

This is an Accepted Manuscript of an article published by Taylor & Francis in Journal of College Student Psychotherapy on 04 Sep 2020, available online: <http://www.tandfonline.com/10.1080/87568225.2020.1797604>. Access to this work was provided by the University of Maryland, Baltimore County (UMBC) ScholarWorks@UMBC digital repository on the Maryland Shared Open Access (MD-SOAR) platform.

Please provide feedback

Please support the ScholarWorks@UMBC repository by emailing [scholarworks-group@umbc.edu](mailto:scholarworks-group@umbc.edu) and telling us what having access to this work means to you and why it's important to you. Thank you.

**Psychosis-Spectrum Screening and Assessment Within a College Counseling Center:  
A Pilot Study Exploring Feasibility and Clinical Need**

Elizabeth C. Thompson<sup>a</sup>

Nicole D. Andorko<sup>a</sup>

Pamela Rakhshan Rouhakhtar<sup>a</sup>

Zachary B. Millman<sup>a</sup>

Kristin Sagun<sup>b</sup>

Susan C. Han<sup>b</sup>

Doha Chibani<sup>a</sup>

Gloria M. Reeves<sup>c</sup>

Bruce Herman<sup>b</sup>

Jason Schiffman<sup>a</sup>

<sup>a</sup> Department of Psychology, University of Maryland, Baltimore County, Catonsville, MD, 21250

<sup>b</sup> Counseling Center, University of Maryland, Baltimore County, Catonsville, MD, 21250

<sup>c</sup> Child and Adolescent Psychiatry, University of Maryland Medical Center, Baltimore, MD, 21201

Corresponding author: Elizabeth Thompson; [Elizabeth.Thompson@brown.edu](mailto:Elizabeth.Thompson@brown.edu)

**Acknowledgements:** This work was supported by the Maryland Department of Health and Mental Hygiene, Behavioral Health Administration through the Maryland Center of Excellence on Early Intervention Program (MEIP) (OPASS# 14-13717G/M00B4400241to J.S.)

*Footnote:* Dr. Thompson's current affiliations: Department of Psychiatry and Human Behavior, Warren Alpert Medical School of Brown University, Providence, RI, 02912 and Rhode Island Hospital, Child and Adolescent Psychiatry, Providence, RI, 02903.

Dr. Han's current affiliation: Johns Hopkins University Counseling Center, Baltimore, MD, 21218

### **Abstract**

Evidence supports the use of brief psychosis-spectrum screening tools for identifying individuals at an increased risk of developing a psychotic disorder. Screening has not been well studied in general mental health settings that serve young adults in the age range associated with highest risk for psychosis. This study explored the feasibility of psychosis-risk screening and assessment among help-seeking students at a university counseling center. The PRIME Screen-Revised was administered to students at clinic intake. Participants who screened positively were offered a follow-up assessment using the Structured Interview for Psychosis-risk Syndromes (SIPS). At intake, 510 students completed the PRIME Screen-Revised, with 132 (25.9%) screening positive.

Comprehensive psychosis-spectrum evaluations were completed with 38 participants, and 22 met criteria for a psychosis-spectrum disorder, representing 57.9% of this subsample. Findings suggest that psychosis-risk screening in a college clinic is a promising approach to identifying those at high risk for or in the early stages of psychosis.

**Psychosis-Spectrum Screening and Assessment Within a College Counseling Center:  
A Pilot Study Exploring Feasibility and Clinical Need**

Psychosis is defined by persistent positive symptoms, including hallucinations, delusions, disorganized thoughts and speech, and disorganized or catatonic behavior (American Psychiatric Association [APA], 2013). It is frequently accompanied by comorbid difficulties such as depression, anxiety, post-traumatic stress disorder, and substance use (Buckley et al., 2009). The onset of these symptoms can cause a great deal of distress and confusion, oftentimes disrupting one's ability to maintain productive relationships and fulfill instrumental life roles (Andrade et al., 2016; Griffiths et al., 2019; Häfner et al., 1995; Marwaha & Johnson, 2004). Given that psychosis typically emerges when young people are establishing their identities, major life goals, and independence, the development and persistence of psychosis can be particularly debilitating and devastating to one's sense of self and future. Not surprisingly, given high levels of distress and functional interference, emerging psychosis is associated with particularly elevated risk for suicide, especially prior to and in the early stages of treatment (Nordentoft et al., 2015; Taylor et al., 2015). Efforts to intervene in the course of developing psychosis during the crucial life phase of emerging adulthood has the potential to mitigate disruption and minimize negative sequelae of illness, including suicide. Identifying early psychosis in mental health settings serving the high-risk young adult population, such as college counseling centers, may help facilitate early recognition of symptoms and appropriate treatment (Csillag et al., 2016).

**Psychosis Risk States**

The period of time prior to the potential onset of psychosis is sometimes known as the clinical high risk (CHR) phase, which is defined by the presence of subthreshold or attenuated psychotic symptoms that are typically less severe, more fleeting, and less impairing than full-

threshold psychotic symptoms. For example, psychotic-intensity hallucinations are defined as fully formed experiences perceived in the absence of external stimuli (e.g., frequently hearing distinct voices conversing in full sentences), whereas subthreshold hallucinations may be less formed, intermittent, and less distressing (e.g., hearing occasional murmuring that is difficult to discern). In addition to differences in frequency, duration, and intensity of symptoms, individuals experiencing attenuated symptoms retain insight into their experiences.

People at CHR often experience clinically significant comorbid concerns (e.g., mood, anxiety, and attention problems; Addington et al., 2017; Myer et al., 2005; Thompson et al., 2015) and impairments in social and role functioning (Corcoran et al., 2011; Fusar-Poli et al., 2015a; Grano et al., 2011; Niendam et al., 2009). This comorbidity presents a strong rationale for identifying individuals at CHR in order to facilitate appropriate services, whether specific to psychosis or not (Schiffman & Carpenter, 2015). In order to bring attention to and enhance understanding of psychosis-risk symptomatology and course of illness, the Diagnostic and Statistical Manual of Mental Disorders, 5<sup>th</sup> edition (DSM-5) has included Attenuated Psychosis Syndrome (APS) under the Schizophrenia Spectrum chapter as an “Other Specified” disorder and within the conditions for further study section (APA, 2013).

### **Importance of Early Intervention for Psychosis**

Longer duration of untreated psychosis (DUP), the period of time between the onset of full-threshold psychotic symptoms and treatment, may be linked to more long-term distress and impairments in cognition, social functioning, and role fulfillment (Drake et al., 2000; Harrigan et al., 2003; Marshall et al., 2005; Penttila et al., 2014). Evidence shows that comprehensive psychosocial treatment initiated at the first episode of psychosis can alleviate symptoms; improve functioning; and reduce treatment disengagement, suicide rates, hospitalization time,

and readmission rates (Chen et al., 2011; Penn et al., 2005). Even earlier intervention, during the CHR phase prior to the onset of full-threshold psychotic symptoms, may be influential and possibly reduce or prevent DUP (Malla et al., 2018; Oliver et al., 2018).

### **Barriers to Symptom Recognition and Appropriate Treatment**

Many individuals who eventually develop psychosis seek help for mental health concerns prior to the development of psychotic symptoms (Falkenberg et al., 2015; Fridgen et al., 2013; Rietdijk et al., 2011), presenting an opportunity for mental health clinicians to identify psychosis-risk symptoms early on, monitor these symptoms over time, and initiate services specific to psychosis when indicated. Some literature suggests, however, that individuals at risk of developing psychosis who are already engaged in mental health services may not receive the care they need when psychotic symptoms develop (Rietdijk et al., 2011). It is possible that individuals seeking services for other mental concerns are receiving treatment narrowly focused on the presenting problem, and/or providers are not asking about psychosis-related experiences throughout the course of treatment. If providers do not have the knowledge or tools to effectively screen for symptoms, they may not probe psychosis symptoms well enough, in an emotionally-sensitive manner, or after building rapport with clients, when clients may feel more comfortable and/or trusting to disclose.

