CLEAR[[1]](#footnote-1) ‘Online stress’ PROJECT Description

Antonia Bifulco, Stephen Nunn, Lisa Kagan, Deborah Rodriguez, Ruth Spence Middlesex University

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**Title:** Stress online: Developing a reliable and valid interactive online method for measuring stressful life events and difficulties

This three year ESRC funded project ran from February 2014 to April 2017. It was run at Middlesex University with partners at Goldsmith’s College and Kings College London. Its objectives were to:

1. develop an online measure of life stress in the form of life events and difficulties, which adequately captures objective features of events (contextual) across a wide range of classifications and these recorded by date and sequence. The format informed by, and validated against the face-to-face interview the Life Events and Difficulties Schedule (LEDS);
2. test the measure’s validity and reliability in a young adult (student) sample and a previously studied (DeCC – Depression and Case Control) mid-life depression and control sample
3. confirm the association of negative life events and difficulties, to depression and physical health outcomes and explore their association with poor academic outcomes in first year undergraduate students.

Ethical permission was received from the Middlesex Psychology Department Ethics Committee (for the student sample) and from the ISIS National Health Service ethics (for the DeCC sample).

A CLEAR informational website was created early on in the project to hold information and updates on the project and to be accessible by the general public as well as participants in the project who wish to learn more (www.clearaboutstress.net).

**Introduction**

Online measurement of experience and psychological states is now recognised as a useful and reliable method for use in social and medical sciences. This study aimed to create an online site for assessing all life change in terms of life events and long term problems to mimic an existing standardised semi-structured interview: The Life Events and Difficulties Schedule – LEDS. The study involved the design, implementation of the site and then testing its reliability (test-retest), validity (against interview and RLEQ questionnaire) and its predictive validity in relation to depression symptoms.

In order to collect very large sample sizes with a particular aim to accurately collect provoking agents for clinical depression, at low cost and low researcher effort, an online facility – CLEAR – has been designed and tested. This is a web-based system designed to mimic aspects of the LEDS which is self-completed by respondents. It is designed to be as simple and appealing as possible whilst covering all 10 domains of events; to utilise respondent aids involving video instructions and explanations as well as a calendar to aid event-dating and which reflects sequences of events; to give a brief feedback report as well as help-sites for the respondent. It is also programmed (using Python) to produce output which can be used for SPSS analysis and which utilises categories of event experience/variable combination based on decades of published LEDS analysis. The practical advantages are obvious – it takes virtually no researcher time once respondents approached – and indeed can be linked to websites where respondents can approach it unsolicited. It also requires no technological support from the agency using it.

It is not however a brief assessment: it takes around 50 minutes to complete – and respondents need to be primed to entail sufficient commitment. However it can be completed over several sessions - all entries are automatically saved as the respondent progresses through the system. It is extremely secure and no names or very identifying features are included on the site. The site also allows for traditional questionnaires to be included in its architecture and these could be varied easily for different projects or applicants. The prototype CLEAR has used a depression symptom questionnaire (GHQ) a physical illness questionnaire, one for Wellbeing (WB…) and an attachment questionnaire (VASQ) as well as a published Life Events Questionnaire (RLEQ) for comparison purposes.

Demographic information is collected throughout the site under the different domains filtered through the three way initial choice of lifestyle, relationships and health. Thus under lifestyle/work details of respondents work experience is questioned, prior to questions about events involving work. Under relationships/partner information is collected about presence of a partner, whether cohabiting, duration of relationship prior to recent events involving partner. Health also includes reproduction which is where pregnancy and birth is located, prior to asking about life events in this and the broader health field (see figure 1).

**1.2 ONLINE MEASURES AND DEMOGRAPHICS**

A full description of CLEAR is detailed in figure 1. The other measures used are ‘static’ online well known questionnaires to provide information about demographics, as well as the dependent variables depression symptoms and physical health, positive outcomes (wellbeing) vulnerability (attachment style) and for validation/comparison (recent life events)

A decision was made to collect demographic characteristics throughout the CLEAR process of using the website rather than just at the start. This is both to distribute the information to make it less ponderous, but also so that each of the domains has information that is regularly completed even if there are no events. Information regarding age, gender, ethnicity and location is asked at the beginning of the measure together with close relationships. Marital status, prior divorce/separation; social class/ employment, is asked in the relevant event domains.

