dichotomised to identify the presence or absence of life events in the previous 12 months, in line with other research (Prince et al., 1997). PHQ-9 data were also dichotomised on presence or absence of major clinically significant depression (≤9 and ≥10) (Kroenke, Spitzer, & Williams, 2001). This sampling frame resulted in four participant groups to be interviewed using the LEDS.

LEDS interviews lasted approximately 90 minutes and were carried out by HD, who was trained to competency to administer the LEDS. Interviews were carried out at the participants' homes or the Local University and were recorded using a digital Dictaphone. Consensus meetings were held to standardise the ratings, with authors GTT and AH, also trained in using this measure. At the end of the interview, a further question was asked to examine the subjective experience of having adversity captured through the LTE-Q and LEDS measures. This was: *"We measure life experiences in different ways. One way is to come and talk to people in interviews like I have today. The other is to ask people to fill out questionnaires like the one you did before [showing questionnaire]. What do you think about these different measures? How have they captured your life experiences over the last year?"*

The research received both NHS ethical approval from the Leeds East Research Committee, Yorkshire and Humber REC and clearance from the local R&D teams (REC Ref: 10/H1306/61 Substantial Amendment 15).

_____Table 1. near here_____

2.2 Measures

Patient Health Questionnaire - Depression module (PHQ-9)

A brief self-report clinical measure for assessing symptoms of major depressive disorder (Kroenke et al., 2001). The measure comprises nine items which reflect diagnostic symptom criteria, rated on a four point scale as to; 'how often are you bothered by the symptom' over the preceding two weeks. It offers a diagnostic cut off score for depression, which at <9 has a sensitivity of 95% and specificity of 84%. In the original study this measure was shown to have excellent internal consistency (Cronbach's alpha = 0.89), good test-retest reliability (Alpha coefficient = 0.84), and concurrent validity (Pearson's correlation = 0.73). We chose this measure as we aimed to distinguish between people with or without clinically significant mood disorder, using a measure well utilised in primary care clinical practice.

List of Threatening Experiences Questionnaire (LTE-Q)

A self-report questionnaire to evaluate stressful life events over the preceding year (Brugha, Bebbington, Tennant, & Hurry, 1985). This comprises twelve items which cover major categories of life adversity including, health, bereavement, marital and other relationships, work, financial, crime/legal and possessions. Items are rated dichotomously as yes/no for having been experienced over the reporting period. The brevity of this measure was an important pre-requisite for feasibility of inclusion into the larger CASPER study baseline questionnaires. This measure is shown (Brugha & Cragg, 1990) to have excellent internal consistency (Cronbach's alpha = 0.84), good test-retest reliability (Cohen's kappa = 0.72), high sensitivity (89%) and specificity (74%). For the purposes of this study to help anchor the timing of events we requested participants to indicate the month/year of event occurrence. This measure was cleared for use in the current research by Prof Brugha.

Life Events and Difficulties Schedule (LEDS)

A semi-structured interview schedule which facilitates the in-depth investigation of life adversity over a set reporting period (Bifulco, Brown, Edwards et al., 1989; Brown & Harris, 1978b). The reporting time period was the previous 12 months (in line with the LTE-Q). This interview covers ten key areas of adversity including health, reproduction, marital and other relationships, work, education, housing, money, crime/legal and bereavement. This measure distinguishes between discrete events (episodes) and ongoing difficulties (for >4 weeks).

Events are rated on 'reported' and 'contextual' severity, as well as short- and long-term threat (10–14 days after the event). Threat is rated on a 4-point scale ranging from 1—''marked'' to 4—''little or none''. The focus of events is classified as either 'subject,' 'joint' or 'other' focussed. Severe events are those rated 1 and 2 on severity and must be subject or joint focussed. Difficulties are rated on a 7point scale ranging from 1—''high marked severity'' to 7—''no longer a difficulty''. All difficulties must last a minimum of 4 weeks. Those rated 3 and above that have been ongoing for 6 months or more are classed as 'marked' difficulties. We used the long

term contextual threat rating in the analysis, as it is seen as objective and comparable across groups. (Brugha & Cragg, 1990).

