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## Differential relations of locus of control to perceived social stress among help-seeking adolescents at low vs. high clinical risk of psychosis

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### ABSTRACT

Research suggests that perceived social stress influences illness presentation and course among youth in the clinical high-risk (CHR) phase of psychosis. Little is known, however, about the social cognitive factors associated with social stress perception in this population, particularly relative to youth with non-CHR psychopathology. Individuals with psychosis tend to endorse an external locus of control (LOC), which is associated with the stress response in healthy individuals. LOC may therefore be related to perceived social stress in youth at CHR. We examined the differential relations of self-reported LOC and perceived social stress, as measured by the Behavior Assessment System for Children, Second Edition, across 45 CHR and 65 help-seeking control (HSC) participants. Youth at CHR reported more social stress ( $F[1, 107] = 6.28, p = 0.01$ ) and a more external LOC ( $F[1, 107] = 4.98, p = 0.03$ ) than HSCs. Further, external LOC was more strongly associated with feelings of social stress in the CHR group relative to the HSC group (interaction:  $b = 0.35, t[105] = 2.32, p < 0.05, f^2 = 0.05$ ). Group differences in social stress, however, were nonsignificant at internal levels of LOC ( $b = -2.0, t[105] = -0.72, p = 0.48; f^2 = 0.00$ ). Results suggest that perceptions of uncontrollability over one's social environment may more often induce or exacerbate feelings of stress and tension in CHR youth relative to HSCs. A better understanding of the social cognition-stress relation may improve understanding of CHR phenomenology, etiology, and treatment.

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### 1. Introduction

Neurodevelopmental models of psychosis posit that social stress plays a key role in vulnerability to psychotic illness. These models suggest that constitutional abnormalities impacting the hypothalamic-pituitary-adrenal (HPA) and dopamine systems interact with normative neuromaturational events during adolescence to contribute to the disorder (Walker et al., 2008). This process may be accelerated by elevated perceptions of social stress, which are closely tied to HPA activity (Corcoran et al., 2003; Holtzman et al., 2013). To examine the role of perceived social stress in the development of psychosis, attention has recently been directed toward putatively prodromal adolescents at “clinical high-risk” (CHR). Elevated perceptions of stress are especially common among youth at CHR and are associated with illness presentation, course, and treatment. For example, perceived stress is related to emotional reactivity (Palmier-Claus et al., 2012), conversion to psychosis (Trotman et al., 2014) and psychosocial treatment gains among

youth at CHR (O'Brien et al., 2015). Perceived social stress therefore may be an important component of the course and treatment of individuals at CHR.

Given that many promising interventions for CHR youth focus on emerging social cognitive deficits (e.g., CBT; French and Morrison, 2004), understanding the relation between social cognition and perceived social stress in this population may help treatment development. One factor capable of influencing perceived social stress may be an individual's locus of control (LOC). LOC identifies the degree to which individuals believe rewards and outcomes in life are brought about by their own actions (an internal LOC orientation) versus chance, fate, or some outside influence (an external LOC orientation; Rotter, 1966). LOC is related to the broader construct of attributional bias, or how individuals infer causes of particular events (Green et al., 2008). Perceptions of uncontrollability over one's social environment can invoke feelings of stress and tension (Pruessner and Baldwin, 2015), which in turn may exacerbate the emerging psychosis vulnerability among those at CHR. Consistent with this possibility, research with healthy populations has found that an external LOC is associated with greater levels of perceived stress (Khan et al., 2012), failure to habituate to repeated social stress,

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**Table 1**  
Demographic characteristics and descriptive statistics by CHR status.

Variable	CHR		Help-seeking control	
	Mean (SD)/percentage	Range	Mean (SD)/percentage	Range
N <sup>a</sup>	45		65	
Age (yrs)*	15.32 (2.34)	12.08–22.17	16.52 (3.06)	12.25–22.52
Female	67%		60%	
Annual Household Income (\$)				
<20,000	27%		29%	
20,000–39,999	29%		19%	
40,000–59,000	10%		15%	
60,000–79,999	7%		13%	
80,000–99,999	5%		7%	
≥ 100,000	22%		17%	
Ethnicity				
African American	48%		45%	
Caucasian	36%		34%	
American Indian/Alaskan Native	2%		2%	
Asian	0%		2%	
Multiracial or “other”	14%		17%	
Diagnosis (KSADS) <sup>b</sup>				
Mood disorder	67%		48%	
Anxiety disorder	58%		37%	
AD/HD	53%		46%	
Behavioral disorder	29%		19%	
PTSD	31%		25%	
Other diagnosis	2%		15%	
No diagnosis	0%		9%	
Positive symptoms**	12.53 (4.1)	4–23	4.94 (3.14)	0–12
Negative symptoms*	12.00 (5.94)	0–24	9.08 (5.62)	0–22
Locus of control*	59.96 (13.23)	37–86	54.19 (11.51)	36–83
Perceived social stress*	63.00 (15.28)	36–88	56.66 (11.79)	37–88
WASI	101.14 (20.81)	65–132	101.49 (19.68)	55–134