Each participant filled out the following measures: General Health Questionnaire (GHQ-12; Goldberg 1972), Self-Report of Medical Disorder (SRMD; Farmer et al. 2008), Warwick-Edinburgh Mental Well-being Scale (WEMWBS; Tennant et al. 2006), Vulnerable Attachment Styles Questionnaire (VASQ; Bifulco et al. 2003), The List of Threatening Experiences (Brugha et al. 1985)

### 2. CREATING THE CLEAR ONLINE SITE: RATIONALE AND DESIGN

CLEAR is a sophisticated online measurement system for capturing life event and difficulty stressors through a number of different techniques. Information is provided through a mixture of checklists for closed responses, text boxes for open-ended responses, and logic-driven checklist menus. Futhermore, CLEAR is a dynamic system that uses the data entered to shape what questions are asked and what information is presented to the respondent.

**2.1 RATIONALE**

The CLEAR system capitalises on previous research from the fields of life events and online measurement to try and ensure the greatest possible reliability and validity of answers through increasing data accuracy and participant motivation as detailed below:

* **Personalisation** - The CLEAR system aims to be as personalised as possible as this tends to heighten attention to the information provided. Therefore it uses personalised menu options, calendar and feedback of risk and resilience factors.
* **Privacy** -CLEAR can be completed in private. This may elicit more ‘sensitive’ events and can facilitate the disclosure of events which may be hard to talk about face-to-face.
* **Rating** **events** -Important aspects of events are benchmarked and guidelines on how to answer and domain specific examples are provided.
* **Scoring events**: CLEAR is scored using a pre-coded algorithm to generate ratings of severe life events as well as ‘D-matching’ events and other indices. Severe life events will be rated by taking into account (i) a rating of ‘marked’ or ‘moderate’ on long-term contextual threat/unpleasantness (ii) is ‘self’ or ‘joint’ focussed, and (ii) is not ‘illness-related’. For ‘matching difficulty events’ such events also require a stated link to rated difficulties of ‘very marked’, ‘marked’ or ‘high moderate’ severity, in the same domain and of 6 months duration prior to the event.

Researchers’ expert in the interview will review the answers and verify the programme ratings. This also enables quality control and reliability checking.

**2.2 DESIGN AND PRESENTATION ISSUES**

Feedback from the International Scientific Advisory Board and panel members highlighted the importance of a coherent and attractive online system to increase motivation and engagement with the project.

* **Branding**: A graphic designer was approached to develop a brand and identity for CLEAR that was both engaging and modern but which also took into consideration the sensitive nature of the research and the tone of the information that was being collected. It was important that by making CLEAR more user-friendly the subject matter was not trivialised.
* **Videos:** were specially commissioned for the CLEAR system. One set of videos were instructional, directing respondents through the various process of how to use and complete the CLEAR system. The other set of videos provided guidance to illustrate key concepts and what to consider when rating events and difficulties appropriately.

**2.3 MODIFICATIONS RE: MEASUREMENT**

The original face-to-face LEDS interview was developed and used throughout the 1970’s and 1980’s. Therefore it was necessary to change some of the details to update the measurement (see appendix 1). Additionally, the interview was investigator-led with probes to establish factual details, whereas the CLEAR is self-report. The site layout is designed to keep the respondent as close as possible to the original LEDS concepts, using definitions and videos to explain concepts, and concise questions to guide response and specified rating options with clarifications.

**2.4 ONLINE SECURITY**

Web based security is a key concern of the electronic CLEAR architecture: All participants will only enter data under an ID number and personalised password and therefore no names/contact details will be entered onto the CLEAR system.

All data is saved to the Middlesex University shared drives in anonymised form with access only by the research team through password protection. Backups are also made and stored on removable hard drives stored securely.

Data deposited with the ESRC does not include the personal logins created.

### 3. PANELS AND FEEDBACK

**3.1 PANELS**

Three different panels were set up to test the usability of the CLEAR site and to provide feedback to improve the site. At the time of piloting the site was still under construction and only four domains were ready to be used. Listed below are the panels and feedback given from them. This exercise is to be repeated when the site is finished.

* A **community panel** was made up of a convenience sample consisting of five participants – aged in in their twenties, thirties, forties, fifties and sixties. Three were male and two were female.
* A **student panel** had two female participants who were recruited from the psychology department post graduate programmes.
* An **expert panel** will look at the CLEAR site on completion. It will be made up of academics/ professionals who have used the LEDS in previous studies.

**3.2 FEEDBACK**

A feedback questionnaire was given to the community and student panels to understand their experience of using the site and its content. Questions centred on: accessing the system, general impressions, questions and scoring, event categories, and help provision and videos.