### **Psychosis-Risk Identification**

CHR status is often identified using the Structured Interview for Psychosis-Risk Syndromes (SIPS; Miller et al., 2003), a semi-structured clinical interview. Meta-analytic data indicates that approximately 26% of people who meet SIPS criteria for psychosis-risk syndromes convert to psychosis within three years (Fusar-Poli et al., 2015b). Given the time and expertise the SIPS requires, however, it is not a feasible approach to assess for psychosis-risk symptoms in

a general mental health setting (Kline & Schiffman, 2014). An efficient method of “first-line”, routine, self-report screening in general mental health settings, especially among help-seeking young adults, may be the best option to cast a wider net of screening within a relevant population, while balancing the demands of a clinic setting that serves a population of clients with diverse needs (Boydell et al., 2006).

Numerous checklist-style psychosis-risk inventories have been developed to facilitate more widespread screening, with many validated against comprehensive psychosis-risk interviews. The PRIME Screen-Revised (hereafter referred to as the PRIME; Miller et al., 2004) was designed by SIPS’ creators and includes 12 items modeled after the SIPS positive symptom probes. Due to its brief format and simplicity of scoring, the PRIME is an appealing tool to efficiently screen for potential psychosis-spectrum experiences in busy, general mental health settings.

### **Psychosis-Risk Screening Among University Students**

Given that the majority of individuals with psychosis start experiencing positive symptoms two to three years prior to the development of full-threshold psychosis, late adolescence to early adulthood is likely the optimal time frame for identifying early predictors of future illness (Amminger et al., 2006; Cornblatt et al., 2009; Gomes et al., 2016; Thompson et al., 2004). One of the best ways to sample individuals in this age range is to use university samples, as nearly half of the individuals aged 18-24 in the U.S. attend college (Snyder & Dillow, 2012). To our knowledge, only four studies have used screening tools in conjunction with follow-up psychosis-risk interviews, all of which were conducted among a general college population (i.e., not a help-seeking sample). Two of the four studies assessed schizotypy features, which are related to, but different than, psychosis-risk symptoms. Results indicate that

these questionnaires may be useful for identifying schizotypal personality disorder (i.e., long-standing and rigid patterns of thinking and behaving, characterized by delusional, highly-valued, paranoid and/or magical beliefs and often accompanied by restricted affect, social anxiety and/or isolation, and peculiar speech and mannerisms). Using these schizotypy tools in a general sample is not very promising for identifying those at high risk for future psychosis (Barrantes-Vidal et al., 2013; Cicero et al., 2014). Further, given low base-rates of psychosis-spectrum disorders, a general college population may not be a fruitful method for identifying individuals who truly meet risk criteria and would therefore benefit from specialized services (Chen et al., 2014; Shi et al., 2016).

### **Goals of the Current Study**

The current study sought to explore the prevalence of psychosis-risk symptoms among help-seeking university students, and to investigate the feasibility of psychosis-risk screening and assessment within a campus counseling center. A large proportion of risk-age individuals attend college, making the university setting an ideal place to screen for emerging psychosis-risk symptoms. Employing efficient screening tools with help-seeking university students may help more high-risk students access early specialty intervention services, which could ultimately minimize periods of untreated illness and maximize recovery.

The PRIME was administered to help-seeking students presenting for intake at the counseling center. Those who screened positive and agreed to the follow-up study then completed a SIPS evaluation to determine whether they met criteria for a high-risk or full-threshold psychosis syndrome. The specific aims of the current study were to 1) explore the occurrence of psychosis-risk symptoms and syndromes among help-seeking students, 2) evaluate the feasibility of psychosis-risk screening and assessment in the counseling center setting, and 3)



describe the clinical characteristics of the individuals meeting clinical high risk or early psychosis criteria.

## **Method**

### **Participants**

The current study was conducted within a college counseling center at a midsize, mid-Atlantic public university. All university students over the age of 18 presenting for intake at the counseling center between 2/01/16 and 4/14/17 ( $N = 998$ ) were given the opportunity to participate in the current study at the time of intake.

### **Procedure**

Immediately after completing all standard intake forms and questionnaires, students were offered the option to consent to part one of the study by completing the PRIME psychosis-risk screen. With consent, all participants agreed to allow their intake screening data to be de-identified by center staff and made available to the research team. Participants answered intake and screening questions electronically via Titanium software, an electronic mental health record, already in use at the center. These questions were administered prior to their first, 50-minute intake appointment at the center. Additionally, individuals who did not voluntarily complete the PRIME, but endorsed potential psychosis-risk symptoms at intake, were asked by their intake therapist (clinical, counseling center staff) to complete the PRIME for clinical purposes (i.e., to determine if further evaluation was indicated).

Individuals who screened positive on the PRIME were offered, by clinical staff, the opportunity to participate in part two of the study. Their study appointment, typically lasting 2-3 hours in total, would be scheduled to occur at a future date with research staff, separately from typical services, within the counseling center for ease of participation. Part two of the study

entailed a process of in-person consent with research staff, before completing a follow-up mental health evaluation. Participants were able to complete the assessment without participating in the research study, but notably, all potential participants provided research consent. Screening and clinical data obtained at intake was shared with the research team, as explained in the consent process. Participants completed two consecutive clinical interviews, a comprehensive diagnostic interview (Structured Clinical Interview for DSM-5 Disorders, Research Version or SCID-5-RV), and a specialized psychosis-risk interview (SIPS). Research staff (i.e., graduate-level psychology students supervised by a licensed psychologist) administered the evaluation interviews. Research staff also rated participants' functioning using a set of independent functioning scales, the Global Functioning Social and Role Scales (Cornblatt et al., 2007), which were completed in addition to the global functioning scale included within the SCID-5-RV. The licensed psychologist provided supervision and consultation for every assessment completed within the study.

Upon completion of the interviews, the research evaluators met with the supervising psychologist to discuss clinical conceptualization and recommendations for treatment and/or referral. The evaluation team then provided feedback and written reports to counseling center clinicians who communicated the team's recommendations to participants and their therapists. Referral to a local psychosis specialty clinic was available for clients determined to be at risk for psychosis or who met criteria for full-threshold psychosis according to the SIPS.

## **Measures**

The current study included two measures completed by all participants: 1) the Standardized Data Set background information form, and 2) the PRIME. Participants in part two of the study completed two structured interviews, the SCID-5-RV (available for review upon

request) and the SIPS, along with evaluations of functioning (via the Global Functioning Social and Role Scales).

***The Center for Collegiate Mental Health Standardized Data Set (SDS)***

As part of the counseling center's standard intake battery, all students seeking services are asked to complete the SDS (Locke et al., 2012) to provide background and demographic information such as age, sex, gender identity, race/ethnicity, year in college, and grade point average. These data were used to describe the study sample.