Note. Due to some cell sizes being <5 for Ethnicity, participants were categorized as African American, Caucasian, or other for group comparison. CHR = clinical high-risk; KSADS = Kiddie Schedule for Affective Disorders and Schizophrenia; AD/HD = Attention Deficit/Hyperactivity Disorder; PTSD = Posttraumatic Stress Disorder, WASI = Wechsler Abbreviated Scale of Intelligence.

<sup>a</sup>  $n = 1$  case was missing Ethnicity data for both groups;  $n = 4$  cases were missing Annual Household Income data for the CHR group, and  $n = 6$  cases were missing Annual Household Income data for the help-seeking control group. Percentages for these variables reflect the percent of cases with valid data.

<sup>b</sup> Comorbid diagnoses were common, therefore total percent diagnosis exceeds 100%.

\*  $p < 0.05$ .

\*\*  $p < 0.001$ .

and disrupted structure and function of the neurohormonal stress response (Pruessner and Baldwin, 2015; Pruessner et al., 2005).

Although to our knowledge no studies have examined the relation between LOC and perceived social stress in the psychosis spectrum, an external LOC among people with schizophrenia is common and associated with unfavorable clinical features and outcomes (Bentall et al., 2001; Bentall and Kaney, 2005; Harrow et al., 2009). Scholars have also posited that interpreting thoughts as uncontrollable and external to the self is an important mechanism in the shift from the premorbid state to psychosis (Morrison, 2001). Nonetheless, despite the conceptual relevance of this possibility, studies examining LOC among those at CHR are few. The available literature generally suggests that youth at CHR possess an external control bias relative to healthy controls, and that these biases are associated with worse symptoms (Thompson et al., 2013), a lower quality of life (Schmidt et al., 2014), and less frequent use of adaptive coping strategies (Ruhmann et al., 2008; although for an exception see DeVlyder et al., 2013). When considered alongside findings that an external LOC is associated with increases in perceived stress and disruptions to the neurohormonal stress response among healthy participants (Pruessner and Baldwin, 2015; Pruessner et al., 2005), these cognitive biases and their associations with functioning among youth at CHR suggest that LOC may be a viable avenue for understanding individual differences in perceived social stress in this population.

This study aimed to examine associations between LOC and perceived social stress among adolescents at CHR in relation to a mixed clinical group of help-seeking control (HSC) participants. Although a large body of literature has demonstrated that adolescents at CHR

experience disruptions in cognitive and stress-related domains relative to healthy peers, few studies have examined these domains in relation to same-aged individuals with non-CHR psychopathology. Such studies are clinically and etiologically informative as they allow researchers to identify unique features of the psychosis vulnerability and may inform treatment strategies aiming to modify these characteristics. We hypothesized that (1) participants at CHR would report a more external LOC and (2) more social stress than non-CHR HSC participants, and that (3) external LOC would be associated with elevated reports of perceived social stress in both groups. Given that youth at CHR are thought to be especially vulnerable to potentially stressful stimuli, we hypothesized that (4) the LOC-stress relation would be stronger in the CHR group.

## 2. Method

This study was conducted through the Strive for Wellness (SFW) clinic, an early identification, research, and treatment clinic focusing on individuals at CHR. The SFW clinic is located within the University of Maryland, Baltimore County's Youth FIRST Program, and the University of Maryland Medical Center (the site where institutional review board approval was obtained).

### 2.1. Participants

Youth ages 12–25 were recruited from hospital clinics, schools, family-oriented behavioral health conferences, and community practitioners. Some were referred due to concerns of early psychosis or psychosis risk, and others were referred for assessment of

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