Below are summarised the main points from feedback and changes have been documented above:

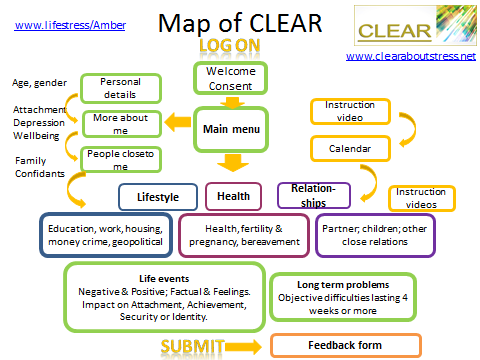
* Importance of using videos and explanation of terms
* Need for modernising the look of the site in terms of its aesthetics e.g. colour, fonts etc. and usability
* Having an indicator of progress as the user completes the site to encourage motivation and to give the user an idea of how much they have done and how much is left to complete
* Importance of sorting out all technical errors which occurred on the site
* Importance of having a secure server and using an icon on the site to reassure users that data is secure

### 4. PILOTING LEDS-CV INTERVIEW

Once all the LEDS-CV materials were ready, pilot interviews were arranged to test out the updated materials and in preparation for the validation study.

Participants were recruited through a large email group via one of the researchers. None of the participants were known personally to the researcher. Participants consisted of three male and three female participants. Two were between the ages of 19 -22, and the other four were between the ages of 50-65 and consisted of two couples. All participants were white.

Interviews took place at the university and participants were given a £20 amazon voucher for taking part. Interviews were recorded. All interviews were rated using the LEDS-CV rating form and guide. The LEDS-CV manual was consulted when necessary to help with rating threat and for clarifying rules. After the interviews had been rated the research team met to discuss the pilot interviews and viability of the new materials.



### 5. FINAL SAMPLE

The CLEAR study recruited 328 respondents and included those from an existing sample which was recontacted. The Depression Case-Control (DeCC) study: This case−control study of unipolar depression (Ethics Ref: 195/00) comprised 598 healthy controls and 1236 patients with recurrent depression. This study will contact those recruited by the IPPN, Kings College London. This sample was supplemented by a parallel one (The Genome-based therapeutic drugs for depression (GENDEP) study) consisted of 100 treatment-seeking patients suffering from moderate to severe depression also recruited in the same institution in a similar time frame. (Ethics Ref: 292/03). These were both midlife samples, recruited nationally and last seen in 2011. Approval was obtained from the Depression Consortium at the IPPN, Kings College to re-contact the samples. The last known address, email and telephone numbers of the participants were available for 600 depression cases and 550 controls. The records were last updated in 2011. All DeCC and GENDEP study participants were contacted by post or email.

First year undergraduate psychology students were approached to complete the CLEAR. Lectures and brief presentations on CLEAR and Wellbeing were provided to encourage participation. To finalise numbers once term time was over, recruits were taken from the Psychology Summer School.

The final group numbers included (i) 75 with a history of recurrent depression (ii) 127 matched controls and (iii) 127 students (mainly first year) from Middlesex University.

**Data sets**

Three categories of SPSS files are included in the data deposit.

# Main sample analysis

* The main sample analysis comprises the life change and psychological characteristics for all respondents. This is a download and transformation of the online data which in its raw form is unintelligible to SPSS. The transformation follows the variables derived from the LEDS interview. Whilst the full online variables cannot be reproduced here, the LEDS schedule and related questionnaires give the outline of the meaningful data collected.
* The variables included cover demographic characteristics, summed life events ratings and long term problem ratings. It also includes depression (utilising 5+ cut-off on the GHQ); ‘high’ ‘moderate’ and ‘low’ wellbeing categories; and VASQ overall insecurity; anxious and avoidant categories . Health items are individually represented (eg diabetes, heart disease).
* Each respondent has a unique id number and is also identified by group (DeCC Depression history; DeCC matched control and Student).

# Reliability data

This file includes data from the subset of 60 individuals from each group who completed the CLEAR on two occasion s 4 weeks apart (Time 1 and Time 2). This is arranged in three files – the demographics (one line of date per respondents – ids match those in the main sample); life events – a line of data for each life event entered, thus multiples per respondent. Respondents however keep their unique id. A file of Long Term problems, again with multiples per respondent but respondent retaining their unique identifying number. T1 data is followed by T2 data to allow correlational analysis.

# Validity data

This comprises data from 30 respondents from their LEDS inter view and CLEAR data. As with reliability the data involves demographics as a single line of data per person, but the life events data is listed for each life event and the long term problems for each reported. The data is matched on the basis of the event descriptor. Where there are non matches new lines of data are created with are ‘missing values’ for the mode which failed to pick up the event or LTP.

**I: Reliability**

The aim was to test whether CLEAR was reliable in terms of test-retest one month apart in three sections (i) demographic, (ii) life event and (iii) long term problems?

