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Temperament factors and dimensional, latent bifactor models of child psychopathology: Transdiagnostic and specific associations in two youth samples

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ABSTRACT

Common emotional and behavioral symptoms co-occur and are associated with core temperament factors. This study investigated links between temperament and dimensional, latent psychopathology factors, including a general common psychopathology factor (p factor) and specific latent internalizing and externalizing liabilities, as captured by a bifactor model, in two independent samples of youth. Specifically, we tested the hypothesis that temperament factors of negative affectivity (NA), positive affectivity (PA), and effortful control (EC) could serve as both transdiagnostic and specific risks in relation to recent bifactor models of child psychopathology. Sample 1 included 571 youth (average age 13.6, SD =2.37, range 9.3–17.5) with both youth and parent report. Sample 2 included 554 preadolescent children (average age 7.7, SD =1.35, range =5–11 years) with parent report. Structural equation modeling showed that the latent bifactor models fit in both samples. Replicated in both samples, the p factor was associated with lower EC and higher NA (transdiagnostic risks). Several specific risks replicated in both samples after controlling for co-occurring symptoms via the p factor: internalizing was associated with higher NA and lower PA, lower EC related to externalizing problems.

1. Introduction

Decades of research examining child psychopathology have produced two clear facts. First, common psychiatric syndromes, including internalizing problems of anxiety and depression, as well as externalizing problems of hyperactivity and conduct problems, significantly co-occur (Angold et al., 1999). Second, individual differences in temperament traits, especially negative affectivity, positive affectivity, and effortful control, are associated with child psychopathology (De Pauw and Mervielde, 2010). However, little research has systematically and rigorously integrated these two core findings to understand whether all three main temperament factors operate as transdiagnostic risks, that broadly relate to psychopathology, and particular risks to specific syndromes, especially when considered in light of recent latent dimensional, structural models of psychopathology (e.g., p factor, Caspi et al., 2014). Specifically, which temperament factors relate broadly to the p factor, that represents a common latent liability to general psychopathology, and which temperament dimensions are linked more specifically to particular aspects of child psychopathology (internalizing or externalizing problems)? To address these questions, this study examined data from two independent samples of differently aged youth.

1.1. Latent dimensional structural models of psychopathology and symptom co-occurrence

Multiple studies provided evidence for latent dimensional structural models to organize psychopathology across different levels (for review, Hankin et al., 2016). Investigators have applied bifactor modeling and demonstrated that common psychopathology (e.g., mood, anxiety, conduct and aggression) could be best structured by a general psychopathology latent factor (the p factor) as well as unique

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internalizing and externalizing latent factors (Caspi et al., 2014; Laceulle et al., 2015; Lahey et al., 2012, 2014; Murray et al., 2016; Olino et al., 2014; Patalay et al., 2015; Snyder et al., 2016). The p factor captures, in a single latent variable, the co-occurrence that is common across all measured psychopathology symptoms. After statistically accounting for shared variance common across all psychopathology symptoms via the p factor, unique covariance that remains among these psychopathology symptoms is independently captured and organized by additional unique factors, specifically, latent internalizing and externalizing liability dimensions.

1.2. Temperament factors and child psychopathology

1.2.1. Effortful control

Effortful control (EC) involves the recruitment of attentional and behavioral processes to self-regulate and guide behavior toward a goal (Rothbart, 2007). Historically, poor EC has been examined more extensively as risk to externalizing problems, such as conduct problems, aggression, and hyperactivity. More recently, poor EC has been shown to associate more broadly beyond externalizing to most forms of psychopathology (Beauchaine and Thayer, 2015; Snyder et al., 2015a, 2015b), including depression, anxiety, bipolar disorder, schizophrenia, conduct, and ADHD. Such data are consistent with EC conferring a broad-based, transdiagnostic risk to child psychopathology, so we hypothesize that poor EC is associated with the p factor. At the same time, past work shows individual links between poor EC and specific internalizing (Vasey et al., 2013) and externalizing problems (Beauchaine and McNulty, 2013), so there may also be unique associations between low EC and the specific internalizing and externalizing latent dimensions after controlling for the p factor of general psychopathology.

