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Mood instability is the distinctive feature of neuroticism. Results from the British Health and Lifestyle Study (HALS)

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ABSTRACT

The predictive value of neuroticism for adverse mental and physical outcomes is well documented in the literature. As a construct, neuroticism itself needs to be further clarified because of its overlap with symptoms characterizing depression and anxiety. The goal of this study was to examine the factor structure of neuroticism, and using factor scores, to predict psychological health 7 years later.

Using the 1984 British Health and Lifestyle Study (HALS), we factor analyzed neuroticism as measured by the Eysenck Personality Inventory Neuroticism subscale ($n = 5940$). Of these 5940 wave one respondents, the General Health Questionnaire (GHQ) scores ($n = 3599$) seven years later (1991) were dichotomized and regressed against neuroticism factor scores, baseline GHQ, and physical health variables.

A three-factor solution was found for neuroticism that represented anxiety, mood instability, and low mood. Although these three factors were significantly correlated ($r = .446$ to $.530$, $p < .0001$), mood instability had the highest communality and was the strongest predictor of worse mental health (OR: 1.17, robust se: .06, $p < .01$) next to baseline GHQ.

The results of the present study confirm those of a previous study that indicated mood instability as a distinct and clinically relevant feature of neuroticism.

1. Introduction

Mood disorders are common complex conditions (Becker, 2004) with excessive or inappropriate mood as the salient feature. Definitions of particular mood disorders require a minimum number of symptoms for a minimum duration, e.g. 2 weeks for major depression (American Psychiatric Association, 1994). In contrast, when high moods occur, depression becomes bipolar disorder and when mood fluctuates rapidly, the condition is often considered a personality disorder (American Psychiatric Association, 1994). In fact, the recent literature confirms that high moods are common among patients with depression (Nusslock & Frank, 2011), and mood can shift rapidly between lows and highs (Bowen, Baetz, Hawkes, & Bowen, 2006; Eid & Diener, 1999; Eysenck & Eysenck, 1969), but this view is not widely accepted.

In a previous paper, we reported that one of three factors of the Eysenck Personality Inventory Neuroticism scale represents "moods going up and down" and that this unstable mood factor (along with factors for anxiety and depression) predicts suicidal thoughts (Bowen, Baetz, Leuschen, & Kalynchuk, 2011). Unstable moods are termed mood instability (MI) defined as "extreme and frequent fluctuations of mood over time" (Trull et al., 2008). MI has a moderate correlation with trait depression but empirically the concepts are distinct enough to be considered as separate constructs (Eid & Diener, 1999; Murray, Allen, & Trinder, 2002; Thompson, Berenbaum, & Bredemeier, 2011).

Neuroticism is a robust predictor of a variety of psychiatric syndromes and health outcomes that include anxiety and mood syndromes (Kendler & Jablensky, 2011), substance abuse, personality disorders (Jacobs et al., 2011), adverse events (Kendler, Myers, & Reichborn-Kjennerud, 2011), suicidal thoughts (ten Have et al., 2009) and possibly physical health outcomes (Ormel, Rosmalen, & Farmer, 2004; Shipley, Weiss, Der, Taylor, & Deary, 2007). However, it is still not clear whether our understanding of the concept of neuroticism or of the relationship between neuroticism and mood symptoms has been advanced by this research, since there are shared symptoms of anxiety and depression between the measures of neuroticism and the outcome syndromes (Kendler & Gardner, 2011; Ormel et al., 2004; ten Have et al., 2009).

In this study, our hypothesis is that MI is an essential component of neuroticism that will predict future psychological ill health. We used data from the British Health and Lifestyle Survey (HALS) (Shipley et al., 2007) to address limitations of our previous study that were the relatively small sample size ($n = 125$) from one

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center, the use of the brief Eysenck Neuroticism Scale and the cross sectional nature of the data (Bowen et al., 2011).

2. Methods

2.1. Description of the sample

The sample used in this study is a subset of questionnaire respondents from the 1984/1991 British Health and Lifestyle Survey (HALS) (Cox, Huppert, & Whichelow, 1993; Cox et al., 1987). One of its aims was to study the association between mental state and self-reported well-being (Shipley et al., 2007). The sample was broadly representative of the population in England, Scotland, and Wales as measured by the census of 1981. The initial cross sectional component was completed in 1984 and a follow-up component was completed in 1991–1992. Of the original 9003 respondents from 1984, 5940 completed the mental status questionnaires at baseline and 3599 in 1991. Except for the fact that the youngest respondents were 25 years old, the HALS follow-up sample compares well with the 1991 census data.

2.2. Instruments and measures

The Eysenck Personality Inventory (EPI) is a questionnaire that primarily measures neuroticism and extraversion. HALS used the 57-item version of the EPI that includes 24 neuroticism items (EPI-N) (Table 1) but includes a subscale to detect socially desirable responding (Eysenck & Eysenck, 1969). The EPI-N scale contains questions such as "Does your mood often go up and down?" which are answered with "Yes" or "No". The 1-month test–retest reliability of the EPI-N scale has been found to be 0.87 (Knowles & Kreitman, 1965) and the Kuder–Richardson Formula 20 (KR-20) reliability score in this study is 0.736. The KR-20 is comparable to Cronbach's alpha for dichotomous item scales. Eysenck determined that items of the EPI Neuroticism factor were similar to items in corresponding factors in the Cattell and Guilford Personality Inventories (Eysenck & Eysenck, 1969) and self-ratings on the EPI-N have been validated by spousal ratings (Gomà-i-Freixanet, 1997).

