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The Interplay of Sub-Clinical Psychosis, Cognitive Insight, Locus of Control, and Psychological Well-Being

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UNIVERSITY OF MIAMI

THE INTERPLAY OF SUB-CLINICAL PSYCHOSIS, COGNITIVE INSIGHT,
LOCUS OF CONTROL, AND PSYCHOLOGICAL WELL-BEING

By

Marc J. Weintraub

A THESIS

Submitted to the Faculty
of the University of Miami
in partial fulfillment of the requirements for
the degree of Master of Science

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THE INTERPLAY OF SUB-CLINICAL PSYCHOSIS, COGNITIVE INSIGHT,
LOCUS OF CONTROL, AND PSYCHOLOGICAL WELL-BEING

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Patients with schizophrenia demonstrate diminished cognitive insight (Warman, Lysaker, & Martin, 2007), and a more external locus of control (Bentall & Kaney, 2005) compared to non-psychiatric populations. Although having increased insight has many benefits for those with schizophrenia (e.g. greater treatment adherence), a paradox exists in which it is often associated with worse well-being, known as the insight paradox (Staring et al., 2009; Lysaker, Roe, & Yanos, 2007). It is unclear whether this pattern between insight and well-being also occurs in individuals with subclinical psychotic symptoms. Prior research in schizophrenia also suggests that the relationship between greater psychotic symptoms and decreased psychological well-being is stronger for individuals who endorse a more external locus of control (Garety et al., 2007). This relationship has not been tested in a non-clinical population. Studying these relationships in a non-clinical population will provide information on whether patterns seen in schizophrenia are also present at lower level psychotic symptoms, or whether they only emerge once the threshold for a clinical diagnosis is met. Using structural equation modeling in a sample of 420 undergraduates, this study found, in line with hypotheses, that sub-clinical psychotic symptoms were negatively associated with psychological well-

being. Secondary analyses suggested that this relationship is stronger for individuals who identify as minorities (Hispanics, Blacks and “Others”) than for Whites. The insight paradox was also substantiated as increased cognitive insight was associated with worse psychological well-being. However, contrary to expectations, cognitive insight and locus of control did not moderate the relationship between sub-clinical psychosis and psychological well-being. Finally, on an exploratory basis, study hypotheses were re-examined with symptoms broken down by positive, negative, and disorganized type. Disorganized symptoms were found to have the strongest negative association with psychological well-being. This study sheds light into the association between sub-clinical psychotic symptoms and psychological well-being in a non-clinical population.

Keywords: sub-clinical psychotic symptoms, cognitive insight, locus of control, psychological well-being

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CHAPTER 1: INTRODUCTION

Unusual experiences and symptoms of psychosis are thought to be distributed along a continuum, from non-clinical manifestations to full-fledged schizophrenia (Claridge et al., 1996). Measuring sub-clinical psychosis in non-psychiatric populations provides a useful method for identifying risk and protective factors without a lot of the confounding effects associated with schizophrenia (Gross, Silvia, Barrantes-Vidal, & Kwapil, 2012; Tabak & Weisman de Mamani, 2014). Additionally, studying sub-clinical symptoms in non-psychiatric populations can provide an understanding of whether patterns seen in schizophrenia are also present at lower level symptoms, or whether they are only visible once a certain threshold of psychotic symptoms is surpassed. One area that has received significant attention in the schizophrenia literature is insight (e.g., Riggs, Grant, Perivoliotis, & Beck, 2012). However, there is a paucity of literature examining cognitive insight in non-psychiatric populations. Similarly, the construct of locus of control has been extensively studied in individuals with schizophrenia (e.g., Ekinci et al., 2012), but little is known about how locus of control relates to sub-clinical psychotic symptoms and psychological well-being in non-psychiatric populations. Studying sub-clinical symptoms of psychosis and cognitive patterns found in schizophrenia is important because it can inform our understanding of the full spectrum of psychosis, and elucidate whether patterns seen in full-blown psychosis are present at lower levels of symptom severity.

Sub-Clinical Psychosis and the Psychosis Continuum

Symptoms of psychosis and unusual experiences (e.g. false beliefs and hallucinations) that do not meet criteria for a psychotic disorder have been termed

psychosis proneness, “at-risk mental states,” or schizotypy (Claridge, 1997). Psychotic experiences are generally thought to be distributed along a spectrum/continuum (Eysenck, 1952; Strauss, 1969), with lesser symptom severity deemed a sub-clinical manifestation of a full-blown psychotic disorder, such as schizophrenia. Schizophrenia is a chronic and severe psychiatric disorder that occurs in approximately 1% of the population, and is characterized by the presence of severe and debilitating psychotic symptoms (including positive, negative, and disorganized symptoms; Saha, Chant, Welham, McGrath, 2005; DSM-5, 2013). The distinction between these levels of psychosis is based on varying intensities and durations of similar symptoms, rather than qualitative differences (Chapman & Chapman, 1987). This dimensional view of psychosis assumes it is a continuous variable that ranges progressively from healthy individuals to individuals with schizophrenia (Claridge, 1985; Eysenck & Eysenck, 1976; Tabak & Weisman de Mamani, 2014). Changes in the new DSM-5 reflect this dimensional perspective—schizotypal personality disorder is included under both the psychotic disorders spectrum and personality disorders, and personality disorders are rated using a 3-point dimensional scale to assess the severity of the disorder in addition to assigning a categorical diagnosis (DSM-5, 2013).

Schizophrenia occurs in about 1 in 100 people, but having psychotic experiences is far more common. For example, the lifetime prevalence of hallucinations related to organic causes was found to be 10% for men and 15% for women (Tien, 1991). The National Comorbidity Study reported that 28.4% of subjects from the general population answered positively to at least one question exploring psychotic symptoms (Kendler et al., 1997), and another more recent study showed the percentage of individuals reporting

at least one lifetime delusional or hallucinatory experience by the age of 26 was 20.1% and 13.2%, respectively (Poulton et al., 2000). Subjects with no history of a psychiatric disorder tend to score lowest on scales of delusional ideation and hallucinations, while those with a history of mood disorders score in the intermediate range, and subjects with psychotic disorders score the highest (van Os et al., 1996). These findings support a dynamic spectrum of psychosis that is based on the extent of one's psychotic experiences, ranging from subclinical psychotic symptoms to a full-blown psychotic disorder.

The spectrum of psychosis has been further substantiated by research in genetics (Debbane, Van der Linden, Glaser & Eliez, 2008), neurocognition (Davis, Kahn, & Davidson, 1991; Goff & Evans, 1998), and psycho-metrics (Toomey & Schildberg, 1995; Compton, Chien, & Bollini, 2007). Research on the overlap between sub-clinical psychosis and schizophrenia has revealed the two populations share common genes (Siever & Davis, 2004; Lin et al., 2005), neuroimaging results (Dickey, McCarley, & Shenton, 2002), and neurocognitive abnormalities (Spaulding, Garbin, & Dras, 1989; Siever & Davis, 2004). These patterns continue to emerge when comparing patients with schizophrenia to their healthy relatives (Mechri et al., 2010) and to high-risk populations (Johnstone et al., 2005), as all three groups rated higher degrees of psychotic features, compared to controls. Additionally, psychotic symptoms in patients with schizophrenia seem to follow the same age trajectory as subjects with psychosis proneness (Verdoux & van Os, 2002). For example, in both groups, delusional symptoms increase from puberty to early adulthood and then become less prominent in elderly patients (Galdos & van Os, 1995). (Claridge, 1997; Claridge & Beech, 1995). These findings underscore the close connection between sub-clinical psychosis and full-blown schizophrenia, and suggest

there are parallel processes that become incrementally more pronounced as psychotic symptoms increase. However, the question of whether the same connections and patterns related to well-being and social cognition are also present in individuals with lower level psychotic symptoms remains unanswered. Investigating non-clinical populations with lower levels of psychotic symptoms will be an important step in answering these questions.

The view that lower level/schizotypal symptoms are a diathesis for schizophrenia is long-standing. Schizotypy scales are often viewed as measures of psychosis-proneness, meaning that individuals who rate higher on these sub-clinical psychotic symptoms are at higher-risk for developing a psychotic disorder (Grove, 1982). Twenty percent of individuals with a diagnosis of schizotypal personality disorder developed schizophrenia in a 5-20 year follow-up, compared to a 1% risk in the general population (Hoch, Cattel, Strahl, & Pennes, 1962). More recent analyses have presented a variety of findings in support of this theory. A study measuring perceptual and delusional ideation found that subjects who had higher ratings on these scales at baseline had a higher frequency of psychosis and mood disorders over the next 10 years (Chapman et al., 2004). A similar study by Kwapil and colleagues (1997) replicated these findings, showing that subjects with high scores on delusional features were more likely, than subjects with low scores, to present with psychosis at follow-up (7% vs. 0%). Additionally, children reporting delusional or hallucinatory experiences at age 11 were also shown to be at increased risk of later developing schizophreniform disorder at age 26 (Poulton et al., 2000). The rates of conversion from a milder form of psychosis to a more severe form of psychosis provide further support for the continuum model of psychoses, but these studies fail to

address any functional or cognitive phenomena that underlie these lower levels of psychotic symptoms. Clearly, early and more severe sub-clinical psychotic symptoms are a risk factor for future psychopathology, but the current literature has not investigated whether individuals with lower level psychotic symptoms present with the same cognitive and psychological patterns that are seen in schizophrenia populations.

Examining lower level symptomatology adds an important angle to the psychosis literature. Studies on schizophrenia samples are confounded by medication usage and psychosocial consequences of the psychiatric diagnosis (Jahshan & Sergi, 2007; Noguchi, Hori, & Kunugi, 2008). Therefore, it can be difficult to make clear attributions about the diagnosis itself. Further, the literature illustrates a clear pattern of greater sub-clinical psychotic symptoms being a risk factor for the development of schizophrenia (e.g. Chapman et al., 2004). However, it is unclear whether the associations between psychotic symptoms, social cognitive factors (e.g., locus of control, cognitive insight), and psychological well-being follow similar patterns in people with and without schizophrenia. Deciphering whether these patterns are due to the symptoms, a psychological response caused by having the symptoms for an extended period of time, or some other confound can often be difficult (Johnson, 2005). Examining individuals along the psychosis spectrum can provide a more complete picture of psychosis and offer insight into whether patterns seen in more severe psychotic populations are also visible in non-psychiatric populations.

Psychotic Symptoms and Psychological Well-Being

Psychological well-being has been widely researched along the psychosis spectrum, using a variety of constructs. In general, greater psychotic symptoms have been

linked to poorer well-being. A common construct to measure psychological well-being is quality of life (QoL), which a large body of research suggests tends to be lower among individuals with both sub-clinical and elevated levels of psychotic symptoms (e.g. Verdoux & van Os, 2002). A poorer quality of life in the early stages of sub-clinical psychotic experiences then predicts compromised quality of life following the first episode of full-blown schizophrenia (Macbeth & Gumley, 2008). Additionally, Macbeth and Gumley find that poorer QoL (measured by social, educational, and occupational functioning) is also associated with a longer time to recovery following a psychotic episode. Psychological well-being and symptom severity may play a reciprocal role with one another, as patients who have psychotic symptoms for longer periods of time tend to have significantly poorer well-being (Ho et al., 2000).

Researchers have also used emotional distress (e.g. depression) to measure psychological well-being in patients with psychosis. Depression is highly comorbid with psychosis (comorbidity estimates range from 15-25%; Buckley et al., 2009), and more severe depression is strongly associated with lower levels of satisfaction and quality of life in patients with schizophrenia (Huppert et al., 2001). The occurrence of depression in schizophrenia is also associated with worse symptom outcomes (Siris, 2000), higher rates of re-hospitalization (Birchwood et al., 1993), and higher rates of suicide (Caldwell & Gottesman, 1990). The research on less severe psychotic symptoms is scant, however, and the relationship between psychotic symptoms and psychological well-being in non-clinical populations is not well known. Elucidating these patterns in non-psychiatric populations is an important step in understanding whether these outcomes are present before reaching threshold for a clinical diagnosis.

Insight, Schizophrenia, and Sub-Clinical Psychosis

Individuals with schizophrenia tend to have poor insight into their illness, and have difficulties recognizing their need for treatment (e.g. Amador et al., 1993). In fact, close to 97% of patients in an international study of schizophrenia were found to lack insight into their illness (Kim, Sakamoto, Sakamura, Miyaoka, 1997). Poorer insight is also common in individuals with elevated sub-clinical psychotic symptoms (Peters, Joseph, & Garety, 1999; Warman & Martin, 2006). The original understanding of insight is based on a binary conceptualization—either a person has insight or does not (Lewis, 1934). Subsequent research has approached insight in a more dimensional and continuous fashion (Mintz, 2003), measuring the degree to which the individual is aware of the illness, its signs and symptoms, the need/benefit of treatment, and their acceptance of the illness label in populations with schizophrenia (Amador et al., 2004). Newer measures of insight measure the participant’s ability to question their flawed beliefs when presented with discordant feedback from others, and their ability to evaluate and correct distorted beliefs and misinterpretations (Beck, Baruch, Balter, Steer, & Warman, 2004). Beck and colleagues measure of insight is more amenable to sub-clinical populations than is Amador and colleagues’ measure because it asks questions about unusual experiences and thoughts that relate both to individuals who have not crossed over into full-fledged psychosis as well as individuals with a psychotic disorder.

The “Insight Paradox”

In some cases, higher levels of insight are associated with better outcomes (e.g. Francis & Penn, 2001; Sim et al., 2006); however, this association is not consistent across all outcomes. One of the most robust examples of this is the paradoxical association

between insight and depression. Greater insight has been associated with greater hopelessness and depressive symptoms in populations with schizophrenia (e.g. Lysaker, Roe, & Yanos, 2007; Mintz, Dobson, & Romney, 2003). Two studies have examined insight and depression in schizophrenia using the same measure of insight as the current study (Beck's Cognitive Insight Scale). This scale contains two sub-types of insight—self-reflection and self-certainty. The Self-Reflectiveness factor measures introspection and one's willingness to acknowledge fallibility. Self-Certainty measures one's certainty about beliefs and judgments. The first study found that higher self-reflective insight is positively associated with depression in patients with schizophrenia, and the second found a positive association between self-certainty and depression (Colis, Steer, & Beck, 2006; Warman, Lysaker, & Martin, 2007). The same effects are seen in other realms of psychological well-being, as well. For example, other studies done on populations with schizophrenia have found that greater insight was associated with lower self esteem (Warner et al., 1989), and increased insight has been connected to decreased well-being and quality of life (e.g. Hasson-Ohayon et al., 2006; Kravetz, Faust, David, 2000).