The researchers HD, GTT and AH have all completed a LEDS training programme, involving practice ratings, pilot interviews and supervision to become competent administrators of the measure. The interviews were recorded using a Dictaphone and are rated from audio files, using rating dictionaries with contextualised examples to standardise the process.

2.3 Analysis

Characteristics of the LTE-Q and LEDS samples, including depression prevalence, type and severity of life adversity were summarised using counts and percentages. Mean and standard deviation (SD) were used for the age variable. Univariable comparisons were conducted to compare depression by age and gender.

We assumed that the prevalence of clinically significant depression, measured by PHQ-9≥10, was 15%. Three covariates, sex, adversity and age were to be fitted. Modelling the relationship with age to be linear requires three parameters. Simulations by Peduzzi et al. show that the number of participants with depression should exceed 10 times the number of parameters fitted in order to obtain robust estimates (Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996). That is: N > 10*3/0.15. So the guidance requires at least 200 participants. This assumes that covariates are orthogonal which may not be the case in this observational study. To account for this and the estimation of depression, we aimed to recruit 1000 participants.

The association between LTE-Q life events and depression across older adult life was analysed using multivariable logistic regression. Comparative tests were conducted to establish statistical significance and act as a guide for variable entry into the regression model. The logistic regression model was then fitted using SPSSv20, with 'depressed' and 'non-depressed' categories as dependent variables and covariates (adversity, age category, gender) being entered into the model simultaneously in a single block (forced entry). Other variables recorded in the main CASPER study such as physical health and marital status are confounded with exposure since they are included in LTEQ and therefore werenot entered in the model. The model was validated using the resample validation method, to check optimism of the coefficients and selected based on maximisation of adjusted R2.

We examined the LTE-Q data for participants who completed the LEDS. The LTE-Q items were matched to the LEDS categories (Table 2.). The proportion of adversity measured using the LEDS compared to the LTE-Q was presented using descriptive statistics. The percentage of the sample reporting an event within each life event category was then calculated.

_____Table 2. near here_____

Finally, thematic analysis was used to explore participants' experiences of having adversity captured through different measures – the LTE-Q and LEDS. The process followed the six stages set out by (Braun & Clarke,

2006). This involved the initial process of *familiarisation* with the LEDS vignettes and responses to the additional qualitative question for each of the 19 participants. The second stage saw the development of initial *codes*, through systematically grouping data from across the entire data set into each code. Thirdly, this data was examined to search for *themes*. The fourth stage involved a *reviewing* process, going back to check themes against the initial coded data extracts, then across the whole data, and generating the initial thematic map. The next stage involved the refinement of themes, *defining* each clearly and choosing the most appropriate name for each theme. The final stage involved *producing the report*, which offered further refinement through the choice and of extract examples, and descriptions of the themes in relation to the research question and aims. The outcome of this analysis was the production of a thematic map.

The research adheres to the guidelines for publication of qualitative research in psychology. Every effort was made to remain neutral during the analysis process (Elliott, Fischer, & Rennie, 1999). The first author (HD) who conducted the analysis was significantly younger in age than the sample concerned. There were several preconceptions surrounding the LEDS as a superior measure therefore supervising researchers from the project, as well as two independent members of the Leeds DClin Qualitative Research Group reviewed checked the credibility of extracts and themes. In the results section, examples of the data are provided to ground themes and allow the thematic process to be transparent to the reader. It is important to note the results are not meant as a representation of experience of ageing as a whole, but of adversity as we age.

The data were analysed using SPSSv20 and Microsoft Excel.

3. Results:

The response rate to baseline questionnaires was 92% (York Trials Unit, as of February 2014), therefore a sample of 960 completed both the PHQ-9 and LTE-Q. The mean age of participants was 72 years (SD 6.1), with 50.2% being male and 49.8 % female. In terms of age cohorts, 67% of respondents (n=645) were in the earlier stages of older adult life (65- 74 years) while a smaller proportion of 33% (n=315) were in the later stages (75+ years).

