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## Perceived social stress and symptom severity among help-seeking adolescents with versus without clinical high-risk for psychosis

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### ABSTRACT

Research suggests that social stress *exposure* influences illness presentation and course among youth at clinical high-risk (CHR) for psychosis, though less is known about the extent to which *self-reported perceptions* of social stress relate to the severity of positive symptoms. Importantly, despite the notion that youth at CHR are especially susceptible to elevations in positive symptoms under conditions of stress, no study has examined this presumption relative to other psychiatric groups. Extending previous work demonstrating that perceived social stress was higher in a CHR group than in a clinical group of non-CHR, help-seeking controls, the current study aimed to: (1) examine whether perceived social stress is related to the severity of attenuated positive symptoms in the full sample ( $N = 110$ ); and (2) determine whether CHR status moderates the stress-symptom relation. Exploratory analyses examined relations of perceived social stress to negative, disorganized, and general symptoms. Greater perceptions of social stress were associated with more severe positive symptoms in the entire sample; however, although positive symptoms and perceived social stress were higher in the CHR group, the strength of this relation was statistically indistinguishable across groups. No differential effect of perceived social stress was observed for any symptom domain. Results provide some support for the diathesis-stress model of psychosis, while also suggesting that social stress and symptomatology are related independent of clinical vulnerability to psychosis. Future research would benefit from longitudinal studies of stress-symptom relations across CHR and help-seeking control groups.

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### 1. Introduction

The diathesis-stress model of psychosis suggests that neuro-maturational events interact with environmental stressors during adolescence to unmask a vulnerability to positive symptoms among those with a constitutional risk for the disorder (Walker and Diforio, 1997). In support of this model, evidence suggests that multiple forms of stress may be related to symptom severity among youth at clinical high-risk (CHR) for psychosis, including parental expressed emotion (O'Brien et al., 2006), perceived family criticism (Schlosser et al., 2010), daily hassles (Tessner et al., 2011), life events (Trotman et al., 2014), and trauma exposure (Kraan et al., 2015)<sup>1</sup>. In efforts to refine the understanding of

stress effects on behavior, social psychological research has sought to identify the conditions under which physiological and psychological stress responses are most marked. This literature indicates that stressors possessing social features (e.g., negative social evaluation, threats to self esteem) are especially powerful triggers of these stress responses (Dickerson and Kemeny, 2004). Given that social impairment is a prominent and enduring feature of the psychosis spectrum, researchers have suggested that persistent social stress (e.g., social rejection, tension in relationships) in particular may play an important role in the onset of psychosis (Jones and Fernyhough, 2007; Selten et al., 2013).

The impact of a stressor depends partly on constitutional characteristics of the individual exposed (Lazarus and Folkman, 1984). Interestingly, a small but growing number of studies indicates that although the frequency of exposure to various non-traumatic stressors (e.g., life events) may on average be no greater among youth at CHR relative to healthy controls, the degree of distress elicited by these exposures may be more severe in those at CHR (DeVlyder et al., 2013; Tessner et al., 2011; Trotman et al., 2014); this subjective, self-

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<sup>1</sup> Most researchers believe that stress plays a causal role in the onset of psychosis. See Miklowitz (2004) and van Os et al. (2008), however, for nuanced discussions of potentially reciprocal relations of the developing individual and stressors in their environment.

rated stress response in turn has been shown to predict progression from CHR to psychosis (Trotman et al., 2014). Only a few studies, however, have examined perceived social stress among those at CHR, and those that have tended to use questionnaires of only a few items (e.g., Palmier-Claus et al., 2012; Schlosser et al., 2010), leaving a gap in our understanding of this important relation of stress and psychosis.

A core evidentiary gap in support of the diathesis-stress model of psychosis is that nearly all studies using a control group have compared CHR individuals to healthy, non-clinical peers. Although these studies have been instrumental in demonstrating differential effects of stress on high-risk versus healthy adolescents, they are unable to address the question of whether those with CHR psychopathology are more vulnerable than those with non-CHR psychopathology to elevations in positive symptoms when stressed, a central component of the diathesis-stress model. As social stress influences many adolescent psychiatric disorders (see Harkness et al., 2015), knowledge of whether those with identified clinical psychosis-risk are differentially affected with respect to symptom expression would help characterize the distinctive nature of the CHR construct.

This study aimed to evaluate whether the association between perceived social stress and symptom severity is moderated by psychosis-risk status in a sample of adolescents at CHR and a mixed clinical group of help-seeking controls. Consistent with CHR rating conventions and previous analyses with this sample (Bentley et al., 2016; Millman et al., in press), we expected the CHR group to endorse more severe positive symptoms and more social stress than the help-seeking control group. Extending these findings, we hypothesized that: (1) elevated levels of perceived social stress would be associated with more severe attenuated positive symptoms in the full sample, and (2) consistent with a diathesis-stress model of psychosis (Walker et al., 2008), the magnitude of this stress-symptom relation would be greater for those at CHR of psychosis than for help-seeking controls. Given the range of symptoms associated with the CHR state, as an exploratory aim we examined whether perceived social stress would be differentially related to negative, disorganized, and general psychopathology symptoms across the CHR and help-seeking control groups.