Increased insight is beneficial for treatment outcomes, social functioning, and vocational functioning, but may create other problems that surface from poor psychological well-being (Lysaker et al., 2004). Mintz and colleagues (2003) theorize that growing insight allows the patient to recognize the presence of their symptoms, and creates an understanding that treatment is necessary and beneficial. At the same time, this increased recognition and understanding may lead to a sense of hopelessness as the individual becomes aware that his/her condition has negative, long-term consequences. For example, the more an individual gains insight into their symptoms, the more he/she

may feel that their disorder precludes their chances of achieving goals and living a satisfying life (Lysaker, Roe, & Yanos, 2006). As a result, feelings of hopelessness arise and psychological well-being decreases. It is uncertain, however, whether these same patterns are present in sub-clinical levels of psychosis. More research is needed to determine whether greater cognitive insight is related to poorer psychological well-being in individuals with lower level psychotic symptoms.

Locus of Control and Psychopathology

Social cognition refers to “how people think about themselves and others in the social world” (Sperry, 1993). An area of social cognition that has been extensively studied involves attributional styles, which are individuals’ explanations regarding the causes of events in their lives. Maladaptive attributional styles have been noted across most of the psychosis spectrum. For example, people with paranoia, delusions, and other positive symptoms tend to attribute their unusual experiences to other individuals and external reasons, rather than the situation or themselves (Bentall et al., 2001; Garety & Freeman, 1999). However, the experience of psychotic symptoms, like an auditory hallucination, does not always manifest into a psychotic disorder. The social cognitive theory of psychosis posits that when an individual starts to believe the hallucination is coming from an external source and that the voice is significant and uncontrollable, these together may cause enough distress to lead to a psychotic disorder (Garety, Bebbington, Fowler, Freeman, & Kuipers, 2007). Based on these maladaptive cognitive processes, the social cognitive model of psychosis posits that cognitive appraisals of experiences are strong driving forces behind the development and persistence of positive symptoms of psychosis (Morrison, 2001).

Locus of control is one of the most well established methods of measuring one's attributional style. The construct of LoC was first proposed by Julian Rotter (1954) within the context of social learning theory. According to Rotter, reinforcement strengthens responses to the degree that the individual expects the response to lead to further rewards. Thus, experiences, over time, create an orientation of LoC along a spectrum of two bi-polar extremes—an internal vs. external orientation (Rotter, 1966). In these two orientations, people who are internally orientated believe that rewards and outcomes in life are brought about by their own actions, while externally oriented people believe that their circumstances are due to chance, fate, or powerful others.

Rotter does not characterize one orientation as better than the other, however, the bulk of the literature on LoC show that internal (versus external) orientations accrue more beneficial outcomes for one's own mental health. For example, an internal LoC has been theorized to generate increased well-being (Langer, 1983). Well-being has been measured across three domains (mental well-being, life satisfaction, and physical health), and an internal LoC predicts general well-being in all three domains (Ng, Sorensen, & Eby, 2006). Ng and colleagues (2006) also found that internal LoC relates to increased job satisfaction, greater feelings of self-efficacy, reduced levels of work and family conflict, as well as increased feelings of empowerment. It is important to note that the majority of LoC research has been done in Western culture, a culture that values an internal locus of control (Marks, 1998). Non-western cultures tend to hold (e.g. Lefcourt, 1982) and value a more external locus of control perspective (e.g. Young & Shorr, 1986; Comas-Diaz, 1993; Wenzel, 1993).

A large body of research on emotional well-being has found that an external LoC is associated with increases in depressive symptoms and the occurrence of major depressive disorder (e.g. Lester, 1999; Harrow, Hansford, & Astrachan-Fletcher, 2009). On the other hand, individuals with an internal LoC have been found to make more improvements in their depressive symptoms (e.g. Bann et al. 2004). The association between an individual's LoC orientation during depression seems to be constant across an array of populations. Studies examining depression in college students (Twenge, Zhang, & Im, 2004), minors (Dunn, Austin, & Huster, 1997), patients with cancer (De Brander, Gerits, & Hellemans, 1997), and caregivers (McNaughton, Patterson, Smith, & Grant, 1995) all found a relationship between an external LoC and increased depressive symptoms. Some of the factors found to be involved in the relationship between LoC and emotional well-being include low self-esteem, pessimism, and hopelessness (Abramson, Metalsky, & Alloy, 1989; Alloy et al., 1999). The directionality of the relationship between depression and locus of control is difficult to determine based on the presently available literature; however, it is theorized that one's LoC and the symptoms of depression influence each other in a reciprocal manner (Harrow, Hansford, & Astrachan-Fletcher, 2009).

Research on LoC and psychosis presents similar results, such that individuals with schizophrenia or increased psychotic symptoms tend to be more externally oriented (e.g. Hoffman & Kupper, 2002; Bentall & Kaney, 2005). Patients who had beliefs and attributions that were externally oriented tended to have a lower quality of life (Bechdolf et al., 2003). Individuals with psychosis who were more external also had decreased occupational performance (Eklund, 2007). However, having an internal LoC in patients

with schizophrenia is associated with increased chances of recovery or rehabilitation (Hoffman & Kupper, 2002; Bender, 1995). A 15-year longitudinal study examined LoC in patients with schizophrenia compared to other diagnostic and control groups (Harrow, Hansford, Astrachan-Fletcher, 2009). Harrow and colleagues replicated findings that an external LoC is associated with higher levels of psychosis, and that an internal orientation is associated with increased recovery. Further, Harrow's research has found that LoC can change across the course of the illness. While orientations tend to be external during the acute phase of a psychotic episode, patients were not more external than comparison groups after the acute phase. Additionally, their results indicated that an external LoC is significantly related to depression in this population.

External attributions made by individuals along the higher end of the psychosis spectrum can lead to poor outcomes by creating an intolerance for ambiguity in social situations (Bentall et al., 2001). This inability to tolerate ambiguity then leads to a need to reach conclusions too quickly, causing errors in attributions (Randall, Corcoran, Day, & Bentall, 2008; Taylor & Kinderman, 2002). Normally, people will attribute negative events to others and positive events to themselves. However, patients with schizophrenia do not always follow these same biases. This attributional style, known as the "personalizing bias," is believed to maintain/regulate one's well-being (Garety & Freeman, 1999). An example of this is evidenced in cases of persecutory delusions. An individual with schizophrenia who has an external orientation may make eye contact with someone walking down the street and think that the person is colluding with the devil to hurt him/her. The external locus of control allows for individuals with schizophrenia to "jump to conclusions," and thereby use the confirmation bias to support their misguided

beliefs (Freeman, 2007). By seeking evidence that confirms their belief, rather than attribute the thought to something internal or false, individuals with schizophrenia tend to point to external reasons to justify their situation. While this theoretical framework is well understood for more severe levels of psychosis, little is known about how LoC interacts with sub-clinical psychotic symptoms in non-clinical populations. This topic is investigated in the current study.

An important aspect of LoC is the different orientations that are found within different ethnicities and cultures. Individuals from collectivistic cultures (e.g. many Asian and South American cultures) are often self-rated as more externally oriented than individuals from individualistic cultures (e.g. the United States; Dyal, 1984).

Collectivistic cultures tend to place greater emphasis on group-harmony and making decisions that are for the benefit of the greater good (Markus & Kitayama, 1991). This viewpoint creates a self-concept that focuses on the demands the larger world/society places on one's thoughts and actions. As a result, individuals from collectivist cultures often align with a more external orientation, which explain events as being the result of some outside agent. Individuals from individualist cultures tend to have a self-concept that revolves around a sense of autonomy and self-agency (Markus & Kitayama, 1991). This leads people from individualistic cultures to more often endorse internal orientations that construe events as resulting from one's own actions.

Symptom-Type and Well-being

Within the psychosis literature, there are mixed findings on the association between symptom type (i.e. positive, negative, and disorganized) and well-being. Most studies have found that the strongest relationship exists between negative symptoms and

poorer well-being in patients with schizophrenia (e.g. Browne et al., 1996; Gallety, Clark, McFarlane, & Weber, 1997) though other research found that both negative and disorganized symptoms have the strongest negative association with psychological well-being (Tabak & Weisman de Mamani, 2014). The explanations for these findings are often presented as consequences of the negative symptoms (e.g., flat affect and low motivation leading to difficulty finding and maintaining a job or friendships). Some studies, however, have found that positive symptoms play a larger role in well-being, and posit that the direct effects of positive symptoms (hallucinations and delusions) preclude individuals from engaging properly with their environment (Norman et al., 2001). All the previous work on symptom-type and well-being is greatly limited by the use of single (and often different) measures of well-being. Therefore, this study will examine, on an exploratory basis, the relationship between sub-clinical psychotic symptom types and psychological well-being using multiple indicators of well-being.

The Current Study

A large body of work has examined the unique role of insight and locus of control in individuals with elevated levels of psychotic symptoms. Previous studies have also assessed the associations between two social cognitive constructs (insight and LoC) and psychological well-being (i.e. quality of life, depression, and well-being). The trends in these studies portray a fairly consistent picture—psychosis and cognitive insight are associated with poorer well-being, and insight and external LoC may moderate the relationship between symptoms and well-being. However, the bulk of literature ignores the lower level symptoms of psychosis, thereby, leaving out a large proportion of the psychosis spectrum. Studying these relationships in a non-clinical population is an

important step to understanding the complete psychosis spectrum and elucidating whether these patterns are present before the onset of a psychotic spectrum diagnosis.

There are two overarching aims of the current study. The first is to examine associations between sub-clinical psychotic symptoms and psychological well-being in a non-clinical population. The second aim is to assess whether two cognitive factors (i.e. cognitive insight and LoC) have the same associations with psychological well-being in a non-clinical population as they do in schizophrenia. In other words, does the “insight paradox” occur in a sub-clinical population? Additionally, does LoC moderate the link between sub-clinical psychotic symptoms and well-being in a non-clinical population? Finally, exploratory analyses are conducted to assess the relationship between sub-clinical psychotic symptom type (positive, negative, and disorganized) and psychological well-being. Although no direct hypotheses are offered, the data reviewed above (e.g., Morrison’s, 2001 & Tabak & Weisman de Mamani, 2014) suggest that the hypothesized relationships may hold up most strongly for negative and disorganized symptoms.

Summary of Hypotheses

Drawing from the research reviewed above, the current study tested four primary and one exploratory set of hypotheses:

1. The first hypothesis examines the association between sub-clinical psychotic symptoms and psychological well-being. Specifically, greater symptoms are hypothesized to be associated with poorer well-being.
2. The second hypothesis examines whether the “insight paradox” is present even in a non-clinical population. It is hypothesized that insight will be negatively associated

- with psychological well-being. Additionally, insight is expected to moderate the relationship between sub-clinical psychotic symptoms and psychological well-being. Specifically, sub-clinical psychotic symptoms are hypothesized to be more strongly associated with poorer psychological well-being in individuals with lower levels of insight.
3. The third hypothesis examines whether LoC serves as a moderator between sub-clinical psychotic symptoms and psychological well-being. Specifically, it is hypothesized that LoC will be more strongly associated with poorer psychological well-being in individuals with a more external LoC.
 4. The fourth set of analyses re-examine hypotheses one through three by substituting positive, negative, and disorganized symptoms, in lieu of the sub-clinical psychosis latent variable. It is hypothesized that negative and disorganized symptoms will have a greater negative relationship with well-being than positive symptoms.
 5. The fifth set of analyses examine whether the relationships for hypotheses one through three differ by ethnicity. Because these analyses are exploratory, no a priori predictions are made.

CHAPTER 2: METHODS

Participants

A total of 420 undergraduates were recruited from the psychology research pool at the University of Miami as part of a larger study examining sub-clinical symptoms of psychosis and attitudes towards disadvantaged others (Tabak & Weisman de Mamani, 2014). The mean age was 19.18 years ($SD = 2.73$) and 62.9%, $n = 264$ were female. Forty six percent of subjects identified as Caucasian ($n = 191$), twenty three percent as Hispanic ($n = 95$), sixteen percent as “Other” ($n = 68$), eleven percent as Asian-American ($n = 47$), and five percent as Black ($n = 19$). Class credit was awarded for participation in the current study.

Procedures

The study was reviewed and approved by the Institutional Board of the University of Miami. A trained research associate administered the questionnaires in a quiet room with 5 to 15 participants at a time. Participants completed the packet of questionnaires in a conventional paper-and-pencil form, and each participant was allowed to work at their own pace.

Measures

All measures are described below and are also included in Appendix A.

Sub-Clinical Psychosis Symptoms

Schizotypal Personality Questionnaire—Brief Form. The Schizotypal Personality Questionnaire—Brief Form (SPQ-B; Raine & Banishay, 1995) measures positive, negative, and disorganized schizotypal traits through 22 self-report, True/False items. It is based on the full 74-item SPQ (Raine, 1991), and has strong reliability

(reliability average = .76; Raine & Banishay, 1995). The SPQ-B measures schizotypal traits and consists of three subscales: Cognitive-Perceptual (SPQ_POS), Interpersonal (SPQ_NEG), and Disorganization (SPQ_DISORG) traits, as well as an overall Schizotypal score (SPQ_TOT). The Cognitive-Perceptual subscale consists of 8 items with questions like, “do you believe in telepathy?” and “have you had experiences with astrology, seeing the future, UFO’s, ESP, or a sixth sense?” The Interpersonal subscale also consists of 8 items and poses such statements as, “people sometimes find me aloof” and “I feel I have to be on guard even with friends.” The Disorganization subscale consists of 6 items such as, “I forget what I am trying to say” and “I often ramble on too much when speaking.” A total score is obtained by summing each individual score—“true” responses are awarded one point. High scores indicate higher levels of schizotypal traits in each area. Previously, internal reliabilities ranged from .58 to .95 for the subscale scores (Raine & Banishay, 1995). In the current study, the SPQ-B had acceptable internal consistencies for all subscales (SPQ_NEG Cronbach’s $\alpha = .78$, SPQ_POS Cronbach’s $\alpha = .64$, SPQ_DISORG Cronbach’s $\alpha = .79$, SPQ_TOT Cronbach’s $\alpha = .83$).

