THE STRUCTURE OF INSIGHT IN PATIENTS WITH PSYCHOSIS

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Failure to acknowledge their mental illness occurs in approximately half of all psychotic patients. Interest has been recently been refocused on insight (i.e., awareness of mental illness), and its associations with treatment compliance and better prognosis. Researchers have called into question the traditional factor structure of insight, instead viewing and defining it as a multidimensional and continuous construct. While factor analytic research has suggested that insight is an independent feature of psychotic disorders rather than a secondary manifestation of psychotic symptoms, several factor analytic studies have identified only one higher-order factor. Furthermore, a significant amount of the research literature has assessed insight or analyzed its relationships using only a single insight score. The current study evaluated the structural model of insight and assessed the associations between the different proposed dimensions of insight and psychotic symptoms. One hundred and six participants recruited from both inpatient and outpatient settings with a diagnosis of schizophrenia, schizoaffective disorder, psychotic disorder NOS, or bipolar disorder with psychotic features were rated on David’s Schedule for Assessing Insight-Expanded Version (SAI-E), Birchwood’s Insight Scale (IS), and the Brief Psychiatric Rating Scale (BPRS) or the Positive and Negative Syndrome Scale (PANSS). Structural equation modeling (SEM) was utilized to provide stringent, confirmatory statistical tests of the hypothetical factor models while accounting for measurement error. Principal findings from the current study were that the three factor model of insight was supported and that the insight factors were meaningfully correlated to the two symptom factors. Moreover, the three factor insight model provided significantly better fit than a single factor model of insight.
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CHAPTER 1
INTRODUCTION

Until the late 1980s, insight (or awareness of illness) into psychotic illness had received little systematic examination (Collins, Remington, Coulter, & Birkett, 1997; David, 1990). However, the concept of insight has often been considered highly relevant to mental health professionals who have to treat psychotic individuals with perceptions of self that are grossly different from that of his or her community and culture (Amador & Kronengold, 1998). While the recognition of having (or having had) a mental disorder is an important characteristic of insight, it has been suggested that insight is not simply present or absent (i.e., categorical), but appears to be a continuous and multidimensional construct (Amador et al., 1993, 1994; Amador & David, 1998; David, 1990; McEvoy et al., 1989a). Important dimensions of insight include not only the awareness or recognition of having a disorder, but also the realization of need for treatment, as well as the ability to re-label unusual mental events as pathological and attribute appropriate causes for mental illness (Amador & Kronengold, 1998; David, 1998). Each of these three primary dimensions (awareness, need for treatment, and ability to re-label/attribute) are considered important continuous factors which make up the higher order construct of “insight.”

Lack of insight is a distinctive feature of severe psychotic disorders (Amador & David, 1998; Carpenter et al., 1979; Lewis et al., 1934). Over half of all psychotic inpatients, particularly those with schizophrenia, fail to acknowledge their mental illness (Amador et al., 1994; Kemp & David, 1996; McEvoy, Schooler, Friedman, Steingard, & Allen, 1993a; Neumann, Walker, Weinstein, & Cutshaw, 1996; Walker & Rossiter, 1989; Young et al., 1998). Slightly higher rates of insight have been reported in outpatients, though it should be noted that these participants were recruited from psychoeducational programs (Dickerson, Boronow,
Ringel, & Parente, 1997; McEvoy, Freter, Merritt, & Apperson, 1993b). Others have found higher insight rates for outpatients were confined to the dimension of awareness for the need for treatment (Kim, Sakamoto, Kamo, Sakamura, & Miyaoka, 1997).

As part of the DSM-IV field trials, Amador et al. (1994) found that nearly 60% of the patients with schizophrenia evidenced moderate to severe unawareness of having a mental disorder. Though patients with schizophrenia produced the poorest insight scores, average awareness scores were not significantly different between patients with schizophrenia, schizoaffective, and bipolar disorder. Pini, Cassano, Dell’Osso, and Amador (2001) found that patients with schizophrenia had significantly lower insight scores than patients with schizoaffective disorder or unipolar depression with psychosis, but that the schizophrenic sample did not differ significantly from the patients with bipolar disorder. In contrast to these earlier studies, Daneluzzo et al. (2002) reported that 65.1% of the patients with schizophrenia in their sample had lack of insight (LOI) scores (based on use of the single PANSS item) of mild or greater compared to only 32.4% of the patients with bipolar disorder. However, the LOI item was the only PANSS item to highly discriminate between these two diagnostic groups. Meanwhile others have not found a significant difference between diagnostic groups regarding level of insight (David, Buchanan, Reed, & Almeida, 1992; David et al., 1995).

