Research report

General distress, hopelessness—suicidal ideation and worrying in adolescence: Concurrent and predictive validity of a symptom-level bifactor model for clinical diagnoses

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ABSTRACT

Background: Clinical disorders often share common symptoms and aetiological factors. Bifactor models acknowledge the role of an underlying general distress component and more specific sub-domains of psychopathology which specify the unique components of disorders over and above a general factor.
Methods: A bifactor model jointly calibrated data on subjective distress from The Mood and Feelings Questionnaire and the Revised Children's Manifest Anxiety Scale. The bifactor model encompassed a general distress factor, and specific factors for (a) hopelessness—suicidal ideation, (b) generalised worrying and (c) restlessness—fatigue at age 14 which were related to lifetime clinical diagnoses established by interviews at ages 14 (concurrent validity) and current diagnoses at 17 years (predictive validity) in a British population sample of 1159 adolescents.
Results: Diagnostic interviews confirmed the validity of a symptom-level bifactor model. The underlying general distress factor was a powerful but non-specific predictor of affective, anxiety and behaviour disorders. The specific factors for hopelessness—suicidal ideation and generalised worrying contributed to predictive specificity. Hopelessness—suicidal ideation predicted concurrent and future affective disorder; generalised worrying predicted concurrent and future anxiety, specifically concurrent generalised anxiety disorders. Generalised worrying was negatively associated with behaviour disorders.
Limitations: The analyses of gender differences and the prediction of specific disorders was limited due to a low frequency of disorders other than depression.
Conclusions: The bifactor model was able to differentiate concurrent and predict future clinical diagnoses. This can inform the development of targeted as well as non-specific interventions for prevention and treatment of different disorders.

1. Introduction

Psychopathology has traditionally been conceptualised in terms of distinct disorders, which clearly differentiate from one another and from normal functioning. However, evidence shows that psychiatric disorders in adolescence and later in life often co-occur and that distinct clinical diagnoses often share common symptoms and aetiological factors (Brown et al., 2001; Cerda et al., 2008; Kessler et al., 2005; Lahey et al., 2004, 2008, 2011). Caron and Rutter (1991) argued that comorbidity of psychiatric disorders may result from the use of categories of disorders where dimensions are more appropriate. Additionally, comorbidity may reflect overlapping diagnostic criteria, artificial subdivisions of syndromes, or may arise when one disorder represents an early manifestation of another or one disorder is part of another disorder.

Krueger and Markon (2006) propose a dimensional spectrum of psychopathology in which a smaller number of liability constructs underlie multiple disorders. This theoretical proposition has been supported by most multidimensional assessments in developmental studies on children and adolescents whether self, parent or teacher rated, on older or more recent instruments. Prior research has identified two well replicated, higher-order liability

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dimensions of internalising and externalising disorders (Krueger et al., 1998; Krueger and Finger, 2001; Vollebergh et al., 2001; Kendler et al., 2003). Affective and anxiety disorders have been located on the internalising dimension. Furthermore, on the internalising dimension a misery or distress factor that includes mood disorders, generalised anxiety disorder, generalised tensions, and social anxiety can be distinguished from a fear factor including phobias as well as obsessions and compulsions (Lahey et al., 2004; Krueger and Markon, 2006). The externalising dimension includes substance use and conduct disorders.

While a diagnoses- or syndrome-level ("top-down") approach informs and defines diagnostic classification systems, a symptom-level ("bottom-up") approach is more likely to represent the dimensional components *within* existing diagnostic categories. They provide better perspectives on symptom co-occurrence for descriptive epidemiology and enrich aetiological hypotheses by emphasising heterogeneity of symptom dimensions and/or their severity within and across diagnoses (Forbush and Watson, 2013; Kotov et al., 2011; Krueger and Markon, 2011). Studies employing a symptom-level approach often show that bifactor models for reported psychopathology fit the data better than alternative models (Brodbeck et al., 2011; Simms et al., 2008, 2012; Thomas, 2012). Bifactor models (also known as general-specific models) acknowledge the role of an underlying general distress component, which accounts for the communality of psychopathological symptoms. They also allow for more specific sub-domains of psychopathology to be present as independent specific factors (Chen et al., 2006; Reise et al., 2007). These domain-specific factors account for remaining variance, beyond that of the general factor.