**Reliability subsample**

The overall sample used for testing CLEAR comprised 325 individuals in three groups based on an existing national midlife sample (Depression and Case Control -DeCC) newly traced for this study, and a new student sample.

* The target DeCC group were those with clinically assessed recurrent episodes of major depression when last studied 10 years earlier,
* A matched no-depression control group.
* Students (mostly first year Psychology UGs)

All respondents were first contacted by the research team to obtain informed consent, before being given unique secure login passwords for completing the site. All respondents were given a £15 voucher on completion of the measure. Those who undertook reliability or validity measures were paid additionally for those.

***Reliability group:***

Amongst 66 agreeing to test retest, 60 were used in the analysis – 20 per group. Both completions of CLEAR occurred within 4.5 weeks. Exclusions were made for those with a larger time gap (5 cases dispersed between the three groups). There were 61 finally used in the analysis (two with a slightly longer time lag were both retained in the control group).

In this group (taking T1 ratings) 59% were female, most (67%) white UK with a further 18% white other, and 15% BME. The average age was 44, the range 18 to 73 (SD 18.6). This was a largely middle class sample. Half were highly education: 46% with a degree or higher and 41% currently in education. Two thirds were employment (64%) with 56% were home owners/mortgaged.

The majority identified a partner (71%), with 56% cohabiting. Nearly half (49%) had children, 83% in very good relationship with their children, 6% described prior pregnancy complications

In terms of parents, 62% had a mother alive and 53% father alive. In terms of childhood separation 17% were separated from mother, 18% separated from father before age 17. Most had siblings, 15% were only children,

Only a low number (5) were depressed in the year as determined by the GHQ.

**Reliability Analysis**

Data was downloaded from CLEAR using Python and variables combined/defined according to those used in the LEDS classification and typical LEDS data file. For reliability, the two CLEAR files (T1 and T2) were combined into a single file when events and long term problems were hand-matched The same procedure for validity with the data lines for individual events and long term problems matched. Life events and LTPs were matched by narrative description, classification, person involved and date. Non-matches were retained in the data file, with half the data shown as missing. Dummy cases were included for the few respondents in the groups who had no events or LTPs. The total ‘n’ was determined by number of life events or number of LTPs when both files combined.

Certain exclusions were systematically made prior to analysis:

1. For time gap between measures re the 4 week difference at beginning and end of period..
2. Obvious duplication of events in CLEAR (same descriptors and ratings)
3. Occasional events or LTPs with no ratings in CLEAR
4. Those incorrectly included even though outside the last 12-18 months
5. Those concerning internal states (eg feelings of guilt or inability to cope)

These exclusions were made prior to the data analysis and compiled by a different researcher (RS) blind to likely agreement/disagreement in analysis. Whilst LTPs do not encompass depression in LEDS, these were retained in the reliability agreement but excluded from the validity/interview exercise.

Associations were examined using Intra Class Correlations (ICC) for dimensional scales and Kappa (K) for dichotomous or categorical scales. Level of association was guided by Cohen’s accepted levels:

* Poor agreement = Less than 0.20
* Fair agreement = 0.20 to 0.40
* Moderate agreement = 0.40 to 0.60
* Good agreement = 0.60 to 0.80
* Very good agreement = 0.80 to 1.00

## Validity procedure

This sought to test whether CLEAR was valid when compared with the LEDS interview conducted in parallel (within a month)

* + Is there adequate coverage of events/long term problems
  + Is there good agreement for severe events?
  + Do subgroups provide more valid CLEAR responses?

***Validity subsample:***

A group of 30 individuals were selected for a parallel LEDS interview – half completed CLEAR first, half were interviewed first. The interviews were undertaken according to standard LEDS procedure, rated, checked by consensus meetings and entered on SPSS.

This group (taking interview ratings) had more females (73%), again most were White/UK (60%) or White other (20%) and 20% were BME. More than half 57% had a degree or higher qualification, and 57% were currently in education. 43% had some sort of employment. 70% had a partner currently and most (86%) described the relationship as good/very good. Half (53% ) had children. 43% had mother alive and 37% father alive. Separation in childhood for a year or more was 10% from mother and 23% from father. Most (80%) had siblings.

6 respondents were depressed in the last year, as identified by their GHQ symptom scores.

**Data set**

The comparison between interview (LEDS) and CLEAR online completion was similarly undertaken. The variables were compiled in three subsets – demographics; life events and long term problems. The latter two files are listed by observation (event or LTP) and are multiple by respondent.

The LEDS and CLEAR assessment are identified for analysis. Intra-class correlational analysis is appropriate

1. Computerised Life Events Assessment Record [↑](#footnote-ref-1)