***The PRIME Screen-Revised (PRIME)***

The PRIME (Miller et al., 2004) is a 12-item psychosis-risk screen that asks respondents how much they agree that they have experienced psychosis-risk symptoms. Ratings are based on a 7-point Likert scale ranging from "0" (definitely disagree) to "6" (definitely agree). The PRIME was constructed by SIPS creators and designed to map onto four out of the five positive symptoms assessed by the SIPS. The PRIME was chosen for this study due to its appealing characteristics: 1) it was developed by SIPS creators; 2) it maps on to SIPS risk symptoms directly; 3) it has several questions that assess bizarre and delusional thoughts, a symptom domain that has been identified as a particularly strong predictor of future psychosis (Addington et al., 2015); 4) it is short (12 questions), requiring only a few minutes to complete; and 5) it can be scored upon visual inspection, making it easy for clinicians to identify those who screen positive. For the current protocol, participants were asked to rate symptom-specific distress in addition to symptom presence, however, distress ratings were not included in this study (i.e., only the original scale ratings were scored and considered here, as these items have been validated for screening purposes).

The ability of the original PRIME to identify individuals at risk has been explored in multiple studies, with sensitivity rates ranging from 0.80-1.00, specificity rates ranging from 0.48-1.00, and positive predictive values ranging from 0.46-0.52 (Kline et al., 2014). The PRIME has been found to have acceptable rates of overall accuracy (~70%; Kline et al., 2012; Thompson et al., 2013) within a specialized psychosis-risk clinic setting.

### ***Structured Interview for Psychosis-risk Syndromes (SIPS)***

The SIPS (Miller et al., 2003) is the gold-standard, clinician-administered, semi-structured interview designed to assess CHR status. The interview includes four scales that assess positive, negative, disorganized and generalized symptoms that have been found to be associated with the development of psychosis.

To determine whether an individual meets criteria for a psychosis-spectrum syndrome, only the positive symptoms are considered. Positive symptoms are rated on a scale from “0” (absent) to “6” (severe and psychotic), with ratings of “3”, “4”, or “5” indicating the presence of risk symptoms. The positive symptoms of the SIPS include: 1) unusual thought content/delusional ideas, 2) suspiciousness/persecutory ideas, 3) grandiosity, 4) perceptual abnormalities/hallucinations, and 5) disorganized communication. Individuals are placed into one of three groups: 1) low-risk, 2) high-risk, or 3) full-threshold psychosis, based on their endorsement of these positive symptoms.

Research staff completed rigorous training from a certified SIPS trainer and were considered reliable once they achieved symptom-level reliability greater than 0.80. Ongoing reliability training within the research team has yielded high rates of reliability ( $ICC = 0.82$ ) and perfect diagnostic consensus ( $kappa = 1.00$ ).

***Structured Clinical Interview for DSM-5 Disorders, Research Version (SCID-5-RV)***

The SCID-5-RV (First et al., 2015) is a semi-structured interview used to evaluate the diagnostic criteria for common mental health disorders among adults. The SCID has been widely validated and used across research and clinical settings to systematically evaluate DSM criteria, and the latest version, SCID-5-RV is developed to align with DSM-5 diagnostic criteria. The SCID-5-RV also includes a measure of global functioning, the Social and Occupational Functioning Assessment Scale (SOFAS). Clinicians use information gathered throughout the interview to assign a summary SOFAS score based on general anchors, ranging from “0” (most severely impaired) to “100” (high functioning across all domains).

***Global Functioning- Role and Social Scales (GF-R and GF-S)***

The clinician-rated GF scales (Cornblatt et al., 2007) capture functioning across two domains: role fulfillment and social engagement. The measure was designed for individuals in the age range of highest risk for psychosis (i.e., ages 12-29) and includes detailed rating anchors based on developmentally-appropriate activities and difficulties that may emerge in early stages of psychosis. Each GF scale includes 10 categories of functioning (rated 1-10, with lower scores indicating more impairment), ranging from “extreme dysfunction/isolation” to “superior functioning”. The GF scales are rated using information gathered through clinical evaluation (e.g., SCID-5-RV and SIPS).

**Data Preparation**

PRIME items were rated on a 7-point Likert scale and were scored continuously (0–6 for each item) and dichotomously (i.e., endorsed or not endorsed). To score the PRIME dichotomously, a cut-point for symptom endorsement was established prior to analyses. In line with standards set forth by the PRIME developers, all symptoms endorsed at a level of “5”

(somewhat agree) or “6” (definitely agree) were considered positive endorsements. For items rated “0” (definitely disagree) through “4” (slightly agree), symptoms were considered absent or minimal. Therefore, PRIME scores were calculated in two ways, 1) by summing the symptom ratings (range: 0-72), and 2) by summing the number of symptom endorsements (possible range: 0-12). Individuals who endorsed two items scored “5” or one item scored “6” were considered positive for screening risk. All data were analyzed using SPSS Software, Version 22 (IBM Corporation, 2013).

## Results

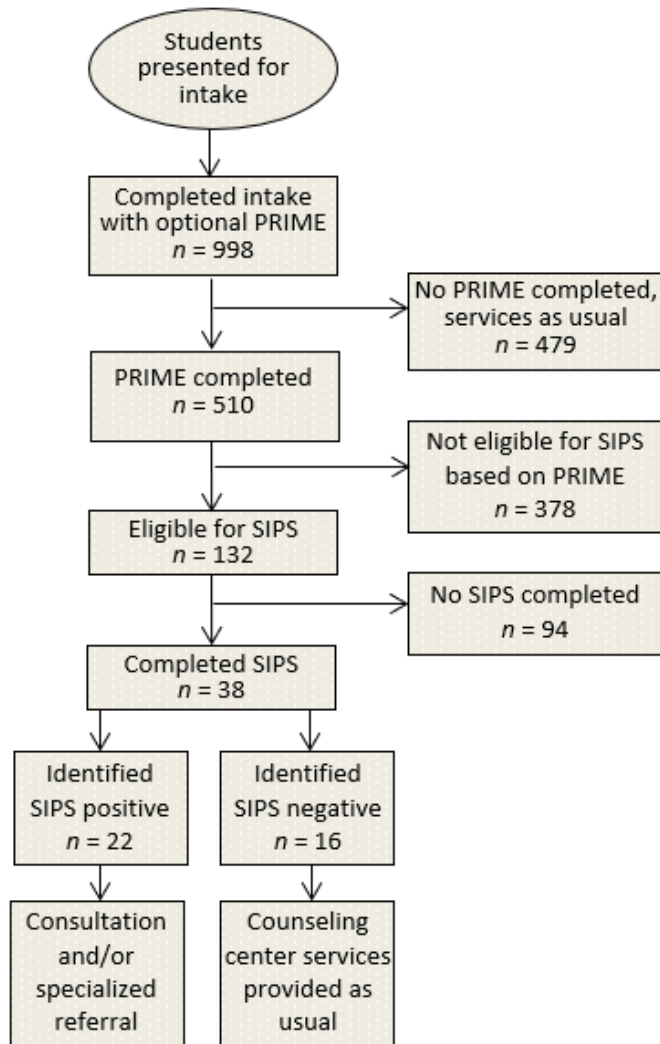
A total of 998 students presented to the counseling center during the study period and completed the standard intake battery. Of these students, 510 (51.1%) consented to part one of the study and completed the PRIME following intake (see Figure 1 for recruitment flowchart). Demographic information for the full sample of 510 students is presented in Table 1.