Oxford-Liverpool Inventory of Feelings and Experiences. The Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE; Mason & Claridge, 2006) measures schizotypal traits across four sub-categories: Unusual Experiences, Introvertive Anhedonia, Cognitive Disorganization, and Impulsive Nonconformity. A total composite score is calculated by summing each sub-category. The Unusual Experiences scale measures positive symptomatology of schizotypal personality with items such as, “I have felt that I have special, almost magical powers.” The Introvertive Anhedonia scale measures negative symptomatology of the schizotypal spectrum, with items such as,

“There are just not many things that I have ever really enjoyed.” The Cognitive Disorganization factor measures cognitive difficulties, social anxiety, and emotional sensitivity. Sample items include “Do you worry too long after an embarrassing experience?” and “I am easily distracted when I read or talk to someone.” Finally, the Impulsive Nonconformity subscale examines self-control, mood lability, and antisocial tendencies with items like “Do you often overindulge in alcohol and food?” and “Do people who drive carefully annoy you?” The O-LIFE contains a total of 104 questions, each of which is answered with a Yes/No response. High scores indicate higher levels of schizotypal traits. Previous research has found the O-LIFE to have high internal consistencies (OLIFE_UE Cronbach’s $\alpha = .89$, OLIFE_IA Cronbach’s $\alpha = .82$, OLIFE_CD Cronbach’s $\alpha = .87$, OLIFE_IN Cronbach’s $\alpha = .77$; Mason, 1995; Rawlings & Freeman, 1997). The current study found similar internal consistency (OLIFE_Total Cronbach’s $\alpha = .91$).

Magical Ideation Scale. The Magical Ideation Scale (MIS; Eckblad & Chapman, 1983) measures positive schizotypy traits with 30 True/False items. The scale inquires about physically impossible, illogical, or magical cause and effect beliefs (i.e. paranormal, superstitious, or extra-sensory perceptual beliefs and thoughts). The scale includes items such as, “I think I could learn to read other’s minds if I wanted to” and “The hand motions that strangers make seem to influence me at times.” In general, “Yes” answers are assigned one point each and “No” answers are assigned zero points when scoring, although some items are reversed-scored. Scores can range from 0 to 30, with a higher score indicating increased magical ideation. Chapman, Chapman, and Miller (1982) previously found the MIS to have strong internal consistency (Cronbach’s $\alpha = .79$

to .89). The current study found the MIS to have acceptable internal consistency (Cronbach's $\alpha = .65$).

Social Cognition

Beck Cognitive Insight Scale. The Beck Cognitive Insight Scale (BCIS; Beck et al., 2004) is a 15-item self-report scale that measures an individual's evaluation of his/her anomalous experiences. Participants rate their agreement for each item on a 4-point Likert Scale (0 = do not agree at all, 1 = agree slightly, 2 = agree a lit, 3 = agree completely). The scale is made up of two subscales—Self-Reflectiveness and Self-Certainty. The Self-Reflectiveness factor measures introspection and one's willingness to acknowledge fallibility, with such items as “some of my experiences that have seemed very real may have been due to my imagination” and “there is often more than one possible explanation for why people act the way they do.” Self-Certainty measures one's certainty about beliefs and judgments, with such items as “If something feels right, it means it is right” and “I know better than anyone else what my problems are.” The composite Cognitive Insight score is computed by subtracting the Self-Certainty score from the Self-Reflectiveness score. A person with high self-reflectivity and low self-certainty is considered to have increased cognitive insight. Beck and colleagues (2004) found acceptable levels of internal consistency for both Self-Reflectiveness and Self-Certainty (Cronbach's $\alpha = .67$ and $.61$, respectively). The current study also found acceptable internal consistency for Self-Reflectiveness and acceptable internal consistency for Self-Certainty (Cronbach's $\alpha = .61$ and $.63$, respectively, as well as overall Cronbach's $\alpha = .59$).

Locus of Control. Rotter's Locus of Control (LoC; *Rotter, 1966*) scale measures the degree to which individuals believe that they can control the events of their lives. The scale is made up of 29 binary items—one option in each scenario indicates a belief in lack of control (External LoC) for that event, while the other indicates a perception of control (Internal LoC) for that event. An example is (a) "People are lonely because they don't try to be friendly" vs. (b) "There's not much use in trying too hard to please people, if they like you, they like you." Internal LoC options are awarded 0 points and External LoC options are awarded 1 point. A composite score of all 29 items is computed to formulate the participants' degree of LoC. Previous research has found the internal consistency for this measure to be good, ranging from a Cronbach's α of .65-.79 (Rotter, 1966). The current study found acceptable internal consistency for this measure (Cronbach's $\alpha = .63$)

Psychological Well-Being

Depression Subscale of the Depression, Anxiety and Stress Scale. The Depression, Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995) is a measure of emotional well-being. The DASS is a self-report questionnaire with 42 items that make up three factors: depression, anxiety, and stress. Each factor is measured by 14 items on a 4-point Likert Scale (0 = did not apply to me at all, 1 = applied to me somewhat, 2 = applied to me a considerable degree, or a good part of the time, and 3 = applied to me very much, or most of the time). Only the Depression (DASS-D) subscale was used for this study, and it is captured by statements like, "I felt like I had nothing to look forward to" and "I couldn't seem to experience any positive feelings." Prior schizophrenia research has demonstrated excellent reliability for this measure (Cronbach's $\alpha = .96$ for

family members of a patient with schizophrenia and .97 for patients; Weisman de Mamani, Kymalainen, Rosales, Armesto, 2007). In the current study, the internal reliability for the DASS-D scale was good (Cronbach's $\alpha = .94$).

Quality of Life Inventory. The Quality of Life Inventory (QOLI; Frisch et al., 1991) is a global assessment of life satisfaction. It is a 24-item measure that conceptualizes satisfaction across twelve domains (Health, Self-Esteem, Goals and Values, Money, Work, Play, Learning, Creativity, Helping, Love, Friends, and Spirituality). Each domain contains two parts—the *importance* of that domain to the participant's happiness, and the level of *satisfaction* with that domain of the participants' life. Importance for each item is measured on a 3-point Likert scale (0 = not important, 1 = important, and 2 = very important. Satisfaction for each item is measured on a 6-point Likert scale (0 = very dissatisfied, 1 = somewhat dissatisfied, 2 = a little dissatisfied, 3 = a little satisfied, 4 = somewhat satisfied, and 5 = very satisfied). The scale's developers reported good internal consistency (Cronbach's $\alpha = .86$; Frisch, Cornwell, Villaneuva, and Retzlaff, 1991). For the current study, internal consistency was also good (Cronbach's $\alpha = .82$).

Psychological Well-Being Scale. The Psychological Well-Being Scale (PWB; Ryff, 1989) contains 84 items from six scales. The six scales include self-acceptance (e.g. "I like most aspects of my personality"), positive relations with others (e.g., "I know that I can trust my friends and they know they can trust me"), autonomy (e.g., "my decisions are not usually influenced by what everyone else is doing"), environmental mastery (e.g., "I feel I am in charge of the situation in which I live"), purpose in life (e.g., "I have a sense of direction and purpose in life"), and personal growth (e.g., "For me, life has been

a continuous process of learning, changing and growth”). Items are scored on a six point Likert-scale (1 = strongly disagree, 2 = strongly somewhat, 3 = disagree slightly, 4 = agree slightly, 5 = agree somewhat, 6 = strongly agree). All six scales are combined to form an overall degree of psychological well-being (with some items reverse scored). In the current study, internal consistency was good (Cronbach’s $\alpha = .94$).

Statistical Analyses

Primary analyses were conducted using structural equation modeling (SEM) in Mplus version 6.0 (Muthen & Muthen, 1998-2010). The first step during modeling was to determine the fit of the proposed measurement models, including the fit of the indicators on the latent variables (sub-clinical psychosis and psychological well-being) in the model. Model fit was determined based on Kline’s (2011) criteria: a non-significant Chi-square test of model of fit, a comparative fit index (CFI) of greater than or equal to .95, a root mean square error of approximation (RMSEA) of less than or equal to .09, and a standardized root mean square residual (SRMR) of less than or equal to .06. When acceptable measurement models were established, latent variables were used in the SEM model specification and evaluation.

The next step was to test the association between sub-clinical psychotic symptoms, the social cognitive factors, and psychological well-being by examining the significance of the direct path coefficient between these variables. Additionally, for exploratory purposes, the direct path associations were re-tested after separating sub-clinical psychosis into its three symptom-types (positive, negative, and disorganized). This model contained only the SPQ questionnaire for sub-clinical psychotic symptoms (because only this measure contains sub-scales for each of the three symptom-types), but maintained the latent variable for psychological well-being.

CHAPTER 3: RESULTS

Preliminary data analysis

All outcome variables were examined for normality by assessing skewness and kurtosis. Using Kline's (2011) criteria, a variable was deemed to have a non-normal distribution when the absolute value of the skew index was greater than 3 and the absolute value of the kurtosis index was greater than 8. The DASS-D was negatively skewed (skewness = -13.47), so square root transformation was conducted to normalize the distribution (skewness = .18). All other variables were within normal limits. The relationships between demographic variables (i.e. age, gender, and ethnicity) and the dependent variables were tested prior to conducting primary analyses to identify potential covariates. Both gender and ethnicity were significantly associated with the outcome variable (psychological well-being). Females were self-rated as having significantly higher psychological well-being than males ($b = .313$, $SE = .130$, $p < .05$). Additionally, Hispanics were self-rated as having significantly higher psychological well-being compared to all other ethnicities ($b = .438$, $SE = .204$, $p < .05$). Therefore, both gender and ethnicity were statistically controlled for in all further primary analyses.

Primary Analyses

Primary analyses were conducted using structural equation modeling (SEM) in Mplus version 6.0 (Muthen & Muthen, 1998-2010). Full information maximum likelihood (FIML) was used as the default in Mplus to estimate model parameters for missing data. This approach results in greater power and accuracy and has been shown to provide unbiased parameter estimates when data is missing (Schafer & Graham, 2002). Latent variables were created for both sub-clinical psychotic symptoms and psychological well-being, and tested for model fit. The sub-clinical psychosis latent first

included three measures: SPQ, O-LIFE, and MIS. The psychological well-being latent also included three measures: DASS-D, PWB, and QoL. The DASS-D was reversed scored for ease of interpretation (so that larger values indicated better psychological well-being across measures). The confirmatory factor analysis for the two latent variables did not create good model fit. While the comparative fit index was greater than .95 (CFI = .97) and the standardized root mean square residual was less than .06 (SRMR = .05), there was a significant Chi-square test of model fit ($\chi^2(8) = 52.31, p < .001$), and the root mean square error of approximation was greater than .09 (RMSEA = .12). After examining the modification indices, the residual variances of the measures PWB and QoL were correlated, so a covariance between these two indicators was added. This modification improved the Chi-square test of model fit value ($\chi^2(7) = 33.51, p < .001$); however, the Chi-square test was still significant and the model did not fit the data. The modification indices were again examined, and the indicator, MIS, empirically load onto both the sub-clinical psychosis latent and the psychological well-being latent. Due to this empirical fit, but theoretical misfit, the MIS was removed from the model. This modification created good model fit: $\chi^2(3) = .22, p = .97, CFI = 1.0, RMSEA = .00, SRMR = .002$.

Each indicator significantly loaded onto its respective latent. The SPQ had a factor loading of .832 ($p < .001$) and the OLIFE had a factor loading of .965 ($p < .001$) onto the sub-clinical psychosis latent. The DASS-D had a factor loading of .806 ($p < .001$), the PWB had a factor loading of .780 ($p < .001$), and the QoL had a factor loading of .721 ($p < .001$) onto the psychological well-being latent. The means of each indicator and social cognitive variable are presented in Table 1.

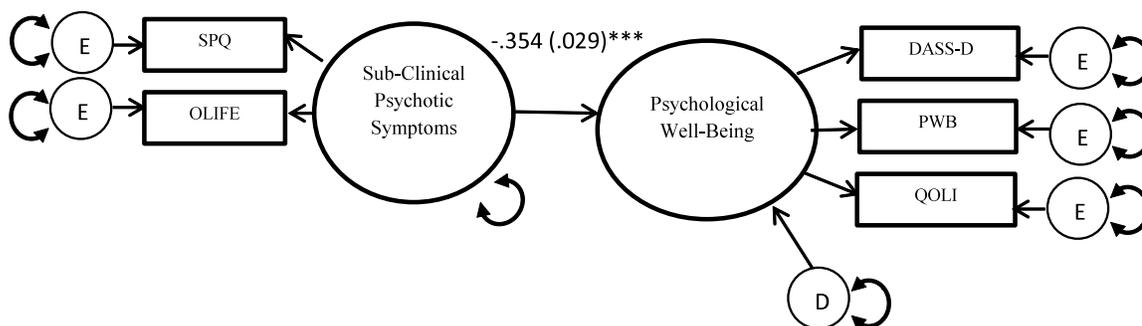
Table 1. Means of indicators and moderator variables

	SPQ	OLIFE	PWB	DASS-D (reverse)	QoL	BCIS	LoC
Overall Mean (SD)	7.67 (4.83)	30.93 (13.78)	382.49 (48.99)	5.62 (1.97)	29.77 (18.97)	4.41 (4.70)	11.08 (3.56)
Majority/ Caucasian Mean (SD)	7.47 (4.98)	30.02 (13.66)	382.33 (47.68)	5.59 (1.95)	29.32 (17.05)	4.68 (4.53)	10.90 (3.56)
Hispanic Mean (SD)	7.61 (4.43)	30.47 (12.99)	389.80 (42.60)	5.90 (1.93)	32.36 (19.68)	3.94 (4.56)	11.11 (3.74)
Black Mean (SD)	9.16 (4.06)	32.35 (15.37)	391.00 (44.35)	5.86 (1.99)	30.28 (20.94)	3.17 (5.34)	11.44 (2.63)
Asian Mean (SD)	7.54 (5.32)	31.17 (13.70)	378.53 (46.65)	5.49 (2.08)	25.39 (23.68)	3.77 (4.72)	11.07 (3.71)
“Other” Mean (SD)	8.07 (4.92)	33.65 (15.18)	364.08 (59.57)	5.37 (2.00)	29.86 (19.43)	5.10 (5.21)	11.52 (3.69)

Sub-Clinical Psychosis and Psychological Well-being

To test the first hypothesis of the association between psychological well-being and sub-clinical psychosis symptoms, the psychological well-being latent was regressed onto the sub-clinical psychosis latent. Sub-clinical psychotic symptoms were negatively associated with psychological well-being, controlling for gender and ethnicity ($b = -.354$, $SE = .029$, $p < .001$). Thus, an increase in symptoms was associated with poorer psychological well-being. Model results are presented in Figure 1.