Previously we applied an integrative data analysis perspective by using a joint factor analyses approach to self-report data from the Mood and Feelings Questionnaire (MFQ) (Angold et al., 1995) and the Revised Manifest Children's Anxiety Scale (RCMAS) (Reynolds and Richmond, 1978). MFQ and RCMAS items were analysed with exploratory factor analyses for categorical data including a Schmid–Leiman decomposition of the second order factor models. Based on these analyses, we compared a three factor model and a bifactor model using confirmatory factor analyses for categorical data. The three factor model identified (a) mood and social-cognitive symptoms of depression, (b) symptoms of worrying, and (c) somatic and information-processing symptoms. These factors can be viewed as distinct yet closely related constructs with inter-factor correlations between .78 and .86. In contrast, the bifactor model operationalised a general distress factor underlying depression and anxiety symptoms, accounting for the communality of these symptoms. Furthermore, domain specific, independent factors were revealed for hopelessness–suicidal ideation, generalised worrying, and restlessness–fatigue. These factors indicated distinct psychopathological constructs, which accounted for unique information over and above the general distress factor. The results clearly identified the bifactor model as the preferred model in our adolescent population sample at age 14. The bifactor model was not compromised by any evidence of item bias with respect to gender differences. Further details of the analysis and interpretation are described elsewhere (Brodbeck et al., 2011).

The general distress factor derived from the MFQ and RCMAS is consistent with an internalising factor comprised of depression, generalised anxiety disorder, and social anxiety (Krueger, 1998; Lahey et al., 2004; Slade and Watson, 2006; Vollebergh et al., 2001) and also in line with neuroticism as a personality trait. The *hopelessness–suicidal ideation* factor was associated with a higher severity on the latent distress continuum than the other factors. The items contained "*Life is not worth living*", "*I thought of killing myself*" and "*My family would be better off without me*". The specific factor for *generalised worrying* contained items such as "*I worried a lot of the time*" and "*I was afraid of a lot of things.*" The specific

restlessness—fatigue factor covered restlessness, sleeping difficulties and tiredness, but did not include other physiological symptoms such as shortness of breath or sweaty hands.

Few studies have used bifactor models for self-reported anxiety and depression data to predict concurrent or future DSM diagnoses in adolescence. One motivation behind the current study is our expectation that both the general distress factor and the specific factors are capable of distinguishing and predicting concurrent and future diagnoses, when these are expressed as binary/dichotomous clinical diagnoses. We sought to establish the criterion-related and predictive validity of the bifactor model's general and specific factors derived from a self-report depression screening and anxiety symptom questionnaire at baseline against interview-based clinical diagnoses of affective, anxiety and behaviour disorders. Firstly, we expected the bifactor model to be validated by lifetime DSM diagnoses of anxiety and depression at age 14. We hypothesised that first the general distress factor would predict affective as well as anxiety diagnoses. Second, we expected that the hopelessness—suicidal ideation factor would be specific to affective and the generalised worrying factor to anxiety disorders. Furthermore, we investigated whether the general distress factor, but not the specific factors, would also predict eating disorders and disorders traditionally located at the externalising dimension of psychopathology. Finally, we tested the predictive validity of the general distress factor and the specific factors for future as well as persistent or recurrent affective, anxiety and behaviour disorders at age 17.

2. Methods

2.1. Participants

The sample comprised 1238 14 year-old adolescents from the ROOTS cohort, a British longitudinal study of the psychological, biological and genetic determinants of adolescent psychopathology (Goodyer et al., 2010). Participants were recruited from Cambridge-shire schools.

Response rate was 33% at baseline ($n = 1238$). A total of 55% of the respondents were female and 94% were white with European origins consistent with the demographic nature of the region. Within this sample 14% were classified socio-economically as of hard-pressed or moderate means, 24% were comfortably off, and 62% were categorised as urban prosperity or wealthy achiever. There were no significant gender differences in ethnicity or socio-economic status. The analysis sample included 1159 respondents (93% of the whole sample) who completed at least 85% of the MFQ and RCMAS items at baseline; 1081 had complete data on all items. Details on the MFQ and RCMAS items and instrumentation have been reported elsewhere (Brodbeck et al., 2011).

The *retention* rate at the 3-year follow-up was 86% ($n = 1074$). Retention was not differentiated by diagnostic status ($\chi^2 = .15$, $p = .700$) or socio-economic status ($\chi^2 = 4.60$, $p = .100$). Retention was clearly associated with gender, with males (14%) more likely to drop out than females (9%) ($\chi^2 = 6.2$, $p = .013$).

The study was carried out in accordance with the Declaration of Helsinki and Good Clinical Practice guidelines. The study was approved by Cambridgeshire 2 REC, reference number 03/302. All participants and their parents gave written, informed consent after the nature of the study was explained.

2.2. Measures

The *Mood and Feelings Questionnaire* (MFQ) is a self-report screening tool for detecting symptoms of depressive disorders in children and adolescents between 6 and 17 years of age (Costello