Understanding the phenomenon of insight in psychosis is critical given the impact awareness of illness has on patients’ clinical outcomes. In a large study of recent-onset, mixed psychotic patients, lack of insight had a significant relationship with time spent in the hospital and living independently regardless of the specific psychotic diagnosis or other prognostic indicators (Van Os et al., 1996). Also, a positive association between level of insight and treatment compliance has repeatedly been reported in the literature (Bartko, Herczeg, & Zador,
Thus, decreased insight predicts poorer treatment compliance and prognosis (David, 1998; McEvoy, 1998; McEvoy et al., 1989b).

Significant relationships have also been noted between insight and contact with mental health services (Sanz et al., 1998), global functioning (Amador et al., 1994), and higher social class (David et al., 1995). Similarly, good insight has been associated with better vocational rehabilitation (Lysaker & Bell, 1994). Finally, a measure of social knowledge developed by Cutting and Murphy (1988, 1990) has been found to be significantly correlated to insight (Gonterman, 2002; McEvoy et al., 1996).

Presently, there are several reliable and valid multidimensional assessments of insight that utilize a semi-structured interview format. Three of the most widely used include: (a) the Scale to Assess the Unawareness of Mental Disorder (SUMD; Amador et al., 1993) with higher scores indicating poorer insight; (b) the Schedule for the Assessment of Insight – Expanded Version (SAI-E; Kemp & David, 1997); and (c) the Insight and Treatment Attitudes Questionnaire (ITAQ; McEvoy et al., 1989). Higher scores indicate better insight on the SAI-E and ITAQ. The ITAQ has been criticized as not being truly multi-dimensional since it consists of only two dimensions (awareness of general mental illness and treatment compliance) with eight of its eleven items mentioning treatment and six of these items specifically measuring treatment compliance (Cuesta, Peralta, and Zarzuela, 2000; David, 1998; Weiler, Fleisher, & McArthur-Campbell, 2000).

Two self-report measures have been reported as psychometrically sound (Birchwood et al., 1994; Markova & Berrios, 1992) and are significantly correlated to the interviewer-based
assessments (Garavan et al., 1998; Gonterman, 2002; Sanz et al., 1998). These self-report measures are also based on a continuous and multidimensional approach. Given that insight is related to disturbances in self-perception, Strauss (1998) has suggested that research involving both subjective (self-report) and more objective (interview) assessments as an area or further research. Indeed, little research has been conducted comparing clinician ratings of insight with client self-reports to determine whether the dimensions gathered from each correlate to symptoms and cognitive factors in a similar manner and if type of assessment impacts the factor structure of insight.

Aside from the impact on clinical course and outcome, insight has been most often associated with psychotic patients’ symptoms of psychopathology. For instance, Peralta and Cuesta (2001) argue that there is evidence to support eight major dimensions of psychopathology in schizophrenia, including a dimension for lack of insight. Moreover, several exploratory factor analytic studies suggest that insight loads on an independent factor rather than merely being a secondary manifestation of psychotic symptomatology (David, 1998). In their study of 115 inpatients diagnosed with schizophrenia, Peralta and Cuesta (1994) found that three proposed dimensions of insight (awareness of illness and specific symptoms and need for treatment) all loaded onto their own factor, separate from positive, negative, and disorganized symptoms. In another study, Cuesta and Peralta (1994) found lack of insight to be a factor independent of several measures of neuropsychological functioning commonly associated with schizophrenia, as well as, positive and negative symptoms. Research with a sample of 150 patients with recent-onset, mixed psychotic diagnoses found lack of insight formed an independent factor from several psychopathological symptoms (Van Os et al., 1996).
Furthermore, changes in psychotic symptoms are not uniformly associated with changes in insight (Carroll et al., 1999). Few significant relationships between insight and psychopathology remained stable after six months, and surprisingly those that did were relationships between negative symptoms and disorganization with lack of insight (Cuesta, Peralta, & Zarzuela, 2000). Additionally, these researchers found no predictive value for variability in psychopathological symptoms for the dimensions of insight. Finally, a review of the literature suggests that insight is largely independent of global severity of psychopathology, with the correlations between insight and total symptom scores being modest at best (David, 1998). Thus, there is reasonable support for the theory that insight is an independent feature of psychotic illness rather than merely a secondary manifestation of psychotic symptoms. An assumption that remains untested, however, is whether the insight construct is multidimensional and can be represented by separate (but correlated) factors.