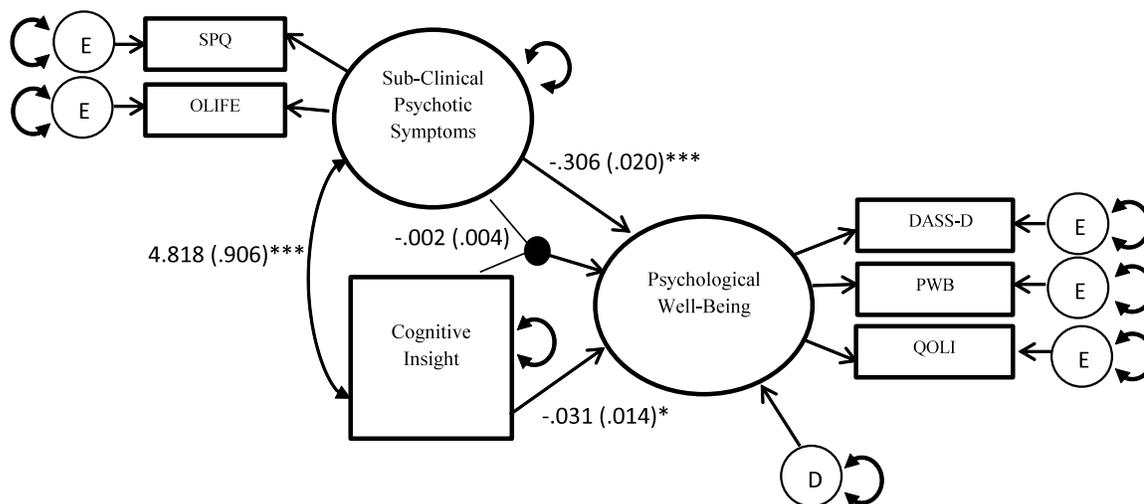
Figure 1. Path analytic representation of sub-clinical psychotic symptoms predicting psychological well-being



Cognitive Insight Model

The model illustrating the relationship between cognitive insight, sub-clinical psychotic symptoms, and psychological well-being is presented in Figure 2. Sub-clinical psychotic symptoms were negatively associated with psychological well-being, controlling for cognitive insight, gender, and ethnicity ($b = -.306$, $SE = .020$, $p < .001$). Supporting the insight paradox, greater cognitive insight was associated with poorer psychological well-being, controlling for psychotic symptoms, gender, and ethnicity ($b = -.031$, $SE = .014$, $p < .05$). Additionally, sub-clinical psychotic symptoms and cognitive insight were strongly positively associated ($b = 4.818$, $SE = .906$, $p < .001$). However, cognitive insight did not moderate the relationship between sub-clinical psychosis and psychological well-being, controlling for cognitive insight, ethnicity, and gender ($b = -.002$, $SE = .004$, $p = .491$).

Figure 2. Path analytic representation of the interactive effect of sub-clinical psychotic symptoms and cognitive insight on psychological well-being

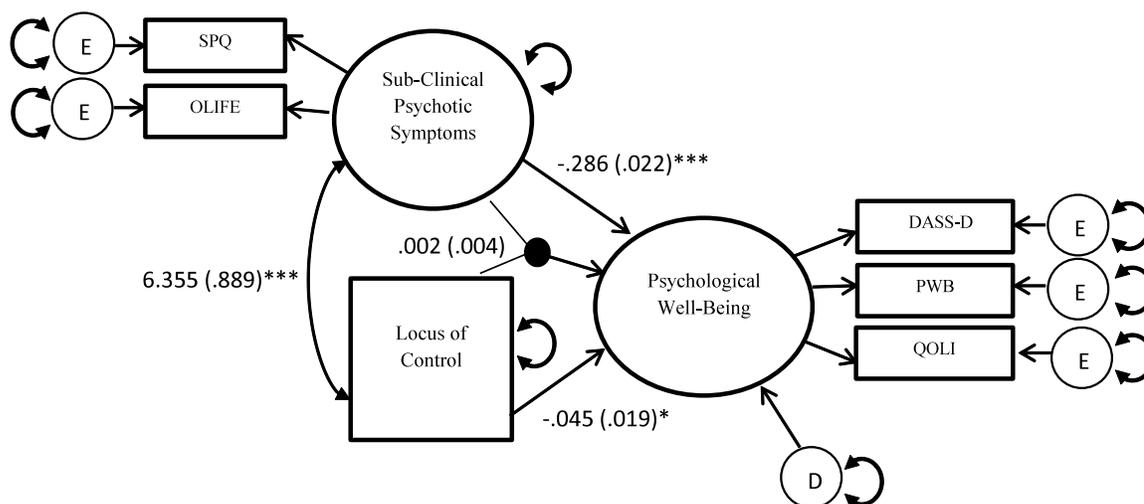


Locus of Control Model

The model for locus of control as a moderator in the relationship between sub-clinical psychotic symptoms and psychological well-being is presented in Figure 3. Sub-clinical psychotic symptoms were negatively associated with psychological well-being, controlling for locus of control, gender, and ethnicity ($b = -.286$, $SE = .022$, $p < .001$). Locus of control was associated with psychological well-being such that a more external locus of control was associated with poorer psychological well-being, controlling for psychotic symptoms, gender, and ethnicity ($b = -.045$, $SE = .019$, $p < .05$). Additionally, sub-clinical psychotic symptoms and locus of control were positively associated such that an external locus of control was associated with greater psychotic symptoms, controlling for gender and ethnicity ($b = 6.355$, $SE = .889$, $p < .001$). However, locus of control did

not moderate the relationship between psychotic symptoms and psychological well-being ($b = .002$, $SE = .004$, $p = .571$).

Figure 3. Path analytic representation of the interactive effect of sub-clinical psychotic symptoms and locus of control on psychological well-being



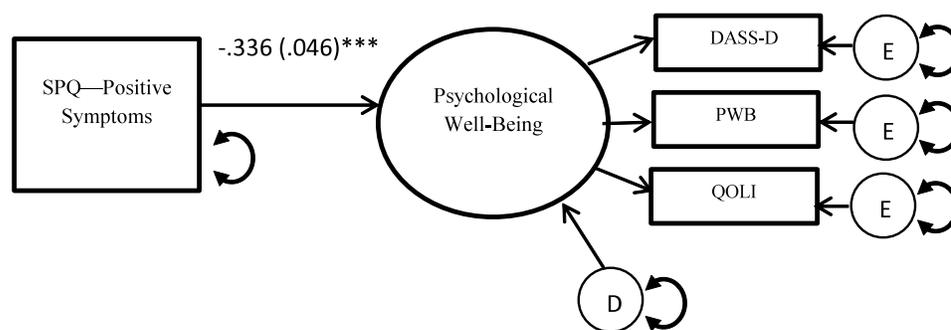
Secondary Analyses

The direct path associations were re-tested after separating sub-clinical psychotic symptoms into its three symptom-types (positive, negative, and disorganized). These models contained only the SPQ questionnaire for psychotic symptoms because the SPQ is the only measure that compartmentalizes symptoms broken down by these three sub-types for positive, negative and disorganized symptoms. The latent variable for psychological well-being used in all previous models was maintained. Additionally, gender and ethnicity were maintained as covariates due to their association with psychological well-being.

Sub-Clinical Psychotic Symptom-Type and Psychological Well-being

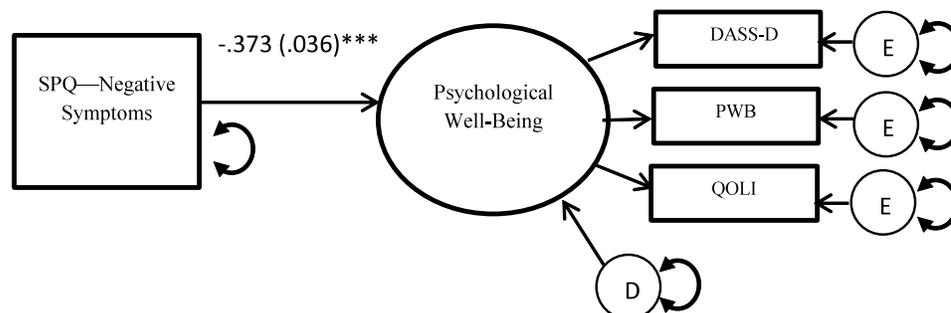
The model for assessing the relationship between positive symptoms and psychological well-being had adequate model fit ($\chi^2(13) = 26.284, p = .023; CFI = .975, SRMR = .018, RMSEA = .049$). Positive symptoms were negatively associated with psychological well-being, controlling for gender and ethnicity ($b = -.336, SE = .046, p < .001$). The results of this model are presented in Figure 4.

Figure 4. Path analytic representation of positive symptoms associated with psychological well-being



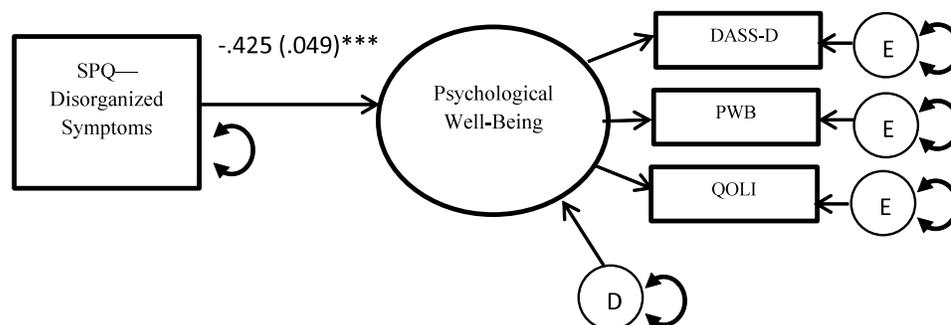
The model for assessing the relationship between negative symptoms and psychological well-being had good model fit ($\chi^2(13) = 21.042, p = .071; CFI = .988, SRMR = .013, RMSEA = .039$). Negative symptoms were more strongly negatively associated with psychological well-being, controlling for gender and ethnicity ($b = -.373, SE = .036, p < .001$) than positive symptoms. The results of this model are presented in Figure 5.

Figure 5. Path analytic representation of negative symptoms associated with psychological well-being



The model for assessing the relationship between disorganized symptoms and psychological well-being had good model fit ($\chi^2(13) = 22.759$, $p = .044$; CFI = .983, SRMR = .014, RMSEA = .042). Disorganized symptoms were most strongly negatively associated with psychological well-being, controlling for gender and ethnicity ($b = -.425$, $SE = .049$, $p < .001$). The results of this model are presented in Figure 6.

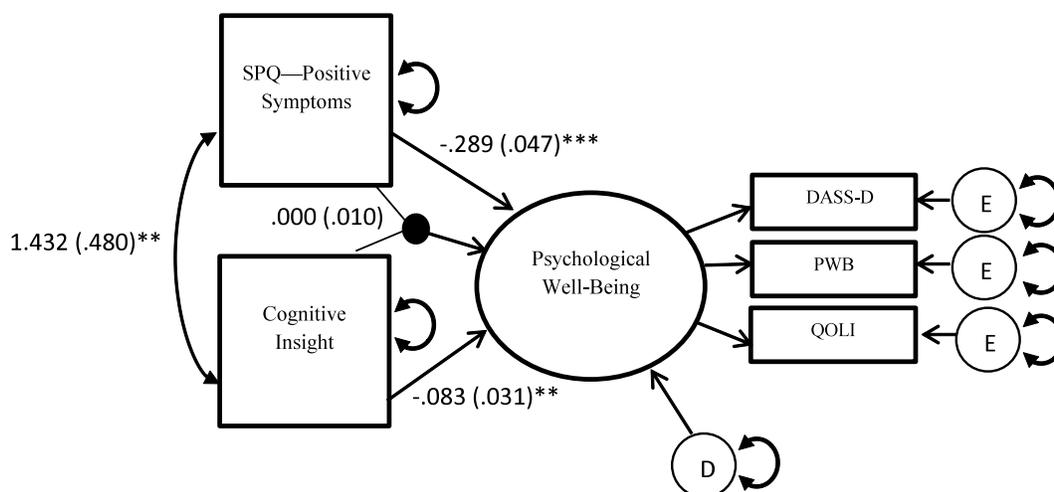
Figure 6. Path analytic representation of disorganized symptoms associated with psychological well-being



Sub-Clinical Psychotic Symptom-Type and Cognitive Insight

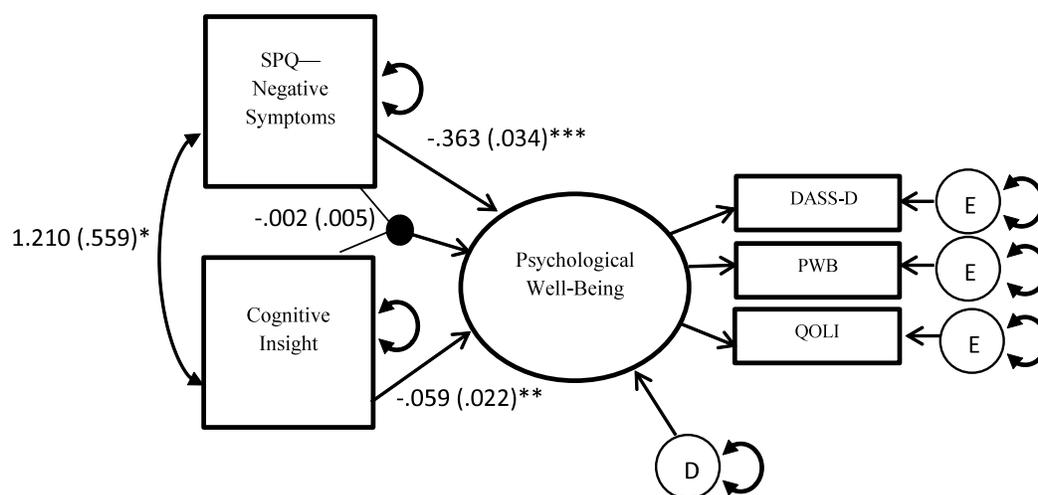
The model for assessing the relationship between positive symptoms, cognitive insight, and psychological well-being had adequate model fit ($\chi^2(35) = 57.669, p = .011$; CFI = .960, SRMR = .031, RMSEA = .039). Positive symptoms were negatively associated with psychological well-being, controlling for cognitive insight, gender, and ethnicity ($b = -.289, SE = .047, p < .001$). Cognitive insight was negatively associated with psychological well-being, controlling for positive symptoms, gender, and ethnicity ($b = -.083, SE = .031, p < .01$). Additionally, positive symptoms and cognitive insight were positively associated ($b = 1.432, SE = .480, p < .01$). Cognitive insight did not moderate the relationship between positive symptoms and psychological well-being ($b = .000, SE = .010, p = .994$). The results of this model are presented in Figure 7.