The PHQ-9 data revealed a mean score of 3.8 with scores ranging from 0-24 across the entire sample. The prevalence of clinically significant depression according to the PHQ-9 cut off ≥10, was 12.1% (N=116) across the total sample (mean 14, SD 3.78). When stratified by severity, 87.9% were classed as non-depressed, 7.7% as moderate, 2.9% moderate-severe and 1.5% as severe. The proportion of depression was higher for women (14%) than for men (10.2%) a difference of -0.39, 95%CI [-1.01, 1.82], which was not significant t (114) = -0.56, p=0.575. Depression prevalence was also seen to increase with age from the early (11.5%) to later (13.3%) stages of older adult life, a difference of 0.81, 95%CI [-0.63, 2.25], which was also not significant t (114) = 1.11, p=0.269

3.1 Life adversity on LTE-Q and the association with depression

Data from the LTE-Q showed that just over half the older adults (58.4%) experienced no life events in the previous 12 months. For those reporting life events, participants largely reported only one (24.7%) or two (10.7%) events, with the remaining participants reporting between three and eight (6.2%) events. Among the most commonly experienced events were health-related and bereavement events. Of the 960 participants, 169 (17.6%) reported bereavement of a close friend or other relative and 88 (9.2%) reported bereavement of a close family member. For health related events, 112 (11.7%) participants reported illness, injury or assault to oneself in the past 12 months and 136 (14.2%) reported these events happening to a close relative. A smaller proportion had experienced events relating to relationships (marital 1.9% or other 7.6%), possessions (3.2%) financial crises (2.3%), employment (1%) or crime/legal situations (0.3%).

The regression model indicated that exposure to recent adversity (characterised by the presence of 1+ life event) was associated with an estimated odds ratio of 1.8. Suggesting adversity significantly increased the odds of having depression, compared to older adults who were not exposed. The remaining coefficients in the model showed no significant improvement in fit or contribution to the model. This model explained the variation in relation to the variables outlined in Table 3, yielding a pseudo R2 of 0.025 suggesting the model accounted for around 2.5% of the variance in depression.

_____Table 3. near here_____

Resample validation was used to check the optimism of the model fit. This showed a simpler model with only one variable was more robust (pseudo R2=0.018, prob=0.003, log likelihood=698.838). Adversity alone predicted 1.8% of the variance in depression, with similar coefficients to the larger model (B=-0.591, SE=0.201, OR=0.1806, p=0.003). Interactions of adversity by age, adversity by gender and age by gender were also tested as predictors of depression, although none were significant and therefore excluded from the regression model.

3.2 Life adversity measured by LEDS and LTE-Q

We used a quota sampling method to ensure a reasonable number of participants in each of four groups according to depression scores and adversity experience (see Table 1).. Forty participants were sent letters inviting them to participate in LEDS interviews. Of these, 12% did not respond and 40% declined (not being interested, being too unwell or too busy). The remaining 48% consented to participate, yielding a sample of 19 participants willing to complete LEDS interviews (See Table 1 for participants per group). As in the LTE-Q sample, the mean age was 72 years (SD 6.4). 68.4% were male and 31.6% female. Participants were predominantly White-British (90%). In terms of a comparison between the characteristics of the LEDS sub-sample and the main LTE-Q sample, both samples had the same mean age (72 years) and split between stages of older adult life. The majority (67-68%) being in the earlier age group (65-74 years) with a smaller proportion (32-33%) being in the later age group (75+ years). Both samples were predominantly White British (90-100%). The sub-sample did however, have a slightly larger proportion of men (68% compared to 50%) and a slightly shorter age range (to 82 years compared with 92 years) than the main sample

LTE-Q data from the subsample showed, in line with the large sample, just over half the older adults (53%) experienced no life events in the previous 12 months. Similarly, for those reporting life events, participants largely reported only one (37%) or two (11%) events. In contrast to the larger sample, the most commonly reported events by the 19 subsample participants were those relating to relationships. 2 (10.5%) reported events related to marital / steady relationships and 3 (15.8%) to other relationships. In line with the larger sample the subsample also reported health-related and bereavement events. 1 (5.3%) reported bereavement of a close friend or other relative, 3 (15.8%) reported illness, injury or assault to oneself in the past 12 months and 2 (10.5%) reported these events happening to a close relative.