### **Aim 1. Explore the Prevalence of Psychosis-Spectrum Symptoms**

Descriptive statistics for the PRIME indicate that participants ( $n = 510$ ) endorsed a significant range of scores for symptom totals ( $m = 13.15$ ,  $SD = 13.49$ , range = 0-56) and number of endorsements (i.e., score of “5” or “6”;  $m = 0.97$ ,  $SD = 1.64$ ; median = 0; mode = 0; range = 0-9). A total of 208 individuals (40.8%) endorsed at least one symptom, 18.0% ( $n = 92$ ) endorsed one, 8.4% ( $n = 43$ ) endorsed two, 6.3% ( $n = 32$ ) endorsed three, 2.5% ( $n = 13$ ) endorsed four, 2.4% ( $n = 12$ ) endorsed five, 1.4% ( $n = 7$ ) endorsed six, 0.8% ( $n = 4$ ) endorsed seven, 0.8% ( $n = 4$ ) endorsed eight, and 0.2% ( $n = 1$ ) endorsed nine symptoms.

**Figure 1**

Flowchart for students presenting for intake and completing the psychosis-risk assessment



**Table 1**

Descriptive statistics across intake and evaluation samples

	Full Sample [n = 510]	SIPS Sample [n = 38]	SIPS - [n = 16]	SIPS + [n = 22]
<b>Continuous variables</b>				
	<i>Mean (SD)</i>			
Age	21.83 (3.87) [n = 470]	20.97 (3.10)	21.00 (3.79)	20.95 (2.57)
GPA	3.20 (0.61) [n = 372]	3.22 (0.62) [n = 37]	3.18 (0.62) [n = 15]	3.24 (0.62)
SCID SOFAS	---	63.24 (10.50)	69.31 (8.18)	58.82 (9.90)
Role Functioning	---	7.74 (1.13)	8.00 (0.89)	7.55 (1.26)
Social Functioning	---	6.58 (1.27)	7.19 (0.75)	6.14 (1.39)
<b>Categorical variables</b>				
	<i>Frequency (%)</i>			
<b>Gender</b>				
Female	279 (54.7%)	21 (55.3%)	11 (68.8%)	10 (45.5%)
Male	172 (33.7%)	13 (34.2%)	4 (25.0%)	9 (40.9%)
Other (non-binary, fluid, etc.)	30 (5.9%)	4 (10.5%)	1 (6.3%)	3 (13.6%)
Missing	29 (5.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
<b>Race</b>				
Caucasian/White	253 (49.6%)	14 (36.8%)	7 (43.8%)	7 (31.8%)
African American/Black	84 (16.5%)	8 (21.1%)	4 (25.0%)	4 (18.2%)
Asian American	75 (14.7%)	5 (13.2%)	2 (12.5%)	3 (13.6%)
Multiracial	33 (6.5%)	7 (18.4%)	2 (12.5%)	5 (22.7%)
Other	29 (5.7%)	2 (5.3%)	1 (6.3%)	1 (4.5%)
Missing	36 (7.1%)	2 (5.3%)	0 (0.0%)	2 (9.1%)
<b>College level</b>				
Freshman	100 (19.6%)	7 (18.4%)	3 (18.8%)	4 (18.2%)
Sophomore	97 (19.0%)	10 (26.3%)	2 (12.5%)	8 (36.4%)
Junior	130 (25.5%)	12 (31.6%)	6 (37.5%)	6 (27.3%)
Senior	107 (21.0%)	6 (15.8%)	2 (12.5%)	4 (18.2%)
Graduate Student	40 (7.8%)	2 (5.3%)	2 (12.5%)	0 (0.0%)
Missing	36 (7.1%)	1 (2.6%)	1 (6.3%)	0 (0.0%)
<b>SCID Diagnoses</b>				
Depression	---	23 (60.5%)	12 (75.0%)	11 (50%)
Anxiety	---	27 (71.1%)	9 (56.3%)	18 (81.8%)
ADHD	---	11 (28.9%)	5 (31.3%)	6 (27.3%)
PTSD	---	9 (23.7%)	6 (37.5%)	3 (13.6%)
Substance Use Disorder	---	4 (10.5%)	1 (6.3%)	3 (13.6%)
Bipolar Disorder	---	6 (15.8%)	1 (6.3%)	5 (22.7%)

*Note:* SCID - Structured Clinical Interview for DSM-5; SIPS - Structured Interview for Psychosis-Risk Syndromes; SOFAS - Social and Occupational Functioning Assessment Scale.



**Table 2**

Characteristics of PRIME item ratings in the full sample and across SIPS groups.

PRIME item	Full Sample ( <i>n</i> = 510)		SIPS-negative ( <i>n</i> = 16)		SIPS-positive ( <i>n</i> = 22)	
	Mean ( <i>SD</i> )	Endorsement frequency (%)	Mean ( <i>SD</i> )	Endorsement frequency (%)	Mean ( <i>SD</i> )	Endorsement frequency (%)
1. Odd or unusual things going on [ <i>n</i> = 506]	2.03 (2.17)	85 (16.7%)	4.00 (2.33)	8 (50.0%)	4.86 (0.99)	15 (68.2%)
2. Able to predict the future [ <i>n</i> = 509]	0.91 (1.66)	26 (5.1%)	1.56 (2.16)	1 (6.3%)	2.23 (2.16)	5 (22.7%)
3. Something interrupting or controlling me [ <i>n</i> = 508]	1.32 (1.98)	50 (9.8%)	2.06 (2.21)	1 (6.3%)	2.64 (2.15)	3 (13.6%)
4. Superstitious [ <i>n</i> = 508]	1.31 (1.98)	53 (10.4%)	2.56 (2.42)	5 (31.3%)	2.77 (2.22)	5 (22.7%)
5. Confusing real vs. imagination/dreams [ <i>n</i> = 509]	1.45 (2.08)	63 (12.4%)	3.19 (1.94)	4 (25.0%) <sup>†</sup>	3.73 (2.37)	12 (54.5%) <sup>†</sup>
6. Mind-reading [ <i>n</i> = 507]	0.61 (1.42)	19 (3.7%)	1.38 (1.89)	2 (12.5%)	2.55 (2.63)	7 (31.8%)
7. People planning to hurt me [ <i>n</i> = 508]	1.07 (1.81)	36 (7.1%)	2.50 (2.45)	5 (31.3%)	3.50 (2.15)	7 (31.8%)
8. Special or supernatural gifts [ <i>n</i> = 508]	0.52 (1.32)	10 (2.0%)	<b>0.63 (1.41)*</b>	0 (0.00%)	<b>1.73 (1.86)*</b>	1 (4.5%)
9. Mind is “playing tricks” on me [ <i>n</i> = 507]	1.29 (1.96)	50 (9.8%)	3.94 (1.95)	7 (43.8%)	3.55 (2.24)	9 (40.9%)
10. Hearing mumbling or talking [ <i>n</i> = 507]	0.81 (1.69)	33 (6.5%)	<b>2.19 (2.43)*</b>	4 (25.0%)	<b>3.86 (1.98)*</b>	11 (50.0%)
11. Thoughts being said out loud [ <i>n</i> = 508]	0.58 (1.44)	19 (3.7%)	1.31 (2.36)	4 (25.0%)	1.45 (2.28)	4 (18.2%)
12. Thoughts of “going crazy” [ <i>n</i> = 509]	1.39 (1.98)	53 (10.4%)	2.63 (2.55)	5 (31.3%)	3.32 (2.28)	10 (45.5%)
Total score [ <i>n</i> = 500]	13.15 (13.49)	---	<b>27.69 (8.12)*</b>	---	<b>36.18 (11.11)*</b>	---

*Note:* \* denotes significant difference in means (t-test) across SIPS-negative and SIPS-positive groups. Each symptom was rated from “0” (definitely disagree) to “6” (definitely agree). All endorsements are defined as items rated “5” (somewhat agree) or “6” (definitely agree). SIPS - Structured Interview for Psychosis-Risk Syndromes

Descriptive statistics for PRIME items within the intake sample ( $n = 510$ ; Table 2) indicate that in general, the mean symptom presence ratings for each item were low, at or below a rating of “2”. This indicates that most participants disagreed that the experiences occurred. Some symptoms seem to be relatively common in this help-seeking college population, as six of the twelve PRIME symptoms were endorsed by between 10-17% of participants: items 1, 3, 4, 5, 9, and 12 (see item descriptions, ratings, and rates of endorsement in Table 2).