Figure 7. Path analytic representation of the interactive effect of positive and cognitive insight on psychological well-being



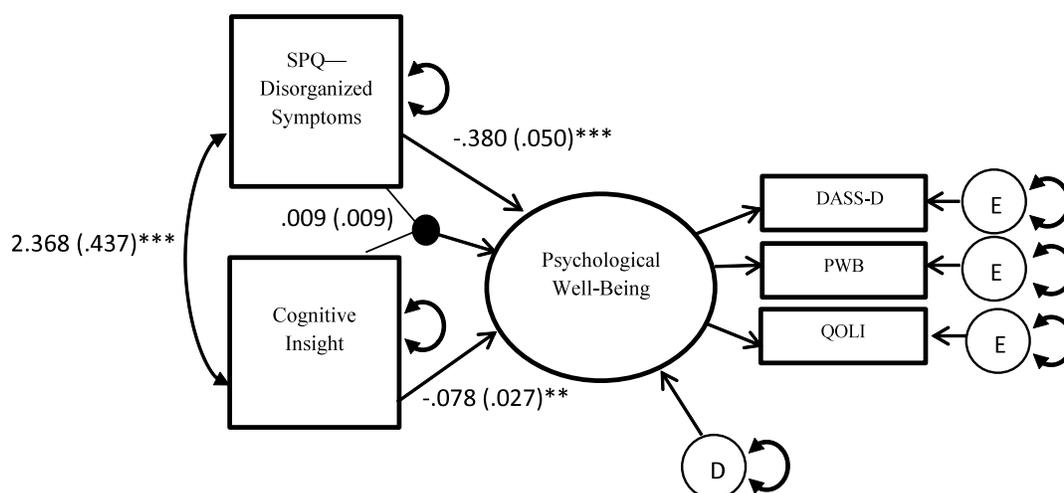
The model for assessing the relationship between negative symptoms, cognitive insight, and psychological well-being had adequate model fit ($\chi^2(35) = 60.510, p = .005$; CFI = .962, SRMR = .034, RMSEA = .042). Negative symptoms were negatively associated with psychological well-being, controlling for cognitive insight, gender, and ethnicity ($b = -.363, SE = .034, p < .001$). Cognitive insight was negatively associated with psychological well-being, controlling for negative symptoms, gender, and ethnicity ($b = -.059, SE = .022, p < .01$). Additionally, negative symptoms and cognitive insight were positively associated ($b = 1.210, SE = .559, p < .05$). Cognitive insight did not moderate the relationship between negative symptoms and psychological well-being ($b = -.002, SE = .005, p < .764$). The results of this model are presented in Figure 8.

Figure 8. Path analytic representation of the interactive effect of negative and cognitive insight on psychological well-being



The model for assessing the relationship between disorganized symptoms and psychological well-being had adequate model fit ($\chi^2(35) = 53.887, p = .022; CFI = .968, SRMR = .031, RMSEA = .036$). Disorganized symptoms were negatively associated with psychological well-being, controlling for cognitive insight, gender, and ethnicity ($b = -.380, SE = .050, p < .001$). Cognitive insight is negatively associated with psychological well-being, controlling for disorganized symptoms, gender, and ethnicity ($b = -.078, SE = .027, p < .01$). Additionally, disorganized symptoms and cognitive insight are positively associated ($b = 2.368, SE = .437, p < .001$). However, cognitive insight did not moderate the relationship between disorganized symptoms and psychological well-being ($b = .009, SE = .009, p < .316$). The results of this model are presented in Figure 9.

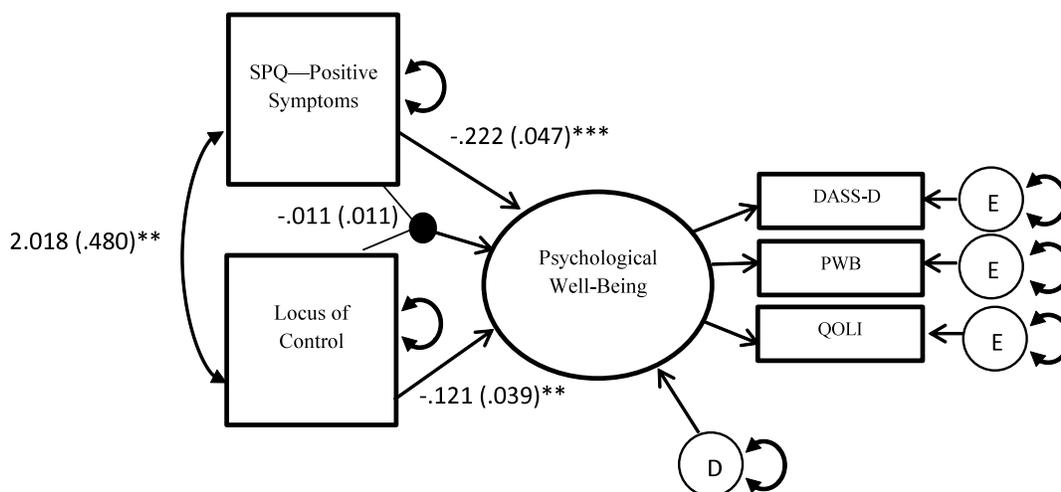
Figure 9. Path analytic representation of the interactive effect of disorganized and cognitive insight on psychological well-being



Sub-Clinical Psychotic Symptom-Type and Locus of Control

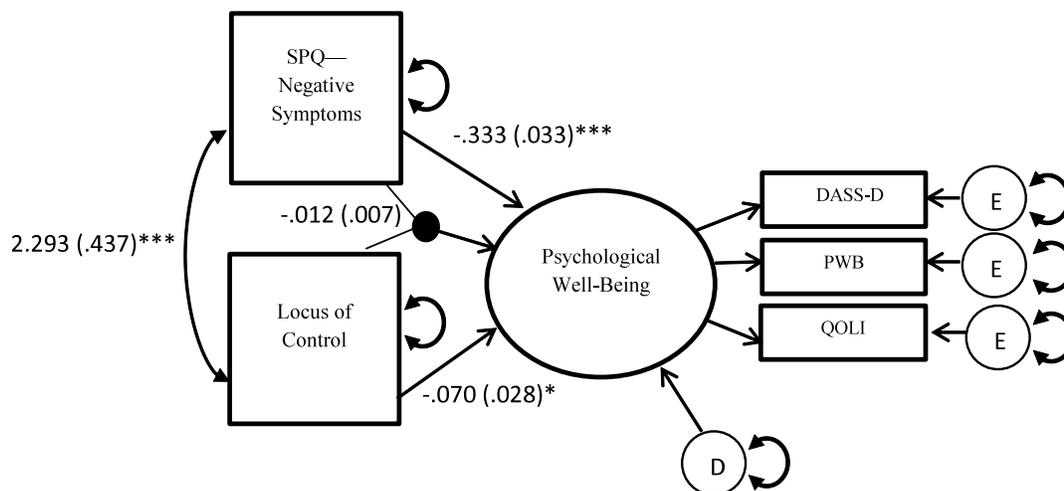
The model for assessing the relationship between positive symptoms, locus of control, and psychological well-being had good model fit ($\chi^2(35) = 45.882, p = .103$; CFI = .980, SRMR = .025, RMSEA = .027). Positive symptoms were negatively associated with psychological well-being, controlling for locus of control, gender, ethnicity ($b = -.222, SE = .047, p < .001$). An external locus of control was negatively associated with psychological well-being, controlling for positive symptoms, gender, and ethnicity ($b = -.121, SE = .039, p < .01$). Additionally, positive symptoms and an external locus of control were positively associated ($b = 2.018, SE = .480, p < .01$). Locus of control did not moderate the relationship between positive symptoms and psychological well-being ($b = -.011, SE = .011, p = .332$). The results of this model are presented in Figure 10.

Figure 10. Path analytic representation of the interactive effect of positive and locus of control on psychological well-being



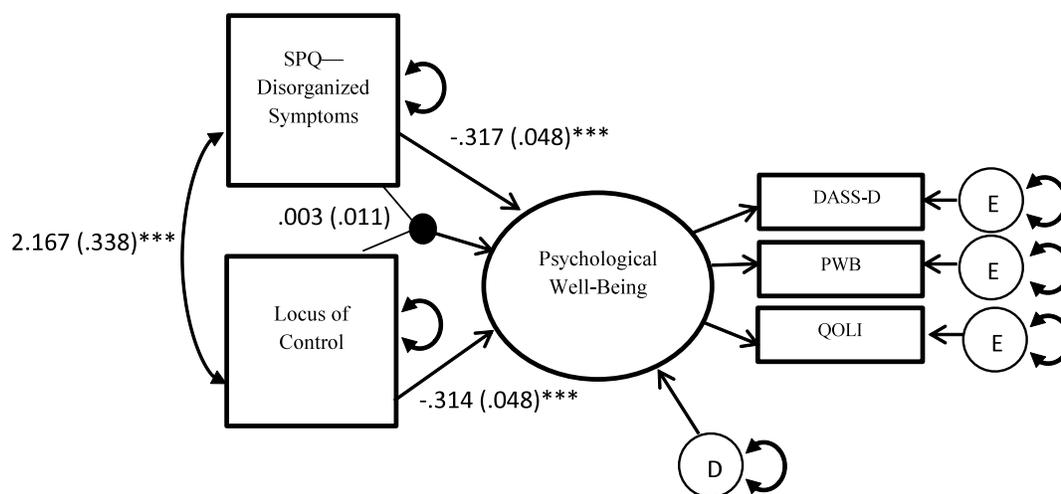
The model for assessing the relationship between negative symptoms, locus of control, and psychological well-being had good model fit ($\chi^2(35) = 42.458, p = .180$; CFI = .989, SRMR = .029, RMSEA = .023). Negative symptoms were negatively associated with psychological well-being, controlling for locus of control, gender, and ethnicity ($b = -.333, SE = .033, p < .001$). An external locus of control was negatively associated with psychological well-being, controlling for negative symptoms, gender, and ethnicity ($b = -.070, SE = .028, p < .05$). Additionally, an external locus of control was positively associated with negative symptoms ($b = 2.293, SE = .437, p < .001$). However, locus of control did not moderate the relationship between negative symptoms and psychological well-being ($b = -.012, SE = .007, p = .110$). The results of this model are presented in Figure 11.

Figure 11. Path analytic representation of the interactive effect of negative and locus of control on psychological well-being



The model for assessing the relationship between disorganized symptoms and psychological well-being had good model fit ($\chi^2(35) = 41.084, p = .22; CFI = .989, SRMR = .023, RMSEA = .020$). Disorganized symptoms were negatively associated with psychological well-being, controlling for locus of control, gender, and ethnicity ($b = -.317, SE = .048, p < .001$). An external locus of control was positively associated with psychological well-being, controlling for disorganized symptoms, gender, and ethnicity ($b = .314, SE = .048, p < .001$). Disorganized symptoms and an external locus of control were positively associated ($b = 2.167, SE = .338, p < .001$). However, locus of control did not moderate the relationship between disorganized symptoms and psychological well-being ($b = .003, SE = .011, p = .888$). The results of this model are presented in Figure 12.

Figure 12. Path analytic representation of the interactive effect of disorganized and locus of control on psychological well-being



Exploratory Analyses

The primary analyses were re-examined to determine whether the relationships between sub-clinical psychotic symptoms, the social cognitive factors (cognitive insight and LoC), and psychological well-being differed by ethnicity. Due to limitations of sample size by ethnicity, ethnicity was first separated into two groups: majority (Non-Hispanic Caucasian; $n = 191$) and minority ($n = 229$). The same models used in the primary analyses were used in the secondary analyses. (For each significant interaction, the ethnicities were also individually compared to each other using group comparisons in Mplus. Because sample sizes for some groups are small and may be unreliable, these results are presented in Appendix B only.)

Sub-Clinical Psychosis and Psychological Well-Being by Ethnicity

Ethnicity significantly moderated the relationship between sub-clinical psychotic symptoms and psychological well-being ($b = .049$, $SE = .024$, $p < .05$). Therefore, the simple effects of the relationship between sub-clinical psychotic symptoms and psychological well-being were analyzed. The model created for the majority group had good model fit ($\chi^2(7) = 5.036$, $p = .656$; $CFI = 1.000$, $SRMR = .030$, $RMSEA = .000$). Sub-clinical psychotic symptoms were significantly negatively associated with psychological well-being in the majority group, controlling for gender ($b = -.274$, $SE = .030$, $p < .001$). The model tested in the minority group had good model fit ($\chi^2(7) = 14.900$, $p = .037$; $CFI = .99$, $SRMR = .033$, $RMSEA = .071$), and the results showed a similar pattern. However, sub-clinical psychotic symptoms were found to be more strongly negatively associated with psychological well-being in the minority group, controlling for gender ($b = -.336$, $SE = .033$, $p < .001$), than in the majority group.

Cognitive Insight Model separated by Ethnicity

There were no significant differences in the relationship between cognitive insight and psychological well-being by ethnicity ($b = .014$, $SE = .020$, $p = .492$).

Locus of Control Model separated by Ethnicity

Ethnicity significantly moderated the relationship between locus of control and psychological well-being ($b = .06$, $SE = .028$, $p < .05$). Therefore, the locus of control model was examined separately by majority and minority group. In both groups, sub-clinical psychotic symptoms were similarly negatively associated with psychological well-being, controlling for gender and locus of control (Majority: $b = -.269$, $SE = .029$, $p < .001$; Minority: $b = -.302$, $SE = .034$, $p < .001$). The interaction term of psychotic symptoms with locus of control did not significantly predict psychological well-being for either group, controlling for gender (Majority: $b = .001$, $SE = .006$, $p = .814$; Minority: $b = .004$, $SE = .007$, $p = .536$). However, the main effect of a more external locus of control relating to poorer psychological well-being was stronger for minorities, controlling for gender and psychotic symptoms (Majority: $b = -.111$, $SE = .033$, $p = .01$; Minority: $b = -.232$, $SE = .047$, $p < .001$).

CHAPTER 4: DISCUSSION

The current study examined the relationships between sub-clinical psychotic symptoms, social cognition, and psychological well-being. Similar to the pattern seen in full-blown schizophrenia, the results demonstrated that increased sub-clinical psychotic symptoms are associated with worse psychological well-being. Further, having increased cognitive insight was related to worse well-being, paralleling the insight paradox seen in schizophrenia (Lysaker, Roe, & Yanos, 2007). This study also found that, of the three main symptom types, disorganized symptoms had the strongest connection to well-being.