LEDS life events

Data from the LEDS showed the majority of the sample (84%, n=16) reported at least one event in the previous 12 months while a smaller proportion (16%, n=3) reported no events. Severe life events were reported by 21% (n=4), representing 9% of the total life events in the sample. The majority of life events experienced by older adults were health events (57%), with a smaller proportion representing relationships (19%).

LEDS difficulties

All participants (100%, n=19) reported at least one difficulty in the previous 12 months (Mean = 4, Range = 1-7). Over half the sample (68%, n=13) experienced at least one marked difficulty in the preceding 12 months, with these marked difficulties representing 28% of the total life events reported in the sample. The majority of difficulties experienced by older adults were health related (57%), with a smaller proportion also representing other relationships (21%).

As an initial preliminary exploration of the performance of the LTE-Q the LEDS and LTE-Q data were collapsed into seven of the LEDS categories (Table 2.). The number of sub-sample participants reporting at least one event in each category as measured by the LEDS and LTE-Q is shown in Figure 1. For each life event category the LEDS measure detected a larger proportion of adversity than the LTE-Q. Although the sample size was very small the data showed for the majority of life event categories the LEDS captured at least double the adversity as measured by the LTE-Q. This difference was most striking for health and other relationship events, for which the LEDS captured around four times more adverse experiences than the LTE-Q.

_____Figure 1. near here_____

3.3 Qualitative experience of having adversity captured through different measures

The thematic map representing participants' experiences of having adversity captured through different measures is shown in Figure 2. Three meta-themes were identified as pertinent within this analysis, entitled 'LTE-Q explores and captures an overview of adversity,' 'LEDS explores and captures adversity in detail,' and 'LEDS preferred measure.' Themes will be presented in relation to the first two meta-themes together.

Exploring and capturing adversity - Overview vs In Detail

Within these meta-themes were two interconnected themes entitled 'Use for exploration of adversity' and 'Efficacy as a measure of adversity.'

_____Figure 2. near here_____

Use for exploration of adversity

This theme describes the extent to which the measures were seen as exploring older adult's experiences of adversity. Within this theme participants highlighted that the 'LTE-Q allows minimal exploration.' The 'Narrow 'yes/no' questions' refer to the pre-assigned closed questions in the LTE-Q, narrowing down the exploration of adverse experiences ("this [questionnaire] you're just looking at a piece of paper, and a question, you've just got to give one particular answer," "Just yes…no. Hate these! You can't say the things you're wanting to say"). These questions were also experienced at times as 'inappropriate,' in particular for the older adult group ("…inappropriate for a retired pensioner," "…some LTE-Q questions aren't relevant to myself").

Alternatively the 'LEDS promotes exploration' of adversity through the one to one process of questioning to elicit further information and promoting open communication. Within this sub-theme fell two codes of meaning around the ability to 'Elicit information' and 'Promote openness.' Eliciting information refers to the questioning process as prompting thought ("prompted things I would have forgotten about when I completed the questionnaire"), being exploratory in nature ("could explore more") and providing the ability to expand when responding ("…can't expand on anything when you're just ticking a box"). In doing this, it was also considered not all information gained was relevant to the investigation ("Downside of LEDS is that you get extraneous information alongside that"). 'Promotes openness' highlights the process of having a one to one LEDS interview as opening more honest communication around adverse experiences than the LTE-Q questionnaire ("Wouldn't have been as honest on paper….been absolutely honest here).

Efficacy as a measure of adversity

This theme highlights older adult's views of how effective each measure was at capturing their experience of recent adversity. It was suggested that the 'LTE-Q captures an overview of experiences,' failing to pick up many life events and difficulties, while providing a general sense of important adversity. Within this theme fell three codes of meaning entitled; Clouds understanding, Misses things and General overview. 'Clouds understanding' refers to the closed responses elicited through the LTE-Q as clouding the understanding of adverse experiences ("some LTE-Q questions... could be misconstrued," "You can tick a box but it won't put across what you're trying to say…misses the point"). 'Misses things' relates to the LTE-Q as missing experiences of

adversity ("…doesn't capture my experience and suffering in the same way on the form." "Just ticking a box doesn't really capture it").

