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# Attenuated positive psychotic symptoms and social anxiety: Along a psychotic continuum or different constructs?

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ABSTRACT

Social anxiety commonly occurs across the course of schizophrenia, including in the premorbid and prodromal phases of psychotic disorders. Some have posited that social anxiety may exist on a continuum with paranoia; however, empirical data are lacking. The study aim was to determine whether attenuated positive psychotic symptoms are related to social anxiety. Young adults ($N=1378$) were administered the Prodromal Questionnaire (PQ), which measures attenuated positive psychotic symptoms (APPS), and the Social Phobia Scale (SPS), which measures a subset of social anxiety symptoms. Confirmatory factor analyses were conducted to address the extent to which social anxiety and APPS tap distinct dimensions. Confirmatory factor analyses support the existence of a separate social anxiety factor scale and four separate, though interrelated, APPS factor domains (unusual thought content, paranoia/suspiciousness, disorganized thinking, and perceptual abnormalities). Additionally, social anxiety was significantly, but not differently related to each APPS domain, although the magnitude was reduced between social anxiety and distressing APPS. The current study suggests that social anxiety and attenuated positive psychotic symptoms are separable constructs, but are significantly associated with each other.



## 1. Introduction

Social anxiety commonly occurs in the course of schizophrenia and other psychotic disorders (Lencz et al., 2004; Meyer et al., 2005; Rosen et al., 2006; Yung et al., 2003). Specifically, evidence supports a relationship between social anxiety disorder and schizophrenia (Braga et al., 2004; Pallanti et al., 2013), with rates of comorbidity ranging from 8–36% (Braga et al., 2004; Lysaker and Salyers, 2007). Further, signs of social anxiety, such as shyness and isolated play, have been noted in children who later go on to develop schizophrenia (i.e., during the premorbid period, before symptom emergence) (Evans et al., 2005). Similarly, social anxiety commonly occurs in those with attenuated psychotic symptoms (Jones et al., 1994), in those at clinical high-risk for psychosis (Corcoran et al., 2003; Rietdijk et al., 2013; Tan and Ang, 2001), and in those in the prodrome of the disorder, a period when psychotic symptoms start to emerge (Häfner et al., 1995; Meyer et al., 2005). Moreover, research on help-seeking individuals at clinical high risk for psychotic disorders has indicated that those with social anxiety have decreased quality of life and lower self-esteem (Romm et al., 2012), a greater number of attenuated positive psychotic symptoms (APPS), such as perceptual abnormalities and unusual thought content (Jones et al., 1994; Lysaker and Salyers, 2007), and poorer prognoses for psychosis (Lysaker and Salyers, 2007; Wigman et al., 2012). Given these findings, it is imperative to understand how social anxiety relates to psychotic symptoms, especially in the earliest stages of psychosis.

Previous research has suggested that social anxiety may be on the same continuum as, but a less severe form of, paranoia (Freeman et al., 2005), whereas others have proposed that social anxiety is distinct from psychotic paranoia and precedes or co-occurs with psychotic symptoms (Wigman et al., 2012). Freeman et al. (2005) suggested a hierarchy of paranoia indicating that paranoia and symptoms of social anxiety are along a continuum. This hierarchy has a base of social suspiciousness and interpersonal worry, proceeding to progressively more problematic suspiciousness, finally transitioning into severe paranoia. The hierarchy they provided implies an additive structure, such that each worry or suspicion experienced can contribute toward the eventual development of severe paranoia at a delusional level and that severe paranoia cannot happen independently of the

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preceding stages (Freeman et al., 2005). Conversely, Wigman et al. (2012) suggested that social anxiety co-occurs with paranoia as a response to difficulties occurring in the course of a psychotic disorder. Psychotic symptoms have been associated with social stigmatization, which may lead to low morale and depression (Ritsher and Phelan, 2004). These factors may motivate an individual to avoid social situations due to increased symptoms and fear of appearing strange when around others (Link and Phelan, 2001). One recent study assessing the relationship between attenuated psychotic symptoms and anxiety found moderate correlations between an array of psychosis risk screeners and the Beck Anxiety Inventory (Kline et al., 2012). Nevertheless, studies have not investigated whether social anxiety represents a distinct construct from psychotic symptoms, which is a critical first step in understanding how social anxiety operates within psychotic disorders. Because previous research has suggested that treatment for social anxiety among schizophrenia populations can improve anxiety and psychosis-related symptoms (Halperin et al., 2000; Kingsep et al., 2003), determining how social anxiety is related to attenuated psychotic symptoms has potential applications for early prevention and treatment strategies; however, these clinical trials were conducted prior to characterizing social anxiety within psychotic disorders, which could further improve targeted interventions.