The finding that lower levels of psychotic symptoms are related to well-being supports the continuum perspective of psychotic symptoms. Matching the pattern seen in schizophrenia, sub-clinical symptoms appear to play a role in individuals' psychological well-being in a non-clinical population as well (Claridge, 1985). This suggests that individuals with lower levels of psychosis begin experiencing declines in their psychological well-being even before reaching threshold for a psychotic disorder. Although the participants were fairly high achieving (considering they were college students at a research one private university at the time of data collection) and the sample was non-clinical, a significant negative relationship between sub-clinical symptoms and psychological well-being was still found.

Secondary analyses examined whether the relationship between sub-clinical psychotic symptoms and psychological well-being differed by symptom-type. While all symptom-types were negatively associated with psychological well-being, disorganized symptoms had the strongest association, negative symptoms had the second strongest association, and positive symptoms had the least strong significant association. This

mirrors previous work done on sub-clinical psychosis, and suggests that individuals presenting with lower level disorganized features (such as unusual behavior or speech that is difficult to understand) have the greatest decreases in psychological well-being (Tabak & Weisman de Mamani, 2014).

Exploratory analyses were conducted to determine whether ethnicity moderated the relationships between symptoms and well-being. All ethnic groups demonstrated a negative association between sub-clinical psychotic symptoms and psychological well-being; however, the relationship was significantly stronger for ethnic minorities. The link between sub-clinical psychosis and poor psychological well-being has been previously found (e.g. Cohen & Davis, 2009). This is the first study, however, that has examined whether ethnicity moderates this relationship. Some literature speaks to the increased stigma (e.g. Gary, 2005) and socioeconomic barriers to mental health treatment (e.g. Chow, Jaffee, Snowden, 2003) that are often present for minorities. These factors can lead to decreased well-being and poorer illness prognosis for minorities (Atdjian & Vera, 2005). While this study cannot speak to the reasons why a stronger relationship between symptoms and well-being was present for minorities, it is possible that they face increased stigma and less access to social or professional resources for their sub-clinical psychotic symptoms. As a result of increased stigma and less access to resources, minorities with greater sub-clinical symptoms may have a more difficult time coping with their symptoms, leading to poorer well-being.

The second major finding, examining the relationship between cognitive insight, sub-clinical psychosis, and psychological well-being, provided support for the insight paradox in lower level symptomatology. This is the first study to explore this relationship

in a sub-clinical population. While cognitive insight did not moderate the relationship between sub-clinical psychotic symptoms and psychological well-being, the direct effect for cognitive insight still supports the insight paradox. Having insight into one's unusual experiences appears to be related to poorer psychological well-being for both patients with schizophrenia as well as within the non-clinical population. This relationship is not unique to individuals with elevated psychotic symptoms *and* increased cognitive insight. Instead, there is an overall trend that an increased ability to self-reflect and question one's experiences is associated with poorer well-being. No ethnic patterns were found with respect to cognitive insight and psychological well-being

The notion that insight can be detrimental to well-being is similar to a theory presented in the depression literature: depressive realism (Alloy & Abramson, 1988). Depressive realism posits that individuals who are mildly depressed make inferences about the world that are less optimistic, yet more realistic than non-depressed individuals. For example, whereas healthy individuals tend to overestimate their abilities (e.g., "I am smarter than most") mildly depressed individuals are more realistic and do not overestimate their abilities (Gotlib, 1986). Having increased insight into one's symptoms may produce something similar to depressive realism. In other words, when a person has the insight to recognize that their experiences are not normal, they may become disheartened and more prone to depression (perhaps supporting the cliché "ignorance is bliss"). While it does not seem prudent for clinicians to attempt to promote poorer insight into one's psychotic symptoms, these findings do suggest that clinicians should be especially attentive to pinpointing and modifying maladaptive cognitions in individuals

with sub-clinical psychotic symptoms who appear to have keen insight into their symptoms.

With respect to LoC, study results indicated that an external orientation was associated with poorer well-being than an internal orientation. This finding matches a large body of research (e.g. Harrow, Hansford, & Astrachan-Fletcher, 2009). However, participants' ethnicity played a significant role in this relationship. Individuals who self-identified as a minority (e.g. Hispanic, Black, Asian-American) demonstrated a relationship between an external LoC and poorer well-being. For the majority ethnicity (i.e. Caucasians), there was no significant relationship between LoC and well-being. While there is much research to suggest that an internal locus of control orientation tends to be associated with more beneficial outcomes, at least for Caucasians (e.g. Ng, Sorensen, & Eby, 2006), the current study found no such association for Caucasians. Additionally, some research suggests that individuals from non-Western cultures hold a more external orientation, and that an external orientation can be beneficial for these individuals (e.g. Marks, 1998; Wenzel, 1993). This finding for minorities was not replicated. Instead, the results from the current study suggest that an external LoC is connected to poorer psychological well-being for minorities.

The association between an external locus of control and well-being for minorities may be due to a mismatch between the minority culture and the culture within which they live (Fulmer et al., 2010). Individuals who live within a culture that supports their LoC orientation may have an easier time justifying the actions around them and making sense of their experiences. Both the individual and his/her community would have similar attributional styles, and there would not be any disconnect between the ways these two

parties make sense of their environment. However, individuals who maintain allegiance with ideals and values that do not align with their current culture may face greater struggles as they attribute life circumstances to causes that are different than their current culture's views. In other words, an external orientation may be beneficial within a culture that values this orientation. However, when an individual is more external but in a culture that values a more internal orientation, this may have a detrimental impact on their well-being.

The social cognitive theory of psychosis (Garety et al., 2007) would suggest that the relationship between increased psychotic symptoms and decreased psychological well-being would be stronger for individuals with a more external locus of control. However, the current study did not support this hypothesis. Sub-clinical psychotic symptoms had the same relationship with well-being regardless of participants' locus of control orientation. Similarly to the previous moderation analysis with cognitive insight, the ability to power the moderation was greatly hindered by the strength of the association between psychotic symptoms and LoC. The relationship between the social cognitive factors and psychological well-being were not changed when sub-clinical psychotic symptoms were broken down by symptom-type. Additionally, the interaction between the social cognitive factors and each of the symptom-types in relation to psychological well-being remained non-significant.

Limitations

While the current study illustrates that patterns seen in full-blown schizophrenia also emerge at lower levels of psychotic symptoms, the current study is not without limitations. First the study measured all variables cross-sectionally, which limits the

ability to make any causal inferences. Measuring sub-clinical psychosis, well-being, and the social cognitive factors over time could provide greater insight into the trajectory of individuals' well-being as a function of sub-clinical symptoms of psychosis. Measuring the study variables using self-report measures is another limitation. Conducting clinical interviews to determine participants' levels of psychotic symptoms and psychological well-being would provide a more objective method of measuring study variables.

Future Directions

It is clear that psychotic symptoms, cognitive insight, and well-being are associated across the psychosis spectrum; however, the way these variables might interact to precipitate a psychotic disorder over time is not well understood. Though the current study found a significant relationship between insight and well-being, most individuals in this study will not go on to develop a psychotic disorder. Future research should attempt to measure study variables in high-risk samples to pinpoint whether or when insight and well-being interact to precipitate a full-fledged psychotic disorder. The reasons why the relationships between sub-clinical psychosis, locus of control, and psychological well-being are stronger for ethnic minorities is beyond the scope of this study. However, on a speculative basis, this finding could be related to the stigma related to unusual thoughts and/or behaviors for minority cultures, differing cultural values, or less access to care that make unusual thought and/or behaviors more distressing for minorities (e.g. Veling et al., 2007, Veling et al., 2010). Examining why the patterns found in this study differ based on ethnicity is an important step for basic science and treatment research. Since cultural factors often play an important role in individual's experience, it is important to elucidate

both similarities and differences across ethnicities/cultures and determine why individuals experience similar situations with different outcomes.

Conclusion

This study replicates patterns seen in full-blown schizophrenia. Results indicated that increased sub-clinical psychotic symptoms were associated with decreased psychological well-being. Within this relationship, disorganized symptoms had the greatest negative association with well-being of the three symptom-types (positive, negative, and disorganized). Additionally, the paradoxical finding seen in schizophrenia showing that increased insight into one's unusual experiences is associated with decreased psychological well-being even in a non-clinical population. While locus of control as a moderator in the relationship between sub-clinical psychotic symptoms and psychological well-being was not found, a positive association between external locus of control and psychological well-being was found. These patterns seen in schizophrenia have now been shown to be present within a non-clinical population in the current study. Future research should attempt to measure study variables longitudinally in a high-risk sample.

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Appendix A: MEASURES

Schizotypal Personality Questionnaire- Brief Form

Instructions: On the line preceding each sentence, please write T if the statement is true or mostly true OR F if the statement is false or mostly false.

- _____ 1. People sometimes find me aloof and distant.
- _____ 2. Have you ever had the sense that some person or force is around you, even _____ though you cannot see anyone?
- _____ 3. People sometimes comment on my unusual mannerisms and habits.
- _____ 4. Are you sometimes sure that other people can tell what you are thinking?
- _____ 5. Have you ever noticed a common event or object that seemed to be a special _____ sign for you?
- _____ 6. Some people think that I am a very bizarre person.
- _____ 7. I feel I have to be on guard even with friends.
- _____ 8. Some people find me a bit vague and elusive during a conversation.
- _____ 9. Do you often pick up hidden threats of put-downs from what other people say or _____ do?
- _____ 10. When shopping, do you get the feeling that other people are taking notice of _____ you?
- _____ 11. I feel very uncomfortable in social situations involving unfamiliar people.
- _____ 12. Have you had experiences with astrology, seeing the future, UFO's, ESP, or a _____ sixth sense?
- _____ 13. I sometimes use words in unusual ways.
- _____ 14. Have you found that it is best not to let other people know too much about you?
- _____ 15. I tend to keep in the background on social occasions.
- _____ 16. Do you ever suddenly feel distracted by distant sounds that you are not normally aware of?
- _____ 17. Do you often have to keep an eye out to stop people from taking advantage of _____ you?
- _____ 18. Do you feel that you are unable to get "close" to people?
- _____ 19. I am an odd, unusual person.
- _____ 20. I find it hard to communicate clearly what I want to say to people.
- _____ 21. I feel very uneasy talking to people I do not know well.
- _____ 22. I tend to keep my feelings to myself.

Oxford-Liverpool Inventory of Feelings and Experiences

These questions relate to your thoughts, feelings, experiences and preferences. There are no right or wrong answers or trick questions so please be as honest as possible. For each question please choose either YES or NO and circle this on the form. Please do not spend too much time thinking about it – choose the answer closest to your own.

- YES NO 1. Do you often hesitate when you are going to say something in a group of people whom you more or less know?
- YES NO 2. Do you often overindulge in alcohol or food?
- YES NO 3. Are the sounds you hear in your daydreams really clear and distinct?
- YES NO 4. Do you enjoy many different kinds of play and recreation?
- YES NO 5. Do your thoughts sometimes seem as real as actual events in your life?
- YES NO 6. Does it often happen that nearly every thought immediately and automatically suggests an enormous number of ideas?
- YES NO 7. When in a group of people do you usually prefer to let someone else be the centre of attention?
- YES NO 8. Do you frequently have difficulty in starting to do things?
- YES NO 9. Has dancing or the idea of it always seemed dull to you?
- YES NO 10. When you catch a train do you often arrive at the last minute?
- YES NO 11. Is trying new foods something you have always enjoyed?
- YES NO 12. Do you often change between intense liking and disliking of the same person?
- YES NO 13. Have you ever cheated at a game?
- YES NO 14. Are there very few things that you have ever really enjoyed doing?
- YES NO 15. Do you at times have an urge to do something harmful or shocking?
- YES NO 16. Do you often worry about things you should not have done or said?
- YES NO 17. Are your thoughts sometimes so strong that you can almost hear them?
- YES NO 18. Are you usually in an average sort of mood, not too high and not too low?
- YES NO 19. Would you take drugs which may have strange or dangerous effects?
- YES NO 20. Do you think you could learn to read other's minds if you wanted to?
- YES NO 21. When in a crowded room, do you often have difficulty in following a conversation?
- YES NO 22. No matter how hard you try to concentrate do unrelated thoughts creep into your mind?
- YES NO 23. Are you easily hurt when people find fault with you or the work you do?
- YES NO 24. Do you stop to think things over before doing anything?
- YES NO 25. Have you ever felt that you have special, almost magical powers?
- YES NO 26. Are you much too independent to really get involved with other people?