The LEDS interview however, 'Captured their experience in depth'. The LEDS gains a 'Deeper understanding' of adverse experiences than the questionnaire ("…you can go more deeply into it," "greater understanding," "…listen to you and where you're coming from, may understand a bit better," The LEDS interview process also allows 'Elaboration of experience' ("you can get your point of view over better," "…more rounded picture," with the potential for weighting ("…interview is better as…can weight things") and linking ("…link things together") experiences.

LEDS preferred measure

Within this meta-theme fell one theme entitled 'Personal responses to measures of adversity.'

Personal responses to measures of adversity

This theme highlights the different personal responses older adults had to the measures of adversity used, with the one sub-theme covering 'preference.' It must be noted that this theme does not reflect personal responses to the analysis but moreover to the process of measurement. 'Preference for LEDS' was represented by repeated positive and preferential responses to participation in a LEDS interview ("I prefer the interview," "…would pick an interview every time," "Much better to have a one to one interview"), as well as the interview process being considered cathartic ("Feel better talking to you," "wouldn't have sat and cried with a questionnaire...get it off your chest"). At the same time, one participant conveyed a 'preference for LTE-Q' which was experienced as an adequate or 'good enough' measure of adversity ("Questionnaire probably would have done").

4. **Discussion:**

Our study aimed to explore the nature of life adversity experienced in the past 12 months and its association with current clinically significant depression in adults aged over 65. Further, we aimed to compare the utility of a brief questionnaire measure (LTE-Q) for capturing life adversity in older adults compared to a more in-depth interview (LEDS) both quantitatively and through qualitative accounts. Increasingly trials in mental health are interested in the psychosocial predictors of disorder. With a plethora of time consuming measures conducted over several time points, there are concerns of research fatigue, low response rates and drop-out. It is therefore imperative to determine how well briefer measures of life adversity perform against their more in-depth counterparts, if we are to include them in large trials.

4.1 Comparison of LTE-Q and LEDS

The LEDS captured up to four times more life events than the LTE-Q. However the types of events reported were similar in this age group - namely health, relationship and bereavement events. Interestingly there was a marked difference (LTEQ= 0 vs LEDS =10.5) in work-related events that we know are related to mental health decline (Carmichael et al., 2013). This is an example of where the LTE-Q falls short. The specific wording of questions is unable to cover all eventualities and may need to be tailored to suit the population being studied – for example to include 'retirement' in the examples of work events. These findings were mirrored in the qualitative accounts which indicated a preference for the LEDS because it was considered to capture adversity 'in-detail' whereas the LTE-Q captured an 'overview' of important adversity. On the LTE-Q, less than half (41.6%) reported at least one life event compared to 84% on the LEDS. Comparably, the LTE-Q showed several shortcomings in that it was unable to differentiate the severity or duration of adversity.

Early work suggested that severe events were associated with depression, however more recent research has shown the potential of persistent lower-level threat to have a cumulative negative effect on mental health (Traviss, Meer, West, & House, 2013). Brief measures fail to measure these kind of difficulties. This appears to be an important shortcoming, given that all participants reported at least one difficulty on the LEDS. Brief measures don't allow us to determine the focus of events or the dependence/independence to the disorder in question. On both measures the most commonly reported events were health related and bereavement events. Dichotomous questions on the LTE-Q do not allow for 'exploration' of diverse areas like health problems and the complexity of relationships in terms of fresh starts, entrapment and neutralising events. For example it fails to understand the context and ongoing ramifications of a 'break-up or separation' and the report of a 'serious illness, injury or assault' does not tell us about the duration, prognosis or quality of life. Furthermore, some items were deemed inappropriate for this age group.

In summary, while the LTE-Q was able to capture an overview of the *type* of events encountered in the given time period it failed to capture the true *number, nature and complexity* in the most commonly reported areas.