Proposed Dimensions of Insight

As mentioned briefly above several dimensions of insight have been proposed, but the dimensions most commonly discussed in the literature are those suggested by David (1990) and Amador (1991). David (1990) has suggested there are three main components of insight: awareness of illness, ability to relabel psychotic experiences correctly, and treatment compliance. The Schedule for Assessing Insight (SAI) and the SAI-E were created to measure these domains along with a supplementary question referred to as the hypothetical contradiction, which asks patients how they feel when others don’t believe them in order to determine whether this cues patients that they are getting sick.

The SUMD (Amador et al., 1991, 1994) assesses domains of insight including global insight, insight into symptoms, need for treatment, and social consequences of the disorder.
Seventeen specific signs and symptoms are assessed providing four additional scales for current and past awareness and current and past attributions.

The subscales (which represent separate dimensions of insight) for each of the insight measures are intercorrelated (Amador et al., 1993; Birchwood et al., 1993; David et al., 1992). For example, Amador et al. (1993) reported that the SUMD subscales representing awareness and attribution for present and past episodes were moderately to strongly correlated ($r = .55, p = .001$ and $r = .67, p = .001$, respectively). David, Buchanan, Reed, and Almeida (1992) related correlations between the insight subscales from the SAI that ranged from .75 ($p < .001$) for the hypothetical contradiction and relabeling to .26 ($p < .02$) for treatment compliance and relabeling of psychotic symptoms. Given the generally high inter-correlations between the subscales of insight, it is not surprising that several studies conducting exploratory factor analysis, using principle component analysis with orthogonal rotation, suggest that the separate dimensions of insight all load onto a single higher-order factor (Birchwood et al., 1994; David et al., 1992; McEvoy et al., 1989a; Peralta & Cuesta, 1994).

Based upon these results, one could reasonably suggest that insight is a unidimensional construct. However, supporters of the multidimensional approach have countered that the low correlations found between some dimensions of insight support the hypothesis that insight is not unitary, but made up of two or more related but partially independent elements (David et al., 1992; David, 1998). Amador et al. (1993) has argued that moderate to strong correlations between awareness of illness and attributions should be expected since attribution scales are hierarchical, and the findings that these scales are not more highly correlated supports the idea that appropriate attributions is a phenomenon independent of awareness. Additionally, research findings that impaired awareness can be limited to specific dimensions of insight and that
percentage of improvement from baseline can vary across dimensions could be used to support a multi-dimensional approach (Amador et al., 1994; Kemp, Hayward, & David, 1996).

Another argument that could be made for the multidimensional approach involves research findings that the dimensions of insight show differential relationships with symptoms and neurocognitive correlates, but these results, which will be reviewed in the sections related to correlates of insight, are not entirely convincing.

In terms of factor analytic research on the dimensions of insight, one study used principal component analysis with an orthogonal rotation at the level of insight scales and found evidence for two insight factors. Cuesta et al. (2000) entered 14 subscale scores from 75 psychotic patients with mixed diagnoses and found a factor representing general awareness and another reflecting attitudes to treatment, which accounted for 76.9% of the variance. These factors demonstrated considerable overlap, though, with an absolute correlation of .42. As mentioned above, these two factors were found again when the insight scores were included in a factor analysis that also included psychopathological symptoms.