- YES NO 27. Do ideas and insights sometimes come to you so fast that you cannot express them all?
- YES NO 28. Do you easily lose your courage when criticised or failing in something?
- YES NO 29. Can some people make you aware of them just by thinking about you?
- YES NO 30. Does a passing thought ever seem so real it frightens you?
- YES NO 31. Have you ever blamed someone for doing something you know was really your fault?
- YES NO 32. Are you a person whose mood goes up and down easily?
- YES NO 33. Does your voice ever seem distant or faraway?
- YES NO 34. Do you think having close friends is not as important as some people say?
- YES NO 35. Are you rather lively?
- YES NO 36. Are you sometimes so nervous that you are `blocked`?
- YES NO 37. Do you find it difficult to keep interested in the same thing for a long time?
- YES NO 38. Do you dread going into a room by yourself where other people have already gathered and are talking?
- YES NO 39. Does it often feel good to massage your muscles when they are tired or sore?
- YES NO 40. Do you sometimes feel that your accidents are caused by mysterious forces?
- YES NO 41. Do you like mixing with people?
- YES NO 42. On seeing a soft thick carpet have you sometimes had the impulse to take off your shoes and walk barefoot on it?
- YES NO 43. Do you often have difficulties in controlling your thoughts?
- YES NO 44. Do the people in your daydreams seem so true to life that you sometimes think they are real?
- YES NO 45. Are people usually better off if they stay aloof from emotional involvements with people?
- YES NO 46. Can just being with friends make you feel really good?
- YES NO 47. Is your hearing sometimes so sensitive that ordinary sounds become uncomfortable?
- YES NO 48. Have you often felt uncomfortable when your friends touch you?
- YES NO 49. When things are bothering you do you like to talk to other people about it?
- YES NO 50. Do you have many friends?
- YES NO 51. Would being in debt worry you?
- YES NO 52. Do you think people spend too much time safeguarding their future with

- savings and insurance?
- YES NO 53. Do you ever have the urge to break or smash things?
- YES NO 54. Do you often feel that there is no purpose to life?
- YES NO 55. Do you worry about awful things that might happen?
- YES NO 56. Have you ever felt the urge to injure yourself?
- YES NO 57. Would it make you nervous to play the clown in front of other people?
- YES NO 58. Have you felt that you might cause something to happen just by thinking too much about it?
- YES NO 59. Have you had very little fun from physical activities like walking, swimming, or sports?
- YES NO 60. Do you feel so good at controlling others that it sometimes scares you?
- YES NO 61. Are you easily distracted from work by daydreams?
- YES NO 62. Are you easily confused if too much happens at the same time?
- YES NO 63. Do you ever have a sense of vague danger or sudden dread for reasons that you do not understand?
- YES NO 64. Is it true that your relationships with other people never get very intense?
- YES NO 65. Have you sometimes had the feeling of gaining or losing energy when certain people look at you or touch you?
- YES NO 66. Do you worry too long after an embarrassing experience?
- YES NO 67. Do you love having your back massaged?
- YES NO 68. Do you consider yourself to be pretty much an average kind of person?
- YES NO 69. Have you ever taken advantage of someone?
- YES NO 70. Would you like other people to be afraid of you?
- YES NO 71. Have you ever thought you heard people talking only to discover that it was in fact some nondescript noise?
- YES NO 72. Have you occasionally felt as though your body did not exist?
- YES NO 73. Do you often feel lonely?
- YES NO 74. Do you often have an urge to hit someone?
- YES NO 75. Do you often experience an overwhelming sense of emptiness?
- YES NO 76. On occasions, have you seen a person's face in front of you when no one was in fact there?
- YES NO 77. Is it fun to sing with other people?
- YES NO 78. Do you often have days when indoor lights seem so bright that they bother your eyes?
- YES NO 79. Have you wondered whether the spirits of the dead can influence the living?
- YES NO 80. Do people who try to get to know you better usually give up after a while?

- YES NO 81. Do you often feel 'fed up'?
- YES NO 82. Have you felt as though your head or limbs were somehow not your own?
- YES NO 83. When you look in the mirror does your face sometimes seem quite different from usual?
- YES NO 84. Do people who drive carefully annoy you?
- YES NO 85. Would you call yourself a nervous person?
- YES NO 86. Can you usually let yourself go and enjoy yourself at a lively party?
- YES NO 87. Do you ever suddenly feel distracted by distant sounds that you are not normally aware of?
- YES NO 88. Do you sometimes talk about things you know nothing about?
- YES NO 89. When in the dark do you often see shapes and forms even though there's nothing there?
- YES NO 90. Have you sometimes sensed an evil presence around you, even though you could not see it?
- YES NO 91. Is it hard for you to make decisions?
- YES NO 92. Do you find the bright lights of a city exciting to look at?
- YES NO 93. Does your sense of smell sometimes become unusually strong?
- YES NO 94. Do you usually have very little desire to buy new kinds of food?
- YES NO 95. Do you ever feel that your speech is difficult to understand because the words are all mixed up and don't make sense?
- YES NO 96. Do you often feel like doing the opposite of what other people suggest, even though you know they are right?
- YES NO 97. Do you like going out a lot?
- YES NO 98. Do you feel very close to your friends?
- YES NO 99. Do you ever feel sure that something is about to happen, even though there does not seem to be any reason for you thinking that?
- YES NO 100. Do you often feel the impulse to spend money which you know you can't afford?
- YES NO 101. Are you easily distracted when you read or talk to someone?
- YES NO 102. Do you feel that making new friends isn't worth the energy it takes?
- YES NO 103. Do you believe in telepathy?
- YES NO 104. Do you prefer watching television to going out with other people?
-

Magical Ideation Scale

Instructions: On the line preceding each sentence, please write T if the statement is true or mostly true OR F if the statement is false or mostly false.

- ___ 1. Some people can make me aware of them just by thinking about me.
- ___ 2. I have had the momentary feeling that I might not be human.
- ___ 3. I have sometimes been fearful of stepping on sidewalk cracks.
- ___ 4. I think I could learn to read other's minds if I wanted to.
- ___ 5. Horoscopes are right too often for it to be a coincidence.
- ___ 6. Things sometimes seem to be in different places when I get home, even though no one has been there.
- ___ 7. Numbers like 13 and 7 have no special powers.
- ___ 8. I have occasionally had the silly feeling that a TV or radio broadcaster knew I was listening to him.
- ___ 9. I have worried that people on other planets may be influencing what happens on earth.
- ___ 10. The government refuses to tell us the truth about flying saucers.
- ___ 11. I have felt that there were messages for me in the way things were arranged, like in a store window.
- ___ 12. I have never doubted that my dreams are the products of my own mind.
- ___ 13. Good luck charms don't work.
- ___ 14. I have noticed sounds on my records that are not there at other times.
- ___ 15. The hand motions that strangers make seem to influence me at times.
- ___ 16. I almost never dream about things before they happen.
- ___ 17. I have had the momentary feeling that someone's place has been taken by a look-alike.
- ___ 18. It is not possible to harm others merely by thinking bad thoughts about them.

- ___ 19. I have sometimes sensed an evil presence around me, although I could not see it.
- ___ 20. I sometimes have a feeling of gaining or losing energy when certain people look at me or touch me.
- ___ 21. I have sometimes had the passing thought that strangers are in love with me.
- ___ 22. I have never had the feeling that certain thoughts of mine really belonged to someone else.
- ___ 23. When introduced to strangers, I rarely wonder whether I have known them before.
- ___ 24. If reincarnation were true, it would explain some unusual experiences I have had.
- ___ 25. People often behave so strangely that one wonders if they are part of an experiment.
- ___ 26. At times I perform certain little rituals to ward off negative influences.
- ___ 27. I have felt that I might cause something to happen just by thinking too much about it.
- ___ 28. I have wondered whether the spirits of the dead can influence the living.
- ___ 29. At times I have felt that a professor's lecture was meant especially for me.
- ___ 30. I have sometimes felt that strangers were reading my mind.

Beck Cognitive Insight Scale

Below is a list of sentences about how people think and feel. Please read each sentence in the list carefully. Indicate how much you agree with each statement by placing an X in the corresponding place in the column next to each statement.

	Do not agree at all	Agree slightly	Agree a lot	Agree completely
1. At times, I have misunderstood other people's attitudes towards me.				
2. My interpretations of my experiences are definitely right.				
3. Other people can understand the cause of my unusual experiences better than I can.				
4. I have jumped to conclusions too fast.				
5. Some of my experiences that have seemed very real may have been due to my imagination. (e.g., daydreaming)				
6. Some of the ideas I was certain were true turned out to be false.				
7. If something feels right, it means that it is right.				
8. Even though I feel strongly that I am right, I could be wrong.				
9. I know better than anyone else what my problems are.				
10. When people disagree with me, they are generally wrong.				
11. I cannot trust other people's opinion about my experiences.				
12. If somebody points out that my beliefs are wrong, I am willing to consider it.				
13. I can trust my own judgment at all times.				
14. There is often more than one possible explanation for why people act the way they do.				
15. My unusual experiences may be due to my being extremely upset or stressed.				

Locus of Control Scale (Rotter)

01. a. Children get into trouble because their parents punish them too much.
b. The trouble with most children nowadays is that their parents are too easy with them.
02. a. Many of the unhappy things in people's lives are partly due to bad luck.
b. People's misfortunes result from the mistakes they make.
03. a. One of the major reasons why we have wars is because people don't take enough interest in politics.
b. There will always be wars, no matter how hard people try to prevent them.
04. a. In the long run people get the respect they deserve in this world.
b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.
05. a. The idea that teachers are unfair to students is nonsense.
b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
06. a. Without the right breaks one cannot be an effective leader.
b. Capable people who fail to become leaders have not taken advantage of their opportunities.
07. a. No matter how hard you try some people just don't like you.
b. People who can't get others to like them don't understand how to get along with others.
08. a. Heredity plays the major role in determining one's personality.
b. It is one's experiences in life which determine what they're like.
09. a. I have often found that what is going to happen will happen.
b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
10. a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
b. Many times exam questions tend to be so unrelated to course work that studying is really useless.

11.
 - a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
 - b. Getting a good job depends mainly on being in the right place at the right time.
12.
 - a. The average citizen can have an influence in government decisions.
 - b. This world is run by the few people in power, and there is not much the little guy can do about it.
13.
 - a. When I make plans, I am almost certain that I can make them work.
 - b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
14.
 - a. There are certain people who are just no good.
 - b. There is some good in everybody.
15.
 - a. In my case getting what I want has little or nothing to do with luck.
 - b. Many times we might just as well decide what to do by flipping a coin.
16.
 - a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.
 - b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.
17.
 - a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.
 - b. By taking an active part in political and social affairs the people can control world events.
18.
 - a. Most people don't realize the extent to which their lives are controlled by accidental happenings.
 - b. There really is no such thing as "luck."
19.
 - a. One should always be willing to admit mistakes.
 - b. It is usually best to cover up one's mistakes.
20.
 - a. It is hard to know whether or not a person really likes you.
 - b. How many friends you have depends upon how nice a person you are.
21.
 - a. In the long run the bad things that happen to us are balanced by the good ones.
 - b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. a. With enough effort we can wipe out political corruption.
b. It is difficult for people to have much control over the things politicians do in office.
23. a. Sometimes I can't understand how teachers arrive at the grades they give.
b. There is a direct connection between how hard I study and the grades I get.
24. a. A good leader expects people to decide for themselves what they should do.
b. A good leader makes it clear to everybody what their jobs are.
25. a. Many times I feel that I have little influence over the things that happen to me.
b. It is impossible for me to believe that chance or luck plays an important role in my life.
26. a. People are lonely because they don't try to be friendly.
b. There's not much use in trying too hard to please people, if they like you, they like you.
27. a. There is too much emphasis on athletics in high school.
b. Team sports are an excellent way to build character.
28. a. What happens to me is my own doing.
b. Sometimes I feel that I don't have enough control over the direction my life is taking.
29. a. Most of the time I can't understand why politicians behave the way they do.
b. In the long run the people are responsible for bad government on a national as well as on a local level.

DASS

Please read each statement and choose the answer that indicates how much the statement applied to you OVER THE PAST 3 MONTHS. There are no right or wrong answers.

Do not spend too much time on any statement. Circle the appropriate number on the left using the following rating scale:

0 = Did not apply to me at all

1 = Applied to me to some degree, or some of the time

2 = Applied to me a considerable degree, or a good part of the time

3 = Applied to me very much, or most of the time

- 0 1 2 3 1. I found myself getting upset by quite trivial things
- 0 1 2 3 2. I just couldn't seem to get going
- 0 1 2 3 3. I had a feeling of faintness
- 0 1 2 3 4. I experienced breathing difficulty (eg, excessively breathing, breathlessness in the absence of physical exertion)
- 0 1 2 3 5. I felt sad and depressed
- 0 1 2 3 6. I found it hard to calm down after something upset me
- 0 1 2 3 7. I perspired noticeably (eg, hands sweaty) in the absence of high temperatures or physical exertion
- 0 1 2 3 8. I found myself getting impatient when I was delayed in any way (eg, elevators, traffic lights, being kept waiting)
- 0 1 2 3 9. I found myself in situations that made me so anxious I was most

relieved when they ended

- 0 1 2 3 10. I tended to over-react to situations
- 0 1 2 3 11. I found myself getting upset rather easily
- 0 1 2 3 12. I felt that I had nothing to look forward to
- 0 1 2 3 13. I couldn't seem to experience any positive feeling
- 0 1 2 3 14. I found that I was very irritable
- 0 1 2 3 15. I was aware of the dryness of my mouth
- 0 1 2 3 16. I felt that I had lost interest in just about everything
- 0 1 2 3 17. I could see nothing in the future to be hopeful about
- 0 1 2 3 18. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increasing, missing a beat)
- 0 1 2 3 19. I felt scared without any good reason
- 0 1 2 3 20. I felt that life wasn't worthwhile
- 0 1 2 3 21. I felt that I was rather touchy
- 0 1 2 3 22. I felt that I was using a lot of nervous energy
- 0 1 2 3 23. I couldn't seem to get any enjoyment out of anything I did.
- 0 1 2 3 24. I had a feeling of shakiness (e.g., legs going to give)
- 0 1 2 3 25. I felt down-hearted and blue
- 0 1 2 3 26. I found it difficult to work up the initiative to do things

- 0 1 2 3 27. I found it hard to wind down
- 0 1 2 3 28. I was intolerant of anything that kept me from getting on with what I was doing
- 0 1 2 3 29. I had difficulty swallowing
- 0 1 2 3 30. I feared that I would be “thrown” by some trivial by unfamiliar task
- 0 1 2 3 31. I felt that I was pretty worthless
- 0 1 2 3 32. I was unable to become enthusiastic about anything
- 0 1 2 3 33. I was worried about situations in which I might panic and make a fool of myself
- 0 1 2 3 34. I was in a state of nervous tension
- 0 1 2 3 35. I felt that I was close to panic
- 0 1 2 3 36. I felt I wasn't worth much as a person
- 0 1 2 3 37. I found it difficult to relax
- 0 1 2 3 38. I felt terrified
- 0 1 2 3 39. I experienced trembling (e.g., in the hands)
- 0 1 2 3 40. I found myself getting agitated
- 0 1 2 3 41. I felt that life was meaningless
- 0 1 2 3 42. I found it difficult to tolerate interruption to what I was doing.

Quality of Life Inventory

DIRECTIONS: This survey asks how satisfied you are with parts of your life such as your work and your health. It also asks how important these things are to your happiness. Special definitions are used for words like “money,” “work,” and “play.” Keep these definitions in mind as you answer the questions. Answer every question, even if it does not seem to apply to you. It is your feelings and opinions that are important, so there are no right or wrong answers. Just give the answers that best describe you. Answer questions based on the **LAST 3 MONTHS** or **SINCE YOUR LAST ASSESSMENT**.

The survey asks you to describe how **important** certain parts of your life (such as work and health) are and how **satisfied** you are with them.

Important means how much this part of your life adds to your overall happiness. You can say how important something is by picking one of three choices: “Not Important” (0), “Important” (1), or “Extremely Important” (2).

Satisfied means how well your needs, goals, and wishes are being met in this area of life. You can say how satisfied you are by picking one of three choices from “Very Dissatisfied” (0) to “Very Satisfied” (5).