4.2 Association between life adversity and depression

The regression model showed that recent adversity on the LTE-Q was associated with an almost twofold increase in the odds of having depression. This finding is supported by various other checklist research in the field (Hermans & Evenhuis, 2012; Kaji et al., 2010; Prince et al., 1997; Sale et al., 2008). The prevalence of depression in our study was 12%, which is in line with other reported findings internationally (Blazer, Hughes, & George, 1987; Braam et al., 2014; Hardy et al., 2002; Kaji et al., 2010).

4.3 Study limitations

This study captures life events in a large sample of older adults and is one of the few to make a comparison with the gold standard LEDS measure and to obtain qualitative accounts. It was embedded in the largest cohort study of Collaborative Care for older adults in the UK and consequently had an excellent response rate (92%). The main study limitation was the cross-sectional design which compromised our ability to draw inferences around the causal effect of adversity on late life depression. A possible bidirectional relationship

means depression may increase the likelihood of adverse experiences. Further longitudinal work is needed to look at the onset and course of depression in relation to life events and difficulties. For the purposes of comparing groups of participants we made a choice to use categorical variables, dichotomising depression, age and life events for the analysis. There is a possibility this method, despite its utility, may overlook information inherent in the continuous nature of these variables. Future research may examine the relationship between life events and difficulties with the severity of depression experienced. Furthermore, while the LEDS sub-sample represented a good cross-section in terms of life events and depression, the sample size was small. Future research involving a larger sample would be beneficial to further explore the utility of the LTE-Q as compared to a more in depth measure such as the LEDS. In addition, while the sub-sample characteristics were consistent with the main LTE-Q sample in many ways, there were some notable differences. These include being overrepresented by males and missing representation from the older members of society as reported in the main LTE-Q sample (82-93 years). This may have skewed the representativeness of LEDS data. Both measures of adversity were based on retrospective accounts. Research shows that respondents fail to report around 4% of life events after 3 months, which increases to around 35% after 12 months (Cash & Moss, 1972). It is unknown how this differs in older adults. A further limitation of the LTE-Q was its sole focus on negative life events. More widespread use of the LEDS would have enabled us to explore positive life events such as fresh starts and neutralizing events. Other confounding variables left unmeasured in the large sample such as participant's socioeconomic position or health status may additionally have influenced the findings as there are known links between depression, recent adversity and these variables. As some of this data was collected as part of the CASPER trial, an interesting avenue for further research would be to further explore the differences between the main LTE-Q sample and the smaller LEDS subsample.

4.4 Implications

UK older adults in the 21st Century experience life adversity characterised by health, relationship and bereavement events, which are associated with symptoms of depression. This has clinical relevance for psychological interventions for older adults to consider their social context and social support.

Events characterized by declining health and disability, shown in this study to be the most prevalent in late life, may increase the risk of depression through reduced engagement in valued leisure activities, socializing and a decrease in the availability of emotional support (Blazer, 2003a). Studies in primary care are therefore trialling behavioural interventions for older adults with depression (Overend, Lewis, Bailey et al., 2014) to increase the amount of positive reinforcement they gain from functionally equivalent activities in which they are able to engage.

In conclusion, our study suggests that measures such as the LTE-Q have a place in epidemiological research with older adults and where they fall short, subsidiary measures can be implemented. Further research is needed to explore the mechanisms of onset of depression and direction of causality.

Contribution of Authors

Hjördis Donoghue – coordinated ethical approvals, data collection, analysis and writing of manuscript

Gemma Traviss-Turner – involved in study design, supervision and writing of manuscript

Allan House – involved in study design, supervision and writing of manuscript

Helen Lewis – coordinated ethical approvals, access to data and day to day running of the CASPER study

Simon Gilbody – Chief Investigator of the CASPER study. Contributed to the development of the grant application and trial protocol.