The General Health Questionnaire (GHQ) 30-item version is designed to distinguish people with psychological disturbance from those who are relatively healthy. (Goldberg, Bridges, Duncan-Jones, & Grayson, 1988; Shipley et al., 2007). The questions inquire about recent symptoms and the subject endorses one of four responses. For the 30-item version, 4–6 factors are usually found, consisting of a general factor and depression, anxiety, somatic, sleep, and social functioning factors (Werneke, Goldberg, Yalcin, & Ustün, 2000). Goldberg emphasizes that the scale assesses transient or statelike psychiatric (dys)function "over the past few weeks" and not more enduring personality traits (Goldberg, 2000). The one-month test–retest reliability was found to be as high as .895 (DePaulo & Folstein, 1978) and the KR 20 reliability score of the GHQ in this study is 0.906. Reviews have supported the validity of the GHQ compared with other appropriate measures (LoBello, 1995). The GHQ items cover most of the conditions of which neuroticism is a predictor.

In addition to demographic data, several measures relevant to physical health were included such as BMI, blood pressure, smoking status, and forced expiratory volume, a general measure of respiratory function. In the analysis, these controlled for measures of "physical" ill health that could affect psychological health. In addition, social factors such as occupation, civil status, household income, and education were included (Shipley et al., 2007). For the purpose of our study, we collapsed occupation into four categories: 1 = white collar, 2 = skilled blue collar, 3 = unskilled blue collar, 4 = unclassifiable/no occupation. We categorized civil status into 1 = widowed, 2 = divorced/separated/single, and 3 = married and living with spouse.

Table 1
Demographic features, EPI-neuroticism, and GHQ scores at baseline and 7-year follow-up in those who completed the GHQ (General Health Questionnaire) and EPI-N (Eysenck Neuroticism Scale).

Variable	HALS 1 (1984)	HALS 2 (1991)
N	5940	3599
Mean age (SD) years	44.50 (16.75)	44.42 (15.20)
Male (%)	2667 (44.9)	1568 (43.6)
Occupational class (%)		
White collar	2700 (45.5)	1667 (46.3)
Skilled blue collar/military	2921 (49.2)	1762 (49.0)
Unskilled blue collar	246 (4.1)	146 (4.1)
Never occupied/unclassified	69 (1.2)	23 (.6)
Missing	4 (.1)	1 (0)
EPI-N median, mean (SD)	10.00, 10.11(5.41)	9.00, 9.34(5.28)
GHQ median, mean (SD)	2.00, 3.95 (5.17)	1.00, 3.95 (5.89)

2.3. Statistical analysis

We first factor analyzed the Neuroticism subscale of the EPI to determine its structure. Due to the binary nature (i.e. Yes/No) of the EPI questions, factor analysis was conducted using the item-by-item tetrachoric correlation matrix. The iterated principal factors method was used for extraction with oblique oblimin rotation. Oblique (in contrast to orthogonal) rotations are recommended for psychometric scores since these tend to be correlated (Costello & Osborne, 2005). The neuroticism factor scores were then calculated using Thomson's regression method (1951).

A subset of the HALS 1984 respondents was traced in 1991 and these completed the GHQ and EPI. Younger age, male gender, higher GHQ scores in 1984, length of unemployment, divorced or separated civil status, higher blood pressure, and history of smoking predicted loss to follow-up in 1991. These variables were used to construct inverse probability weights.

Finally, we created a logistic regression model with GHQ scores, dichotomized into low and high as the dependent variable and the three neuroticism factor scores that we derived as predictors. Because the GHQ was designed to distinguish those in the population with worse psychological functioning from the relatively healthy, and that was also our intention, we calculated GHQ scores using the traditional bimodal method (0-0-1-1), that produces a range of scores from 0 to 30 (Shipley et al., 2007). In addition, we also set a high GHQ threshold of 15, representing two standard deviations from the mean, which yielded 245 individuals (6.8%). Normatively, a score above 5 in the GHQ-30 is indicative of emotional disturbance (DePaulo & Folstein, 1978). In instruments such as the GHQ, sliding (vis-a-vis fixed) thresholds are preferable in epidemiological studies (Furukawa, Goldberg, Rabe-Hesketh, & Ustun, 2001).

STATA v. 12 (Stata: Data Analysis, 2011) was used for statistical analysis.

3. Results

Table 1 shows the main demographic features and questionnaire scores at time 1 (1984) and time 2 (1991). In factor analysis, the eigenvalues and the screeplot indicated that extracting two factors was sufficient based on Kaiser's criterion (>1). However, we extracted an additional factor as Cattell (1952) suggested in order to sort out the unique factors (i.e. due to error) and the common factors of interest (Cattell, 1952). The factor loadings after rotation are shown in Table 2. The rotated factor solution closely