Studies have typically examined social anxiety among help-seeking individuals; it is therefore unclear whether social anxiety is related to the whole continuum of psychotic symptoms, including APPS. APPS, such as perceptual abnormalities or unusual thought content, are symptoms commonly endorsed in the general population that are not severe enough to meet criteria for diagnosis of a psychotic disorder (Hanssen et al., 2003; Kendler et al., 1996; Salokangas and McGlashan, 2008). APPS are typically examined through self-report measures (i.e., Prodromal Questionnaire (PQ); Loewy et al., 2007, 2005) and/or clinical interviews (i.e., Structured Interview for Psychosis Risk Syndromes (SIPS); Miller et al., 2003). In a portion of individuals, APPS can precede a psychotic disorder (Cannon et al., 2008); however, even in those who do not develop a psychotic disorder, findings suggest that APPS share many of the same risk factors as psychotic disorders, such as schizophrenia (Esterberg and Compton, 2009). Establishing whether social anxiety co-occurs with APPS in a non-help seeking population may help in identifying overlapping risk factors, as well as identify those who may benefit from proactive treatments for psychosis but do not meet criteria for a mental disorder.

The aims of the present study were to determine whether APPS are related to social anxiety. An additional aim of the present study was to determine if APPS endorsed as distressing (APPS-distressing) are also related to social anxiety, as distressing symptoms have been associated with a higher likelihood of seeking treatment and tend to have higher predictive power for conversion to psychotic disorders (Freeman and Garety, 1999; Garety et al., 2001). Factor analyses were conducted to address the extent to which social anxiety and particular positive psychotic symptom domains (paranoia/suspiciousness, perceptual abnormalities, disorganized thinking, unusual thought content) measure distinct dimensions. We hypothesized that (1) APPS/APPS-distressing will load on 4 distinct factors, similar to the positive categories within the SIPS (Miller et al., 2003): unusual thought content, paranoid/suspicious ideation, perceptual abnormalities, and disorganized thinking; (2) social anxiety will be positively correlated with all 4 APPS factors and all 4 APPS-distressing factors, but it will cross-load on the paranoid ideation factor, indicating that social anxiety may, in part, overlap with the construct of paranoia.

## 2. Method

### 2.1. Participants

The protocol was approved by the Institutional Review Board at Temple University. Written informed consent was obtained from all participants prior to enrollment. Participants ($N=1400$) were a diverse group of undergraduate students from a large university, who were recruited via an online participant recruitment website, were at least 17 years of age, and were representative of the university community. The online recruitment website, which was open to all undergraduate students at the university, listed the current study with all other available studies that one could choose to participate in; studies are listed in random order. To participate, an individual would select our study from the list of options, be provided information regarding what the study would entail and where it was located, and then choose a day and time that was conducive to their schedule from the options available. A general description of our study is provided to students, which states that the study focuses on psychological symptoms and life events. Our sample included only three 17-year-old participants due to mid-study IRB changes that now restrict participant recruitment to individuals who are age 18 and older. Following data screening (described below), our sample size for analyses was reduced to 1378 cases; see Table 1 for participant demographic characteristics as well as scores on the two primary study measures.

### 2.2. Procedures

Following informed consent, participants were directed to a laboratory computer terminal at which questionnaires were individually, electronically administered (Survey Monkey Inc., Palo Alto, CA). Demographic characteristics were first collected, followed by the administration of additional questionnaires, including the Prodromal Questionnaire (Loewy et al., 2007, 2005) and Social Phobia Scale (Mattick and Clarke, 1998).

### 2.3. Measures

#### 2.3.1. The Prodromal Questionnaire (PQ) (Loewy et al., 2007, 2005)

The PQ, a 92-item self-report measure, has established validity in identifying individuals who are at risk for a psychotic disorder and measures attenuated psychotic symptoms in four domains: positive, negative, disorganized, and general. Participant responses were dichotomized to indicate whether or not they had experienced a given symptom ("Yes" or "No") in the past month. Additionally, for those items endorsed as having been experienced, the participant indicated ("Yes" or "No") whether or not each experienced symptom was distressing. The PQ, which has high levels of reported internal consistency ($\alpha=.96$, Loewy et al., 2005), has been tested against semi-structured interviews commonly used to identify individuals at risk for psychosis, such as the SIPS (Kline et al., 2012; Loewy et al., 2005; Miller et al., 1999) and has been found to be both reliable and valid in comparison, with 90% sensitivity and 49% specificity (Loewy et al., 2005; Miller et al., 1999). Endorsing 8 or more APPS items in the past month has been validated against the SIPS in clinical populations (Loewy et al., 2007). Similarly, 8 or more APPS-distressing identified 2% of an undergraduate sample (Loewy et al., 2012, 2007, 2005), which generally corresponds to expected lifetime prevalence rates of psychotic disorders in the general public (Kessler et al., 2005).

For the purpose of the current study, we were interested in investigating the attenuated positive symptom domain, as this domain has been associated with increased risk for psychotic disorders and has been primarily studied in investigations of