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Table 1. LEDS sub-sample by group (N=19)

	LTE-Q: score 1+ life events	LTE-Q: score no life events
PHQ-9: score ≥10	**DLE** - ***Depressed*** *older adults,* ***life events*** *in the last 12 months (N=5)*	**D** - ***Depressed*** *older adults,* *no life events in the last 12 months (N=3)*
PHQ-9: score ≤9	**LE** - *Older adults not depressed,* *with* ***life events*** *in the last 12 months (N=4)*	**N** – *Older adults with* ***neither*** *depression or life events (N=7)*

Table 2. Matched LTE-Q and LEDS Categories

LTE-Q item	LEDS Category
Suffered a serious illness, injury or assault	Health
Serious illness, injury or assault happened to a close relative	Health
Child, spouse, parent died	Miscellaneous / death
Close family friend or another relative (niece, cousin, grandchild) died	Miscellaneous / death
Separation due to marital difficulties	Marital / partner relationship
Broke off steady relationship	Marital / partner relationship
Serious problem with a close friend, neighbour or relative	Other relationships
Became unemployed or seeking work unsuccessfully for > a month	Employment
Sacked from your job	Employment
Major financial crisis	Money / possessions
Problems with the police and court appearance	Crime / legal
Something you valued lost or stolen	Money / possessions

Table 3. Logistic regression coefficients for predictors of depression

Logistic regression coefficients for depression

	B Beta value	SE Standard Error	OR Odds Ratio	95% CI Lower	95% CI Upper	Probability
Constant	-1.985	0.99	0.137	-2.186	-1.81	0.001
Adversity	0.585	0.2	1.795	1.213	2.657	0.003*
Age	-0.185	0.208	0.831	0.553	1.251	0.376
Gender	-0.335	0.201	0.716	0.482	1.062	0.937