## 2. Method

### 2.1. Overview

This study took place within the context of a longitudinal investigation conducted at the Strive for Wellness clinic at the University of Maryland, Baltimore County's Youth FIRST Lab, and the University of Maryland Medical Center. Strive for Wellness is a specialty team of clinicians, researchers, and trainees focused on identification and treatment of transition-aged individuals at CHR for psychosis. The clinic is embedded within the Maryland Early Intervention Program, a multi-institutional research, clinical, and training collaborative established to improve the lives of individuals in the early phases of psychosis. Institutional review boards at both universities approved the research protocol.

### 2.2. Participants

Transition-aged individuals ages 12–25 were recruited from community health care providers, clinics, hospitals, and schools within the city of Baltimore and the surrounding area. Some participants were referred due to concerns about early symptoms of psychosis, whereas others were referred for psychiatric concerns unrelated to psychosis. To be eligible for the study, participants must have been receiving mental health services and willing and able to provide informed consent. If participants were under 18 years of age, a parent or legal guardian was present and willing to provide consent, while the adolescent provided written assent. These inclusion criteria and referral patterns provided the study with a group of CHR participants and a psychiatric

control group consisting of help-seeking adolescents with a wide range of non-psychosis-related psychopathologies.

### 2.3. Measures

The Structured Interview for Psychosis-risk Syndromes (SIPS) was used to identify the presence of CHR syndromes and rate the severity of positive, negative, disorganized, and general symptoms (McGlashan et al., 2010). To be classified as at CHR, participants must meet at least one of the syndrome criteria described in Table 1. Notably, at least one positive symptom with a score of  $\geq 3$  on a 0–6 scale is necessary, although not sufficient, to meet CHR criteria; comorbidities, symptom pervasivity, and distress/impairment are all taken into account. Thus, nonzero positive symptom scores are common among symptomatic help-seeking youth not at CHR. SIPS training involved attending a two-day workshop led by the SIPS authors plus rating of several audiotaped SIPS interviews, observing and co-rating live SIPS interviews, conducting supervised SIPS interviews, and participating in weekly case discussions. Across 10 audio-recorded interviews selected for training, our group's ICC is 0.82 for positive symptoms and 0.84 for total symptoms; diagnostic agreement is perfect ( $\kappa = 1.0$ ).

The Kiddie Schedule for Affective Disorders and Schizophrenia (KSADS) was used to assess Diagnostic and Statistical Manual diagnoses (Kaufman et al., 1997). The KSADS is a semi-structured interview that is widely used in adolescent psychopathology research. Although typically used in youth < 18 years, the KSADS has been used with young adults up to age 25 (Tang et al., 2014; Weissman et al., 1987), and with young adults at CHR specifically (Cornblatt et al., 2015). Training involved didactic instruction, observation and co-rating of KSADS administration, and supervised KSADS administration until diagnostic agreement with trained raters was achieved.

The Behavioral Assessment System for Children, 2nd Edition (BASC-2) was used to measure perceived social stress (Reynolds and Kamphaus, 2004). The BASC-2 is a self-report questionnaire designed to measure a range of clinical constructs. Out of 176 BASC-2 items, the 10-item social stress scale includes two items answered in a true/false fashion and eight on a 4-point Likert scale. The scale measures feelings of stress and tension in social relationships. Example items include “people say bad things about me” and “other people find things wrong with me.” Scoring produced *T* scores with a mean of 50 and a standard deviation of 10; higher scores reflect more severe perceptions of social stress. Given that the measure was initially validated for ages 12–21,  $n = 3$  participants were treated as 21 years of age (2–6 months below their age) when producing *T*

**Table 1**  
Description and sample prevalence of CHR syndromes identified using the SIPS.

CHR syndrome	Criteria	<i>n</i>
• Attenuated positive symptoms syndrome	• Positive symptoms occur weekly and are recently emerging or worsening	37
• Brief intermittent psychosis syndrome	• Positive symptoms are present at psychotic intensity but are too brief to qualify for a psychotic syndrome	5
• Schizotypal personality disorder <sup>a</sup>	• DSM criteria are met for schizotypal personality disorder	3
• Genetic risk and deterioration syndrome	• Schizotypal personality disorder or a recent decline in functioning is present in addition to a family history of psychosis	7

Note. Some participants met for >1 CHR syndrome. Values in the table are therefore unequal the total CHR sample size. CHR = clinical high-risk, SIPS = Structured Interview for Psychosis-risk Syndromes, DSM = Diagnostic and Statistical Manual of Mental Disorders. Table adapted from Millman et al., in press.

<sup>a</sup> Schizotypal personality disorder alone does not fulfill formal SIPS diagnostic criteria. Given the high rates of transition to psychosis among adolescents with schizotypal personality disorder (Walker et al., 2010), however, participants with this syndrome were included in the CHR group regardless of whether they presented with a recent functional decline or family history of psychosis.

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