1.2.2. Negative and positive affectivity

Negative affectivity (NA) refers to individual differences in the tendency to experience negative moods, including sadness, worry, and anger and characterizes how easily these are aroused (Rothbart, 2007). NA is linked to internalizing and externalizing symptoms (Kotov et al., 2010; Lahey, 2009; Nigg, 2006; Ormel et al., 2013). These findings suggest that NA may serve as a broad-based, transdiagnostic risk to child psychopathology, so we hypothesize that high NA is linked with the p factor. Still, given associations between NA and individual disorders characterized by internalizing and externalizing facets, there may be specific links between high NA and the particular internalizing and externalizing dimensions after controlling for the p factor.

The temperament dimension of positive affectivity (trait PA) can be defined as individual differences in the propensity to experience positive emotions. Low PA correlates with depression, social anxiety and some other anxiety disorders (Clark et al., 1994; Davis and Suveg, 2013; Kotov et al., 2010). Taken together, these findings suggest that low PA may relate to the p factor and especially correlate with the latent internalizing liability, whereas links with the externalizing liability dimension may be much weaker.

1.2.3. Temperament and comorbid child psychopathology

Extensive literature has examined EC, NA and PA, and associations with child psychopathology (Clark, 2005; De Pauw and Mervielde, 2010; Hankin et al., 2016; Muris and Ollendick, 2005; Nigg, 2006; Tackett, 2006). These reviews conclude that each temperament dimension by itself, as a main effect, is associated with various forms of child psychopathology. Moreover, each review calls for additional research to examine all three temperament dimensions together as they relate to, and seek to explain, the general co-occurrence of child psychopathology and unique symptom syndrome expressions. Considerably less research has investigated this issue of how all three temperament dimensions are associated with specificity and overlap in child psychopathology. All three dimensions are needed as indicators of individual differences in temperament traits to more fully characterize risk to child psychopathology, as past work shows that different psychopathologies can best be understood via a multivariate individual difference trait perspective (Clark, 2005; Trull and Sher, 1994). Specifically, the three temperament dimensions are intercorrelated, so examining one temperament dimension without the others could be misleading, as effects could be spurious due to intercorrelations among temperament traits.

Less is known about how all three temperament factors relate to a general dimension of psychopathology as well as specific aspects of psychopathology when child psychopathology is conceptualized as, and analyzed via, a bifactor model of psychopathology. Among adults, the p factor was associated with poor EC and trait NA (Caspi et al., 2014); PA was not investigated. After taking into account the p factor, trait NA's association with externalizing problems became non-significant, whereas the association between NA and internalizing problems remained significant. In children and adolescents (ages 9–17), NE was associated with the general psychopathology dimension (Tackett et al., 2013), although PA and EC were not examined. Last, in a community sample of preschoolers, Olino and colleagues (2014) found that parent reports of child temperament related to latent psychopathology dimensions. The general psychopathology factor was associated with EC negatively, and positively with surgency (a specific aspect of PA) and NA; internalizing specific factor was associated with lower surgency; and externalizing specific dimension was correlated with lower EC and higher surgency. Thus, in addition to serving as a broad transdiagnostic risk factor (i.e., predicting the p factor), temperament traits may also serve as risk for specific psychopathology dimensions.

1.3. The current study

We sought to advance knowledge on the links between temperament and child psychopathology, especially when modeled via a latent dimensional, bifactor structural organization of psychopathology. Past work has tended to study temperament-psychopathology relations without including all three temperament dimensions simultaneously and without explicit consideration of psychopathology co-occurrence. Relatively little past work has examined all three temperament dimensions in relation to multiple forms of psychopathology when structured via recent bifactor latent psychopathology models (cf., Olino et al., 2014). Further, no prior study has evaluated developmental differences in the magnitude and pattern of associations between temperament factors and the latent dimensions of psychopathology between preadolescent children and adolescents. We examined relationships between temperament factors and latent dimensional factors of psychopathology, based on the bifactor p factor model, in two independent samples of children and adolescents.

2. Study 1

2.1. Method

2.1.1. Participants

We used data from 571 youth-parent pairs. On average, child participants were 13.58 years old (SD =2.37, range =9.3–17.5). Youth and a parent from the general community were recruited at two sites, University of Denver (DU) and Rutgers University (RU), for the Gene, Environment, Mood (GEM) Study (see Hankin et al., 2015, for study and sample details). Youth were 55.5% female, and identified their ethnicity as 12% Latino and race as 70% Caucasian, 12% African American, 9% Asian/Pacific Islander, and 9% or other/multiracial. Median annual family income was $86,500; SES, determined via parents' education and specific occupations (Adams and Weakliem, 2011), was 48.86 (SD =11.35) and 18.3% of youth received free/reduced lunch. Caretakers who provided parent report were 85%