* Significant at p<0.05

Pseudo R2=0.025 (Negelkerke), prob=0.006, log likelihood = 695.155
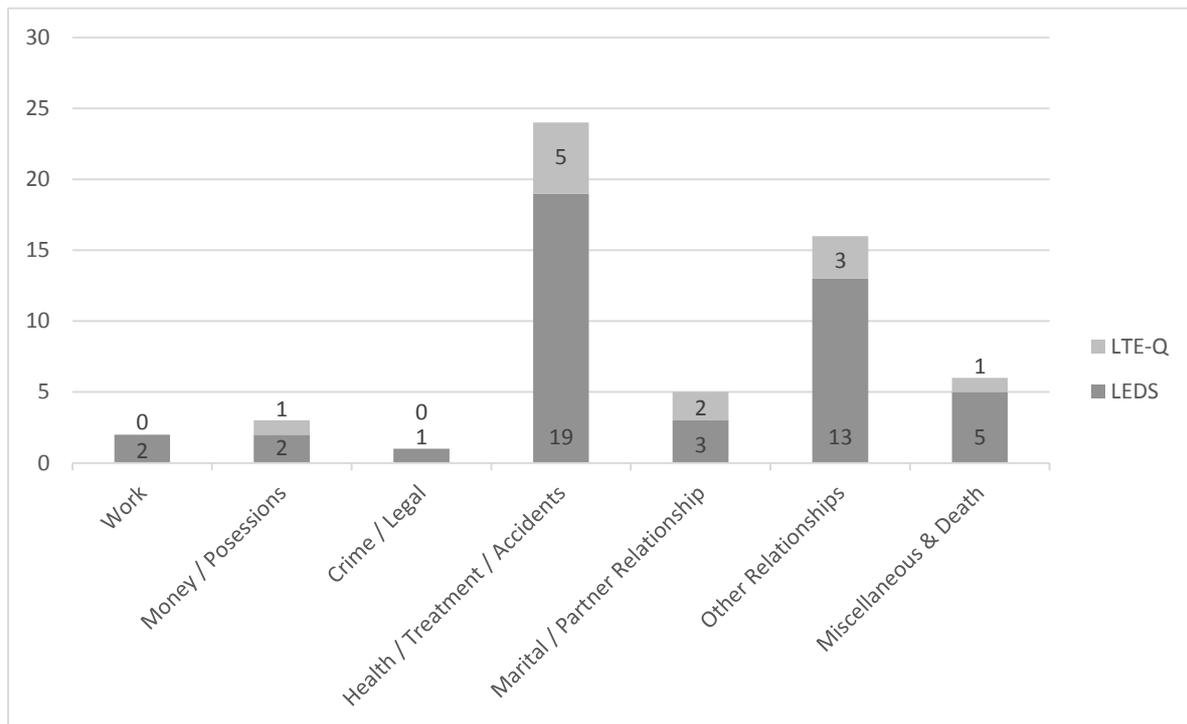
Figure 1. A stacked graph to show the number of subsample participants (n=19) reporting at least one event within each life event category as measured by the LEDS and LTE-Q
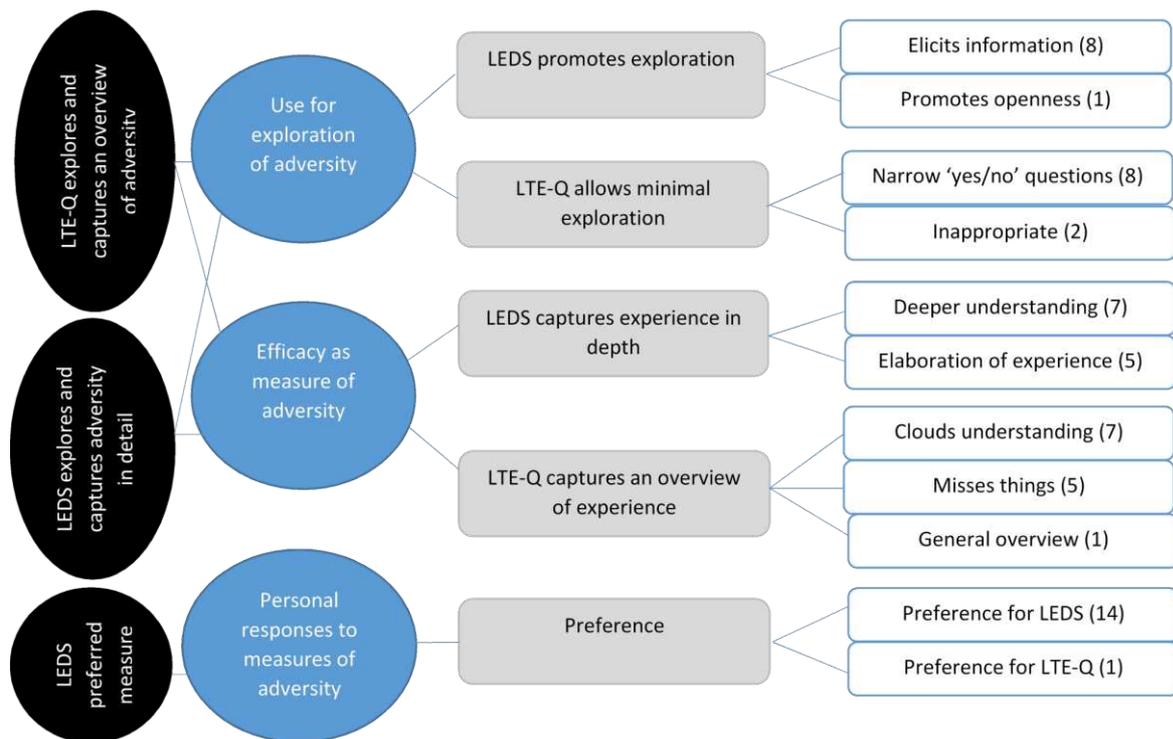
Figure 2. A thematic map to show the qualitative experience of having adversity captured through different measures of adversity, the LTE-Q and LEDS

Contribution of Authors

Hjördis Donoghue – coordinated ethical approvals, data collection, analysis and writing of manuscript

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Simon Gilbody – Chief Investigator of the CASPER study. Contributed to the development of the grant application and trial protocol.

Highlights

- Depression and recent adversity are examined in a large cohort of UK older adults
- Prevalence of depression in this sample is 12%
- Exposure to recent adversity is associated with doubling of the odds of depression
- Adversity in areas of health, bereavement and relationships are associated with depression
- The brief LTE-Q only captures a proportion of adversity measured by the LEDS