### **Aim 2. Evaluate the Feasibility of Risk Screening and Assessment**

Of the 510 participants with complete PRIME data, 132 individuals (25.9%) met criteria for the assessment component of the study due to a positive PRIME screen (two “5” ratings or one “6” rating). A total of 38 of the individuals with positive screens (28.8%) completed the follow-up evaluation. It is unknown how many of the remaining 94 eligible individuals (i.e., those who met PRIME positive screen criteria) were offered the opportunity for evaluation by clinicians and declined participation in the interviews, as this information was not tracked throughout the study. Demographic information for the evaluation subsample ( $n = 38$ ) is presented in Table 1.

Within the SIPS evaluation sample ( $n = 38$ ), 16 participants (42.1%) were characterized as low-risk (SIPS-negative) and 22 (57.9%) were considered positive cases (SIPS-positive) based on clinical interview. Across the SIPS groups, there were no significant differences in age, GPA, gender, or racial identity status (i.e., dichotomized as white/students of color). See Table 1 for descriptive characteristics across SIPS groups.

Comparisons of individual PRIME item ratings across SIPS groups demonstrated that two item means were significantly elevated in the SIPS-positive group: 1) believing one has natural or supernatural gifts, and 2) hearing mumbling or talking sounds. There were no

significant differences in rates of item endorsements across groups in this sample, however, small rates of endorsement (e.g., cells with less than five participants) limited these analyses. There was an under-powered, trend-level pattern in the direction of a higher rate of endorsement among SIPS-positive individuals for one item: confusion related to what's real versus imagination or dreams (25.0% in the SIPS-negative group versus 54.5% in the SIPS-positive group). See Table 2 for PRIME item ratings and endorsements across SIPS groups.

### **Aim 3. Describe the Clinical Characteristics of the SIPS Subsample.**

Participants in the evaluation sample were asked why they came to the counseling center for services (some individuals gave more than one reason). The most common reasons included depression ( $n = 21$ ) and anxiety ( $n = 10$ ). Other reasons included suicidal ideation ( $n = 5$ ), academic difficulties ( $n = 5$ ), general stress or feeling overwhelmed ( $n = 4$ ), trauma ( $n = 3$ ), psychosis symptoms ( $n = 3$ ), attention problems ( $n = 2$ ), alcohol use (mandated treatment,  $n = 1$ ), non-suicidal self-injury ( $n = 1$ ), and treatment for pre-established diagnosis of dissociative identity disorder ( $n = 1$ ).

Among those who were SIPS-positive ( $n = 22$ ), 17 (77.3%) met criteria for a psychosis-risk syndrome and five (22.7%) met criteria for full-threshold psychosis (three participants had current psychosis, and two had psychotic symptoms in the past and current attenuated-level symptoms). Among the five individuals who met criteria for psychosis, two were diagnosed with bipolar disorder with psychotic features. Both individuals had a history of treatment for bipolar disorder, and they had experienced psychotic intensity symptoms during mood episodes in the past. At the time of evaluation, both individuals endorsed multiple current attenuated positive symptoms (at least four SIPS symptoms above the high-risk threshold, but below criteria for full psychosis), and thus, their psychotic symptoms were considered to be in partial remission (yet

still clinically significant). The remaining three individuals who met criteria for psychosis had current psychotic-intensity symptoms at the time of evaluation; one met criteria for schizophrenia, one met criteria for schizoaffective disorder, and one met criteria for an “other specified psychotic disorder” with significant symptoms, but no report of functional decline.

Of note, none of the three participants with current psychosis had a history of adequate treatment for psychosis. One student had not previously disclosed symptoms or been treated for psychosis despite longstanding occurrence and distress; they reportedly presented to the center due to academic difficulties. One student had not recognized their psychotic symptoms as problematic, and in fact, they had presented to the clinic for help resolving conflict between themselves and the voices they were hearing. The third participant with psychosis presented to the clinic for help with worsening psychotic symptoms and new ones emerging; they endorsed symptoms for several years but reportedly managed them on their own, with intermittent contact with mental health care, but no “intensive” services. Given the fact that none of the participants who met criteria for psychosis had pre-existing diagnoses and adequate mental health treatment for those symptoms, they were considered newly identified and clinically appropriate for the positive group used in the current study to explore the use of screening measures.

To test for differences in functioning across SIPS groups, independent samples t-tests were used to compare group means for the functioning ratings. Compared to the SIPS-negative group, the SIPS-positive group had significantly lower ratings of overall functioning on the SOFAS ( $t(36) = 3.46, p = .001$ ) and social functioning scale ( $t(36) = 2.74, p = .009$ ). There were, however, no significant differences in role functioning.

## **Discussion**

### **The Prevalence of Psychosis-Spectrum Symptoms**

Aim 1 of this study sought to explore the occurrence of psychosis risk symptoms as assessed by the PRIME among help-seeking students. This aim was achieved by describing the frequency of, and mean ratings associated with, PRIME-assessed symptoms. Among the large intake sample ( $n = 510$ ), the most commonly endorsed symptom was feeling as though odd or unusual things were going on (16.7% endorsed the symptom as present). The least common symptom was believing that one has special natural or supernatural gifts (2.0% endorsed). This study presents some preliminary data on the occurrence of specific psychosis-risk symptoms within this help-seeking college sample and highlights the need for further research to better understand what types of symptoms may be indicative of higher risk for psychosis.

### **Feasibility of Risk Screening in a College Mental Health Clinic**

Overall, the current study demonstrated that psychosis-risk screening within a university counseling center was acceptable, feasible, and useful. The PRIME was made available electronically (as an add-on questionnaire to the intake battery delivered via tablets) to all students presenting at the counseling center during the study period. On a volunteer basis, 51.1% of students (510 out of 998) presenting for intake at the clinic completed the PRIME at the end of the typical intake battery, suggesting that the additional measure was not too burdensome to complete by choice for many, even in the absence of incentive or pressure. Further, this specialized screening protocol identified a large proportion of students (25.9%; 132 out of 510 respondents) who were experiencing potential psychosis-risk symptoms, above a pre-established cutoff, who may have benefitted from further psychosis-oriented assessment. Given that we were only able to evaluate 38 individuals (28.8%) from this positive screen sample, our results are

likely an underestimate of the prevalence of psychosis-spectrum disorders in this help-seeking college sample. These results indicate that, in this setting, psychosis-risk screening and assessment procedures are not only warranted, but clinically important for a relatively large proportion of help-seeking students.

Although screening results and high rates of participation in the self-report screening phase demonstrated the potential need for and feasibility of risk screening within this setting, only approximately one-third of those who screened positive actually completed the diagnostic interview portion of the study. This fraction indicates that even with clinical indication for care, most clients declined the additional services. It is unknown what factors influenced the decision-making process among students and/or clinicians regarding the evaluation, and systematic investigation into such factors (e.g., clinical judgment, attitudes, stigma, perceived helpfulness, time constraints, and/or other perceived burdens) may elucidate barriers and pathways to psychosis-risk assessment. It is likely that qualitative exploration of clinician attitudes and referral procedures may inform future efforts to maintain protocol fidelity and balance clinic acceptability.