For each question, circle the number that best describes you.

HEALTH is being physically fit, not sick, and without pain or disability.

1. How important is HEALTH to your happiness?

0 1 2

not important important extremely important

2. How satisfied are you with your HEALTH?

0 1 2 3 4 5

Very Somewhat A little A little Somewhat Very

DISSATISFIED

SATISFIED

SELF-ESTEEM means liking and respecting yourself in light of your strengths and weaknesses, successes and failures, and ability to handle problems.

WORK means your career or how you spend most of your time. You may work at a job, at home taking care of your family, or at school as a student. **WORK** includes your duties on the job, the money you earn (if any), and the people you work with. (If you are unemployed, retired, or can't work, you can still answer these questions).

9. How important is **WORK** to your happiness?

0	1	2
not important	important	extremely important

10. How satisfied are you with your **WORK**?

0	1	2	3	4	5
Very	Somewhat	A little	A little	Somewhat	Very
DISSATISFIED			SATISFIED		

PLAY is what you do in your free time to relax, have fun, or improve yourself. This could include watching movies, visiting friends, or pursuing a hobby like sports or gardening.

11. How important is **PLAY** to your happiness?

0	1	2
not important	important	extremely important

12. How satisfied are you with your **PLAY**?

0	1	2	3	4	5
Very	Somewhat	A little	A little	Somewhat	Very
DISSATISFIED			SATISFIED		

LEARNING means gaining new skills or information about things that interest you. **LEARNING** can come from reading books or taking classes on subjects like history, car repair, or using a compute.

13. How important is **LEARNING** to your happiness?

0	1	2
not important	important	extremely important

14. How satisfied are you with your LEARNING?

0	1	2	3	4	5
Very	Somewhat	A little	A little	Somewhat	Very
DISSATISFIED			SATISFIED		

CREATIVITY is using your imagination to come up with new and clever ways to solve everyday problems or to pursue a hobby like painting, photography, or needlework. This can include decorating your home, playing the guitar, or finding a new way to solve a problem at work.

15. How important is CREATIVITY to your happiness?

0	1	2
not important	important	extremely important

16. How satisfied are you with your CREATIVITY?

0	1	2	3	4	5
Very	Somewhat	A little	A little	Somewhat	Very
DISSATISFIED			SATISFIED		

HELPING means helping others in need or helping to make your community a better place to live. HELPING can be done on your own or in a group like a church, a neighborhood association, or a political party. HELPING can include doing volunteer work at a school or giving money to a good cause. HELPING means helping people who are not your friends or your relatives.

17. How important is HELPING to your happiness?

0	1	2
not important	important	extremely important

18. How satisfied are you with your HELPING?

0	1	2	3	4	5
Very	Somewhat	A little	A little	Somewhat	Very
DISSATISFIED			SATISFIED		

LOVE is a very close romantic relationship with another person. LOVE usually includes sexual feelings and feeling loved, cared for, and understood. (If you do not have a LOVE relationship, you can still answer these questions.)

19. How important is LOVE to your happiness?

0 1 2

not important important extremely important

20. How satisfied are you with your LOVE?

0 1 2 3 4 5

Very Somewhat A little A little Somewhat Very

DISSATISFIED

SATISFIED

FRIENDS are people (not relatives) who you know well and care about and that have interests and opinions like yours. FRIENDS have fun together, talk about personal problems, and help each other out. (If you have no FRIENDS, you can still answer these questions).

21. How important are FRIENDS to your happiness?

0 1 2

not important important extremely important

22. How satisfied are you with your FRIENDS?

0 1 2 3 4 5

Very Somewhat A little A little Somewhat Very

DISSATISFIED

SATISFIED

Ryff's Psychological Well-Being Scales (PWB), 42 Item version

Please indicate your degree of agreement (using a score ranging from 1-6) to the following sentences.

	Strongly disagree					Strongly agree
1. I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people.	1	2	3	4	5	6
2. In general, I feel I am in charge of the situation in which I live.	1	2	3	4	5	6
3. I am not interested in activities that will expand my horizons.	1	2	3	4	5	6
4. Most people see me as loving and affectionate.	1	2	3	4	5	6
5. I live life one day at a time and don't really think about the future.	1	2	3	4	5	6
6. When I look at the story of my life, I am pleased with how things have turned out.	1	2	3	4	5	6
7. My decisions are not usually influenced by what everyone else is doing.	1	2	3	4	5	6
8. The demands of everyday life often get me down.	1	2	3	4	5	6
9. I think it is important to have new experiences that challenge how you think about yourself and the world.	1	2	3	4	5	6
10. Maintaining close relationships has been difficult and frustrating for me.	1	2	3	4	5	6
11. I have a sense of direction and purpose in life.	1	2	3	4	5	6
12. In general, I feel confident and positive about myself.	1	2	3	4	5	6
13. I tend to worry about what other people think of me.	1	2	3	4	5	6
14. I do not fit very well with the people and the community around me.	1	2	3	4	5	6
15. When I think about it, I haven't really improved much as a person over the years.	1	2	3	4	5	6
16. I often feel lonely because I have few close friends with whom to share my concerns.	1	2	3	4	5	6
17. My daily activities often seem trivial and unimportant to me.	1	2	3	4	5	6
18. I feel like many of the people I know have gotten more out of						

- life than I have. 1 2 3 4 5 6
19. I tend to be influenced by people with strong opinions. 1 2 3 4 5 6
20. I am quite good at managing the many responsibilities of my daily life. 1 2 3 4 5 6
21. I have the sense that I have developed a lot as a person over time. 1 2 3 4 5 6
22. I enjoy personal and mutual conversations with family members or friends. 1 2 3 4 5 6
23. I don't have a good sense of what it is I'm trying to accomplish in life. 1 2 3 4 5 6
24. I like most aspects of my personality. 1 2 3 4 5 6
25. I have confidence in my opinions, even if they are contrary to the general consensus. 1 2 3 4 5 6
26. I often feel overwhelmed by my responsibilities 1 2 3 4 5 6
27. I do not enjoy being in new situations that require me to change my old familiar ways of doing things. 1 2 3 4 5 6
28. People would describe me as a giving person, willing to share my time with others. 1 2 3 4 5 6
29. I enjoy making plans for the future and working to make them a reality. 1 2 3 4 5 6
30. In many ways, I feel disappointed about my achievements in life. 1 2 3 4 5 6
31. It's difficult for me to voice my own opinions on controversial matters. 1 2 3 4 5 6
32. I have difficulty arranging my life in a way that is satisfying to me. 1 2 3 4 5 6
33. For me, life has been a continuous process of learning, changing, and growth. 1 2 3 4 5 6
34. I have not experienced many warm and trusting relationships with others. 1 2 3 4 5 6
35. Some people wander aimlessly through life, but I am not one of them. 1 2 3 4 5 6
36. My attitude about myself is probably not as positive as most

- people feel about themselves. 1 2 3 4 5 6
37. I judge myself by what I think is important, not by the values of what others think is important. 1 2 3 4 5 6
38. I have been able to build a home and a lifestyle for myself that is much to my liking. 1 2 3 4 5 6
39. I gave up trying to make big improvements or changes in my life a long time ago. 1 2 3 4 5 6
40. I know that I can trust my friends, and they know they can trust me. 1 2 3 4 5 6
41. I sometimes feel as if I've done all there is to do in life. 1 2 3 4 5 6
42. When I compare myself to friends and acquaintances, it makes me feel good about who I am. 1 2 3 4 5 6

Appendix B: RESULTS—POST HOC MODERATION ANALYSES

The primary analyses were re-examined to determine whether the relationships between sub-clinical psychosis, the social cognitive factors (cognitive insight and LoC), and psychological well-being differed by ethnicity (with ethnicity broken up by each individual ethnicity). Chi-square difference tests were conducted to determine whether the ethnicities' path coefficients were significantly different. Each ethnicity was broken up into its distinct levels (i.e. Caucasian, Hispanic, Black, Asian, and "Other"). Then, their paths were constrained equal and systematically freed-to-vary based on the strength of the individual path coefficients. Significant differences in path coefficients were identified if, when unconstraining an ethnicity's coefficient, a significantly improved chi-square model fit was observed. The same models used in the primary analyses were used in the secondary analyses.

Sub-Clinical Psychosis and Psychological Well-Being by Ethnicity

Ethnicity significantly moderated the relationship between sub-clinical psychotic symptoms and psychological well-being ($b = .049$, $SE = .024$, $p < .05$). To determine which ethnicities had the strongest relationship between symptoms and well-being, the path coefficient for each ethnicity was obtained (Caucasian $b = -.263$ (.029), $p < .001$; Hispanic $b = -.346$ (.044), $p < .001$; Black $b = -.319$ (.091), $p < .001$; Asian $b = -.285$ (.061), $p < .001$, and "Other" $b = -.363$ (.040), $p < .001$). Then, a model was created that constrained all the ethnicities' paths equal. As expected when all ethnicities' path coefficients were constrained, the model had poor model fit ($\chi^2(63) = 98.376$, $p = .003$; $CFI = .97$, $SRMR = .141$, $RMSEA = .083$). Since all the paths were significant, the

ethnicity with the strongest path was isolated first (“Other”). A model was created that separated the “Other” ethnicity to determine whether unconstraining this path would lead to significantly better model fit, which it did not (χ^2 difference(1) = 3.239, $p = .0718$).

The next model separated the “Other” ethnicity and the second strongest path (Hispanic) from all other ethnicities to determine whether these two ethnicities, constrained equal to each other, had significantly different path coefficients from the constrained path of all other ethnicities. The chi-square difference demonstrated that constraining the “Other” and Hispanic ethnicities’ paths equal while constraining the remaining ethnicities equal to themselves created significantly better model fit (χ^2 difference(1) = 5.829, $p = .0157$).

The third model separated the “Other,” Hispanic, Blacks (the third most significant path) paths and found that constraining these paths equal to each other, while maintaining the Caucasian and Asian paths equal, had better model fit than the previous mode (χ^2 difference(1) = 6.009, $p = .0142$). This model also had better model fit than the model that separated all minorities from the majority group (χ^2 difference(1) = 5.139, $p = .0233$). Additionally, this model had better model fit than a model tested with the “Other,” Hispanic, and Black ethnicities’ paths freely estimated while Caucasian and Asian ethnicities were constrained equal (χ^2 difference(4) = 6.401, $p = .1712$), indicating that these three ethnicities have stronger negative associations between sub-clinical psychosis and well-being than do Caucasians and Asians, but they do not significantly differ from one another. This final model had adequate model fit ($\chi^2(62) = 92.37$, $p = .007$, CFI = .97, SRMR = .113, RMSEA = .078).

Locus of Control Model separated by Ethnicity

Ethnicity significantly moderated the relationship between locus of control and psychological well-being ($b = .06$, $SE = .028$, $p < .05$). Therefore, the locus of control model was examined separately by ethnicity. First, the path coefficient for each ethnicity was obtained (Caucasian $b = -.111$ (.033), $p < .001$; Hispanic $b = -.228$ (.043), $p < .001$; Black $b = -.267$ (.161), $p < .1$; Asian $b = -.197$ (.063), $p = .002$, and “Other” $b = -.252$ (.057), $p < .001$). All the paths were significant except the path for Blacks. When all ethnicities’ path coefficients were constrained equal, the model had poor model fit ($\chi^2(35) = 51.986$, $p = .032$; CFI = .97, SRMR = .128, RMSEA = .080). Therefore, the next step was to unconstrain the various ethnicities to determine which ethnicities’ paths were significantly different from the rest.

The path for the Black ethnicity was unconstrained, since that was the only group with a non-significant coefficient. This model did not significantly improve the model (χ^2 difference(1) = .295, $p = .587$). Both the “Other” ethnicity and the Hispanic ethnicity were individually freed to vary, but these models did not significantly improve model fit (χ^2 difference(1) = 2.144, $p = .143$ and χ^2 difference(1) = 2.392, $p = .122$, respectively). Because all the minority path coefficients were stronger than the Caucasian path coefficient, the minority ethnicities were then constrained equal one-by-one starting with the strongest path coefficient. The model that created the best fit constrained all the minority paths equal (χ^2 difference(1) = 7.881, $p = .005$). Therefore, it was concluded that the association between external LoC and poorer well-being was stronger for all minorities than for Caucasians; path coefficients did not significantly differ from one

another. This final model had good model fit ($\chi^2(34) = 45.04, p = .10, CFI = .98, SRMR = .11, RMSEA = .065$).

Sub-Clinical Psychotic Symptom-Type Moderated by Ethnicity

Positive Symptoms and Psychological Well-being

When the analysis of the relationship between positive symptoms and psychological well-being was broken down by ethnicity, individuals who identified as Black ($b = -.157, SE = .221, p = .479$), Asian ($b = -.157, SE = .144, p = .278$) did not demonstrate a significant relationship between positive symptoms and psychological well-being. However, individuals who identified as Caucasian ($b = -.299, SE = .065, p < .001$), Hispanic ($b = -.390, SE = .092, p < .001$), and “Other” ($b = -.469, SE < .001$) demonstrated a significantly stronger negative relationship. There were no significant differences in the strength of these significant path coefficients.

Negative Symptoms and Psychological Well-being

When the analysis of the relationship between negative symptoms and psychological well-being was broken down by ethnicity, all ethnicities demonstrated a significant negative relationship between negative symptoms and psychological well-being (Caucasians ($b = -.347, SE = .044, p < .001$), Hispanic ($b = -.383, SE = .063, p < .001$), Black ($b = -.621, SE = .141, p < .001$), Asian ($b = -.277, SE = .082, p < .001$), “Other” ($b = -.465, SE = .071, p < .001$)). However, individuals who identified as “Other” demonstrated a significantly stronger negative relationship compared to all other ethnicities ($\chi^2_{\text{difference}}(1) = 4.78, p = .028$).

Disorganized Symptoms and Psychological Well-being

When the analysis of the relationship between disorganized symptoms and psychological well-being was broken down by ethnicity, all ethnicities demonstrated a significant negative relationship between disorganized symptoms and psychological well-being (Caucasians ($b = -.394$, $SE = .074$, $p < .001$), Hispanic ($b = -.551$, $SE = .083$, $p < .001$), Black ($b = -.619$, $SE = .184$, $p < .001$), Asian ($b = -.597$, $SE = .153$, $p < .001$, “Other” ($b = -.589$, $SE = .101$, $p < .001$)). However, individuals who identified as minority demonstrated a significantly stronger negative relationship compared to the majority ethnicity (Whites), (χ^2 difference(1) = 6.897, $p = .0081$).