ENVIRONMENTAL-RISK (E-RISK) LONGITUDINAL TWIN STUDY
CONCEPT PAPER FORM

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Provisional Paper Title: Identifying a cut-off score for clinically-meaningful loneliness on the 3-item UCLA Loneliness Scale.

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Objective of the study and its significance:

Loneliness is not a psychiatric disorder, and there is no consensus on a threshold at which a person is deemed to be 'lonely' versus 'non-lonely'. For this reason, it is typically treated as a continuum along with all people vary. Indeed, most people are likely to experience some degree of loneliness at some point in their lives, and to the extent that the experience resolves in due course, it is not necessarily pathological in its own right. Nonetheless, higher loneliness is associated with an increased risk for mental health problems such as depression and anxiety, with a 1 standard deviation increase in loneliness more than doubling the odds of meeting diagnostic criteria for these disorders (Matthews et al, 2019). There may therefore be a certain level of severity at which feelings of loneliness could be a cause for concern to clinicians, caregivers or educators.

Moreover, loneliness is independently associated with a diverse range of mental health problems, including not only depression and anxiety, but also ADHD, conduct disorder, self-harm, suicidality and service use (Matthews et al, 2019). These associations remain even when controlling for the comorbidity of these problems. Loneliness could therefore be a valuable risk indicator for psychopathology in general, analogous to sleep problems or difficulty concentrating, which are present in a number of different disorders and are therefore included in widely-used screening checklists. This suggests potential utility of a loneliness measure as an additional screening tool for generalised risk of mental health problems. Again, however, there is a need to discriminate more mundane levels of loneliness that do not warrant clinical attention from more severe levels that may signal risk for mental disorders.

The 3-item short form of the UCLA Loneliness Scale developed by Hughes et al (2004) is among the most well-known and widely-used measures of loneliness. It has sound psychometric properties and is correlated strongly with the full UCLA Scale. Its brevity and ease of use makes it ideal for assessing loneliness in large surveys, and for this reason it has the potential to be administered as a quick screening tool. The items ask "How often do you feel… (1) That you lack companionship? (2) Feel left out? (3) Feel isolated from others?" Items are scored "hardly ever" (1), "sometimes" (2) and "often" (3), and summed to produce a scale from 3 to 9.

The aim of this project is to identify a cut-off score on this brief, widely-used and well-validated loneliness measure that could be used to identify individuals at elevated risk for mental health problems. Such a cut-off score could have applications both in research, to establish a method of categorising individuals as

lonely which can be replicated across studies; and in primary care or education settings, as part of a screening battery.

Statistical analyses:

Using ROC curve analysis, I will estimate how accurately the short form UCLA scale can discriminate between people with and without a mental health problem, denoted by the area under the curve (AUC) statistic. The specific class variables to be selected for analysis are DSM-5 diagnoses of depression and anxiety, presence of self-harm or suicidal behaviours, and use of services for a mental health problem. These will also be combined to create a composite ‘any mental health problem’ class variable.

Given that the scale consists only of three items, and is not specifically designed to assess psychiatric disorders, it is anticipated that the area under the curve (AUC) will be modest in size, but sufficiently greater than chance to suggest that loneliness scores can be clinically informative. By examining the sensitivity, specificity, and positive predictive values, I will identify a cut-point that identifies a substantial number of individuals who have a mental health problem, while keeping the false positive rate low.

As a follow-up analysis, I will test whether the use of extra criteria (e.g. additional items, corroboration by informant report, history of loneliness in childhood) can be used improve the diagnostic accuracy of the scale.

Variables Needed at Which Ages (names and labels):

E-RISK

Age 12:

lonelye12 Loneliness age 12

Age 18:

Derived variables:
dxmdee18 MDE diagnosis
dxgade18 GAD diagnosis
cdmode18 CD diagnosis
sharme18 Self harm
suicate18 Suicide attempt
neete18 NEET

Item-level variables:
ctss1e18 Loneliness item 1
ctss2e18 Loneliness item 2
ctss3e18 Loneliness item 3
ctss3e18 Loneliness item 4
ctss3e18 Loneliness item 5
ser1e18 Service use – GP
ser2e18 Service use – Counsellor
ser4e18 Service use – Psychiatrist
bp86e18 Has trouble making friends (coder impressions)
bp87e18 Feels that no one loves them (coder impressions)
bp88e18 Seems lonely (coder impressions)
inf49e18 Has trouble making friends (co-informants)

inf50e18 Feels that no one loves them (co-informants)
inf51e18 Seems lonely (co-informants)

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From ages 38 and 45, subject to availability:

Loneliness item 1
Loneliness item 2
Loneliness item 3
Loneliness item 4
Loneliness item 5
MDE diagnosis
GAD diagnosis
CD diagnosis
Service use: GP, counsellor, psychiatrist
NEET / employment status
Interviewer report: Has trouble making friends
Interviewer report: Feels that no one loves them
Interviewer report: Seems lonely
Co-informant reports: Has trouble making friends
Co-informant reports: Feels that no one loves them
Co-informant reports: Seems lonely

References cited:

Hughes, M. E., Waite, L. K., Hawkley, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys. *Research Into Aging, 26*(6), 655-672.

Matthews, T., Danese, A., Caspi, A., Fisher, H. L., Goldman-Mellor, S., Kepa, A., Moffitt, T. E., Odgers, C. L., & Arseneault, L. (2019). Lonely young adults in modern Britain: findings from an epidemiological cohort study. *Psychological Medicine, 49*(2), 268-277.