### **Help-Seeking Motivations and Symptom Visibility**

Although over half of the individuals who completed the evaluation met criteria for a psychosis-spectrum disorder (57.9%; 22 out of 38 participants), of note, only three individuals identified psychosis-related difficulties among their reasons for going to the counseling center for help. Our findings are consistent with prior research suggesting that among individuals at clinical high risk for psychosis, the most common reasons for help seeking are depression and anxiety (Falkenberg et al., 2015). Given that psychosis-spectrum disorders require some level of distress or impairment associated with symptoms in order to meet criteria, it is reasonable to

conclude that individuals with these disorders either minimized, or failed to mention or recognize difficulties related to psychosis (likely for a variety of reasons), and/or they had other, more salient or possibly less stigmatized, difficulties that were causing significant interference and/or distress that motivated their help-seeking behavior. Regardless, it is important to consider that many individuals meeting criteria for psychosis-spectrum disorders may not report these symptoms unless they are specifically and adequately probed. Although most individuals who meet criteria for psychosis-risk syndromes do not go on to develop full-threshold psychosis, and symptoms may resolve on their own without specialized intervention (Addington et al., 2011), many of these individuals have endorsed clinically significant difficulties and would likely benefit from support, intervention, and/or monitoring over time.

Given the high rates of comorbidities such as depression and anxiety among individuals with psychosis-risk syndromes, as well as links between these categories of symptoms and suicide risk, monitoring and treating subthreshold psychosis may be critical for suicide risk reduction. Furthermore, positive psychosis-spectrum symptoms, in general and as measured by the PRIME, have been linked to suicidal ideation and attempts above and beyond other diagnoses conferring risk (e.g., depression, anxiety, borderline personality disorder; Kelleher et al., 2017; Thompson et al., 2020). These studies suggest that monitoring PRIME-assessed symptoms may be of incremental value in the context of suicide risk monitoring. Psychosis-risk screening tools have also demonstrated potential for detecting increased suicidal ideation among non-clinical college samples (DeVylder et al., 2015). These findings may be particularly important for university settings, due to the heightened and growing risk for suicide among students (Mortier et al., 2018).

### **Functioning Across Low- and High-Risk Groups**

Results from analyses including measures of functioning demonstrated that SIPS-positive individuals had significantly greater functional impairment compared to the SIPS-negative group. These results indicate that even relative to other help-seeking peers, individuals at high-risk struggle to maintain functioning, particularly within the realm of social functioning (which is factored into both the SOFAS and GF-Social Scale). Therefore, findings suggest that people with psychosis-spectrum symptoms who seek services at the counseling center may have an increased need for support related to managing mental health symptoms and social skills. This is particularly relevant within the context of a college campus, where social pressures are particularly high and interpersonal relationships play a central role in identity formation.

### **Limitations and Future Directions**

Although a substantial proportion of students completed the PRIME (51.1% of intakes), it is possible that those who opted out of the study shared characteristics that distinguish them from individuals that did participate. For example, students who are under a great deal of distress, have difficulties focusing, have low frustration tolerance, are suspicious of research, are suspicious and/or guarded in general, or are impatient due to distractions or other stressors, may have opted out of research participation.

Another limiting aspect of the study is that individuals who screened positive on the PRIME had the option to decline the SIPS interview despite recommendation from their clinician to complete the evaluation (it is unknown how frequently this occurred within this sample). It is possible that those who chose not to complete the SIPS were systematically distinct from the sample that agreed to the SIPS on variables that were not measured as part of the initial intake battery. Factors such as stigma, fear, and lack of insight, all of which are common among



individuals with emerging psychosis, may have impacted an individual's choice to participate. Furthermore, the additional burden of scheduling a separate research appointment, estimated to last two hours, may have deterred students, particularly those with concerns related to stress and time management.

It is also possible that system-level factors may have limited participation. Clinician burden related to high clinical demand in the initial 50-minute intake session and pressures of busy back-to-back appointment schedules may have been a barrier to implementation. The additional responsibilities specific to the research protocol, including administering and/or reviewing the PRIME, explaining the study, and scheduling a research appointment, may have led clinicians to delay the process until a follow-up appointment, which in some cases may never have occurred.

University counseling centers are dealing with increasingly high demand for services, as well as increasing acuity among students, making the feasibility of thorough risk assessment a central concern in this setting. Future studies exploring implementation-level factors are needed to assess and reduce clinician burden, maximize the value added by new systems, as perceived by different stakeholders, and seamlessly integrate these new systems into existing service models and clinic systems. Additionally, building connections with specialized psychosis clinics, to support assessment, consultation, and referral, is necessary to facilitate effective early intervention as needed.

Given the small size of the evaluation sample, we were under-powered to detect differences in the rate of specific clinical diagnoses across SIPS groups. Despite this limitation, it is notable that among the SIPS-positive group, comorbidity was common, indicating that those

with psychosis-risk symptoms are often struggling with clinically significant concerns across multiple diagnostic domains.

### **Conclusion**

Early intervention in the course of psychotic illness holds the promise of helping many people on an apparent trajectory towards illness. The benefits of intervention, however, are contingent upon identification. To date, most identification efforts have been borne from psychosis-risk specialty clinics, an optimal setting to stimulate the field, but inherently limited in terms of more inclusive identification. Screening efforts that reach beyond specialty clinics to include general mental health settings such as college counseling centers are required to bring the benefits of identification and prevention to scale.

The current study indicates that psychosis-risk screening within a college mental health clinic may be a clinically useful practice, especially given the suicide risk within this population, if clinics are able to navigate implementation barriers that impede feasibility. This study demonstrates a need for screening, as 25.9% of intakes screened positive on the PRIME. The finding that 57.9% of participants who completed the full evaluation were determined to be at high risk for or in the early stages of psychosis indicates that the PRIME identifies a relatively large proportion of students who are experiencing clinically significant interference and/or distress due to psychosis-spectrum symptoms. Psychosis-risk screening in a college mental health clinic is a promising approach to identifying those at high risk for psychosis, as well as those with more broadly-defined mental health distress (e.g., comorbidities and functional impairment). Results also suggest that assessing risk in a university counseling center offers the promise of early identification to a much larger population relative to specialty psychosis clinics.

### References

- Addington, J., Cornblatt, B.A., Cadenhead, K.S., Cannon, T.D., McGlashan, T.H., Perkins, D.O., Seidman, L.J., Tsuang, M.T., Walker, E.F., Woods, S.W., & Heinssen, R. (2011). At clinical high risk for psychosis: Outcome for nonconverters. *American Journal of Psychiatry*, 168(8), 800-805.
- Addington, J., Liu, L., Buchy, L., Cadenhead, K.S., Cannon, T.D., Cornblatt, B.A., Perkins, D.O., Seidman, L.J., Tsuang, M.T., Walker, E.F. & Woods, S.W. (2015). North American prodrome longitudinal study (NAPLS 2): The prodromal symptoms. *The Journal of Nervous and Mental Disease*, 203(5), 328-335.
- Addington, J., Piskulic, D., Liu, L., Lockwood, J., Cadenhead, K.S., Cannon, T.D., Cornblatt, B.A., McGlashan, T.H., Perkins, D.O., Seidman, L.J., & Tsuang, M. T. (2017). Comorbid diagnoses for youth at clinical high risk of psychosis. *Schizophrenia Research*, 190, 90-95.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Amminger, G.P., Leicester, S., Yung, A.R., Phillips, L.J., Berger, G.E., Francey, S.M., Yuen, H.P., & McGorry, P. D. (2006). Early onset of symptoms predicts conversion to non-affective psychosis in ultra-high risk individuals. *Schizophrenia Research*, 84(1), 67-76.
- Andrade, M.C.R., Slade, M., Bandeira, M., Evans-Lacko, S., Komaroff, J., Martin, D., de Jesus Mari, J., & Andreoli, S. B. (2016). Subjective distress in a representative sample of outpatients with psychotic disorders. *Journal of Affective Disorders*, 189, 220-223.
- Barrantes-Vidal, N., Gross, G. M., Sheinbaum, T., Mitjavila, M., Ballespí, S., & Kwapil, T. R. (2013). Positive and negative schizotypy are associated with prodromal and schizophrenia-spectrum symptoms. *Schizophrenia Research*, 145(1-3), 50-55.

- Boydell, K. M., Gladstone, B. M., & Volpe, T. (2006). Understanding help seeking delay in the prodrome to first episode psychosis: A secondary analysis of the perspectives of young people. *Psychiatric Rehabilitation Journal*, 30(1), 54.
- Buckley, P. F., Miller, B. J., Lehrer, D. S., & Castle, D. J. (2009). Psychiatric comorbidities and schizophrenia. *Schizophrenia Bulletin*, 35(2), 383-402.
- Chen, E.Y., Tang, J.Y., Hui, C.L., Chiu, C.P., Lam, M.M., Law, C.W., Yew, C.W., Wong, G.H., Chung, D.W., Tso, S., & Chan, K.P. (2011). Three-year outcome of phase-specific early intervention for first-episode psychosis: A cohort study in Hong Kong. *Early Intervention in Psychiatry*, 5(4), 315-323.
- Chen, F., Wang, L., Heeramun-Aubeeluck, A., Wang, J., Shi, J., Yuan, J., & Zhao, X. (2014). Identification and characterization of college students with attenuated psychosis syndrome in China. *Psychiatry Research*, 216(3), 346-350.
- Cicero, D. C., Martin, E. A., Becker, T. M., Docherty, A. R., & Kerns, J. G. (2014). Correspondence between psychometric and clinical high risk for psychosis in an undergraduate population. *Psychological Assessment*, 26(3), 901.
- Corcoran, C.M., Kimhy, D., Parrilla-Escobar, M.A., Cressman, V.L., Stanford, A.D., Thompson, J., David, S.B., Crumbley, A., Schobel, S., Moore, H., & Malaspina, D. (2011). The relationship of social function to depressive and negative symptoms in individuals at clinical high risk for psychosis. *Psychological Medicine*, 41(2), 251-261.
- Cornblatt, B.A., Auther, A.M., Niendam, T., Smith, C.W., Zinberg, J., Bearden, C.E., & Cannon, T. D. (2007). Preliminary findings for two new measures of social and role functioning in the prodromal phase of schizophrenia. *Schizophrenia Bulletin*, 33(3), 688-702.

- Csillag, C., Nordentoft, M., Mizuno, M., Jones, P.B., Killackey, E., Taylor, M., Chen, E., Kane, J., & McDaid, D. (2016). Early intervention services in psychosis: From evidence to wide implementation. *Early Intervention in Psychiatry*, 10(6), 540-546.
- DeVylder, J. E., Thompson, E., Reeves, G., & Schiffman, J. (2015). Psychotic experiences as indicators of suicidal ideation in a non-clinical college sample. *Psychiatry Research*, 226(2-3), 489-493.
- Drake, R. J., Haley, C. J., Akhtar, S., & Lewis, S. W. (2000). Causes and consequences of duration of untreated psychosis in schizophrenia. *The British Journal of Psychiatry: The Journal of Mental Science*, 177, 511-515.
- Falkenberg, I., Valmaggia, L., Byrnes, M., Frascarelli, M., Jones, C., Rocchetti, M., Straube, B., Badger, S., McGuire, P., & Fusar-Poli, P. (2015). Why are help-seeking subjects at ultra-high risk for psychosis help-seeking?. *Psychiatry Research*, 228(3), 808-815.
- First, M. B., Williams, J. B. W., Karg, R. S., & Spitzer, R. L. (2015). Structured clinical interview for DSM-5-Research version (SCID-5 for DSM-5, research version; SCID-5-RV). *Arlington, VA: American Psychiatric Association*, 1-94.
- Fridgen, G.J., Aston, J., Gschwandtner, U., Pflueger, M., Zimmermann, R., Studerus, E., Stieglitz, R.D., & Riecher-Rössler, A. (2013). Help-seeking and pathways to care in the early stages of psychosis. *Social Psychiatry and Psychiatric Epidemiology*, 48(7), 1033-1043.
- Fusar-Poli, P., Cappucciati, M., Rutigliano, G., Schultze-Lutter, F., Bonoldi, I., Borgwardt, S., Riecher-Rössler, A., Addington, J., Perkins, D., Woods, S.W., & McGlashan, T. H. (2015b). At risk or not at risk? A meta-analysis of the prognostic accuracy of psychometric interviews for psychosis prediction. *World Psychiatry*, 14(3), 322-332.

- Fusar-Poli, P., Rocchetti, M., Sardella, A., Avila, A., Brandizzi, M., Caverzasi, E., Politi, P., Ruhrmann, S., & McGuire, P. (2015a). Disorder, not just state of risk: Meta-analysis of functioning and quality of life in people at high risk of psychosis. *The British Journal of Psychiatry*, 207(3), 198-206.
- Gomes, F. V., Rincón-Cortés, M., & Grace, A. A. (2016). Adolescence as a period of vulnerability and intervention in schizophrenia: Insights from the MAM model. *Neuroscience & Biobehavioral Reviews*, 70, 260-270.
- Grano, N., Karjalainen, M., Suominen, K., & Roine, M. (2011). Poor functioning ability is associated with high risk of developing psychosis in adolescents. *Nordic Journal of Psychiatry*, 65(1), 16-21.
- Griffiths, R., Mansell, W., Edge, D., & Tai, S. (2019). Sources of distress in first-episode psychosis: A systematic review and qualitative metasynthesis. *Qualitative Health Research*, 29(1), 107-123.
- Häfner, H., Nowotny, B., Löffler, W., an der Heiden, W., & Maurer, K. (1995). When and how does schizophrenia produce social deficits? *European Archives of Psychiatry and Clinical Neuroscience*, 246(1), 17-28.
- Harrigan, S. M., McGorry, P. D., & Krstev, H. (2003). Does treatment delay in first-episode psychosis really matter? *Psychological Medicine*, 33(1), 97-110.
- IBM Corporation (2013). *IBM SPSS Statistics for Windows, Version 22.0*. Armonk, NY: IBM Corporation.
- Kelleher, I., Ramsay, H., & DeVylder, J. (2017). Psychotic experiences and suicide attempt risk in common mental disorders and borderline personality disorder. *Acta Psychiatrica Scandinavica*, 135(3), 212-218.

- Kessler, R. C., Amminger, G. P., Aguilar-Gaxiola, S., Alonso, J., Lee, S., & Ustun, T. B. (2007). Age of onset of mental disorders: A review of recent literature. *Current Opinion in Psychiatry, 20*(4), 359.
- Kline, E., & Schiffman, J. (2014). Psychosis risk screening: A systematic review. *Schizophrenia Research, 158*(1), 11-18.
- Kline, E., Thompson, E., Bussell, K., Pitts, S. C., Reeves, G., & Schiffman, J. (2014). Psychosis-like experiences and distress among adolescents using mental health services. *Schizophrenia Research, 152*(2), 498-502.
- Kline, E., Wilson, C., Ereshefsky, S., Denenny, D., Thompson, E., Pitts, S.C., Bussell, K., Reeves, G., & Schiffman, J. (2012). Psychosis risk screening in youth: A validation study of three self-report measures of attenuated psychosis symptoms. *Schizophrenia Research, 141*(1), 72-77.
- Kwapil, T. R., Barrantes-Vidal, N., & Silvia, P. J. (2008). The dimensional structure of the Wisconsin schizotypy scales: Factor identification and construct validity. *Schizophrenia Bulletin, 34*(3), 444-457.
- Locke, B. D., Bieschke, K. J., Castonguay, L. G., & Hayes, J. A. (2012). The center for collegiate mental health: Studying college student mental health through an innovative research infrastructure that brings science and practice together. *Harvard Review of Psychiatry, 20*(4), 233-245.
- Loewy, R. L., Johnson, J. K., & Cannon, T. D. (2007). Self-report of attenuated psychotic experiences in a college population. *Schizophrenia Research, 93*(1-3), 144-151.

- Malla, A., de Bonneville, M., Shah, J., Jordan, G., Pruessner, M., Faridi, K., Rabinovitch, M., Iyer, S.N., & Joobar, R. (2018). Outcome in patients converting to psychosis following a treated clinical high risk state. *Early Intervention in Psychiatry*, 12(4), 715-719.
- Marshall, M., Lewis, S., Lockwood, A., Drake, R., Jones, P., & Croudace, T. (2005). Association between duration of untreated psychosis and outcome in cohorts of first-episode patients: A systematic review. *Archives of General Psychiatry*, 62(9), 975-983.
- Marwaha, S., & Johnson, S. (2004). Schizophrenia and employment. *Social Psychiatry and Psychiatric Epidemiology*, 39(5), 337-349.
- Meyer, S.E., Bearden, C.E., Lux, S.R., Gordon, J.L., Johnson, J.K., O'Brien, M.P., Niendam, T.A., Loewy, R.L., Ventura, J., & Cannon, T. D. (2005). The psychosis prodrome in adolescent patients viewed through the lens of DSM-IV. *Journal of Child and Adolescent Psychopharmacology*, 15(3), 434-451.
- Miller, T. J., Cicchetti, D., Markovich, P. J., McGlashan, T. H., & Woods, S. W. (2004). The SIPS screen: A brief self-report screen to detect the schizophrenia prodrome. *Schizophrenia Research*, 70(1), 78
- Miller, T.J., McGlashan, T.H., Rosen, J.L., Cadenhead, K., Ventura, J., McFarlane, W., Perkins, D.O., Pearlson, G.D. & Woods, S. W. (2003). Prodromal assessment with the Structured Interview for Prodromal Syndromes and the Scale of Prodromal Symptoms: Predictive validity, interrater reliability, and training to reliability. *Schizophrenia Bulletin*, 29(4), 703-715.
- Mortier, P., Cuijpers, P., Kiekens, G., Auerbach, R.P., Demyttenaere, K., Green, J.G., Kessler, R.C., Nock, M.K., & Bruffaerts, R. (2018). The prevalence of suicidal thoughts and



behaviours among college students: A meta-analysis. *Psychological Medicine*, 48(4), 554-565.

Niendam, T. A., Jalbrzikowski, M., & Bearden, C. E. (2009). Exploring predictors of outcome in the psychosis prodrome: Implications for early identification and intervention.

*Neuropsychology Review*, 19(3), 280-293.

Nishii, H., Yamazawa, R., Shimodera, S., Suzuki, M., Hasegawa, T., & Mizuno, M. (2010).

Clinical and social determinants of a longer duration of untreated psychosis of schizophrenia in a Japanese population. *Early Intervention in Psychiatry*, 4(2), 182-188.

Nordentoft, M., Madsen, T., & Fedyszyn, I. (2015). Suicidal behavior and mortality in first-episode psychosis. *The Journal of Nervous and Mental Disease*, 203(5), 387-392.

Oliver, D., Davies, C., Crossland, G., Lim, S., Gifford, G., McGuire, P., & Fusar-Poli, P. (2018).

Can we reduce the duration of untreated psychosis? A systematic review and meta-analysis of controlled interventional studies. *Schizophrenia Bulletin*, 44(6), 1362-1372.

Penn, D. L., Waldheter, E. J., Perkins, D. O., Mueser, K. T., & Lieberman, J. A.

(2005). Psychosocial treatment for first-episode psychosis: A research update. *American Journal of Psychiatry*, 162(12), 2220-2220.

Penttilä, M., Jääskeläinen, E., Hirvonen, N., Isohanni, M., & Miettunen, J. (2014). Duration of untreated psychosis as predictor of long-term outcome in schizophrenia: Systematic review and meta-analysis. *The British Journal of Psychiatry*, 205(2), 88-94.

Rietdijk, J., Hogerzeil, S. J., van Hemert, A. M., Cuijpers, P., Linszen, D. H., & van der Gaag, M. (2011). Pathways to psychosis: Help-seeking behavior in the prodromal phase. *Schizophrenia Research*, 132(2), 213-219.

- Shi, J., Wang, L., Yao, Y., Chen, F., Su, N., Zhao, X., & Zhan, C. (2016). Protective factors in Chinese university students at clinical high risk for psychosis. *Psychiatry Research*, 239, 239-244.
- Schiffman, J., & Carpenter, W. (2015). Attenuated psychosis syndrome: Benefits of explicit recognition. *Shanghai Archives of Psychiatry*, 27(1), 48.
- Schultze-Lutter, F., Rahman, J., Ruhrmann, S., Michel, C., Schimmelmann, B. G., Maier, W., & Klosterkötter, J. (2015). Duration of unspecific prodromal and clinical high risk states, and early help-seeking in first-admission psychosis patients. *Social Psychiatry and Psychiatric Epidemiology*, 1-11.
- Snyder, T. D., & Dillow, S. A. (2012). *Digest of education statistics 2011*. National Center for Education Statistics.
- Taylor, P. J., Hutton, P., & Wood, L. (2015). Are people at risk of psychosis also at risk of suicide and self-harm? A systematic review and meta-analysis. *Psychological Medicine*, 45(5), 911-926.
- Thompson, E., Kline, E., Ellman, L. M., Mittal, V., Reeves, G. M., & Schiffman, J. (2015). Emotional and behavioral symptomatology reported by help-seeking youth at clinical high-risk for psychosis. *Schizophrenia Research*, 162(1), 79-85.
- Thompson, E., Kline, E., Reeves, G., Pitts, S. C., & Schiffman, J. (2013). Identifying youth at risk for psychosis using the Behavior Assessment System for Children. *Schizophrenia Research*, 151(1), 238-244.
- Thompson, J. L., Pogue-Geile, M. F., & Grace, A. A. (2004). Developmental pathology, dopamine, and stress: A model for the age of onset of schizophrenia symptoms. *Schizophrenia Bulletin*, 30(4), 875-900.

Thompson, E., Spirito, A., Frazier, E., Thompson, A., Hunt, J., & Wolff, J. (2020). Suicidal thoughts and behavior (STB) and psychosis-risk symptoms among psychiatrically hospitalized adolescents. *Schizophrenia Research*.

Wilson, C., Kline, E., Thompson, E., Demro, C., Pitts, S., Bussell, K., Reeves, G.M., & Schiffman, J. (2014). Comparison of measures of functioning for use with treatment-seeking adolescents experiencing attenuated symptoms of psychosis. *Early Intervention in Psychiatry*, 10(1), 81-87.