One of the main limitations of the exploratory factor analytic studies mentioned above is that they did not examine the factor structure of insight at the level of individual items. To date, only one study has explored the “dimensions” of insight utilizing individual items. Kim et al. (1997) administered the SAI (David, 1990) to 63 patient diagnosed with schizophrenia. Their results suggested three factors which corresponded with the three hypothesized dimensions of insight (awareness of illness, need for treatment, relabeling psychosis).

While the findings of Kim et al. (1997) and Cuesta et al. (2000) do support the multidimensional approach to insight, a definitive statement cannot be made due to several limitations in the analytical methods used in these two studies. First, both studies relied upon
exploratory and not confirmatory factor analysis, and thus a stringent a priori statistical test of the factor structure of insight was not possible (Bentler, 1995). Second, Cuesta et al. (2000) relied upon their insight subscales for their factor analysis, rather than the individual items which made up each scale, which could have potentially obscured the relationship between individual insight items and the factors they were designed to represent. Finally, the Kim et al. (1997) study is limited in that the authors relied upon a principal component analysis (PCA) with orthogonal rotation. The PCA is based upon the assumption of perfect calculation of the variables from the components (Gorsuch, 1983). In addition, PCA is often completed with the assumptions that the factors are uncorrelated (Gorsuch, 1983; Peralta & Cuesta, 2001).

As previously mentioned, the dimensions of insight have been found to be significantly intercorrelated, and thus the assumption of orthogonal insight factors seems unrealistic. Furthermore, it is reasonable to suggest that there would be some degree of measurement error when clinicians are assessing a high base rate condition such as lack of insight among psychotic patients (Meehl, 1973). Thus, there is currently a gap in the literature regarding statistical analysis of the multidimensional (correlated) factors of insight, which also takes into account measurement error.

Confirmatory factory analysis (CFA), which has been recognized as one of the best methods for establishing construct validity (Embretson & Hershberger, 1999), could help address some of the limitations discussed above. Moreover, if the structure of insight was found to be ‘truly’ multidimensional, and it was determined that these dimensions were differentially related to psychotic patients’ symptoms of psychopathology, then such findings would have important treatment implications. As it turns out, latent variable model-based analytical methods such as
CFA have been used with good success to study numerous constructs in psychology and related fields (Bentler, 1995; Embretson & Hershberger, 1999).

**Structural Equation Modeling (SEM)**

SEM is a latent variable method of analysis, which tests the structural theories of various phenomenon. It has also been referred to as causal modeling, covariance structure analysis, path analysis, and linear structural relations. “A structural theory is intended to represent the ‘causal’ process that gives rise to the correlations among the observed variables” (Bentler, 1988, p.317). The intent of causal modeling is to rule out implausible connections. Additionally, SEM can be used to confirm the factor structure of a phenomenon, because the researcher has complete control over the specification of indicators for each construct. Finally, SEM allows for statistical tests to assess the goodness-of-fit of the proposed model, which is not possible with principal component analysis or factor analysis (Hair, Anderson, Tatham, & Black, 1995).

In conducting SEM, a distinction is made between measured (manifest) (MVs) and latent variables (LVs). A LV represents a theoretical construct (e.g., insight) and represents MVs (e.g., subscale scores or items from self-reports or interview ratings). It is hypothesized that correlations between observed variables (MVs) are attributable to the LVs (Bentler, 1980). Moving to the level of latent variable analysis also has certain advantages. For instance, MV causal models tend to be less reliable than LV models due to the bias that can be introduced by the level of measurement error contained in each variable, which strongly influences the correlation coefficient between two MVs. In contrast, LV models can represent the common factor variance separately from the error (plus unique) variance in a set of MVs representing a particular theoretical construct (Bentler, 1980). Finally, LV approaches allow investigators to hypothesize on how a pattern of correlations among a set of observed variables can be explained.
in terms of a smaller set of factors (LVs), and then statistically estimate the fit between the model and the observed (manifest) data (Bentler, 1995).

The primary statistical issues within SEM are to estimate the unknown parameter values of the model (e.g., factor loading and correlations) and then determine the goodness-of-fit of the model to the sample data of measured variables (Bentler, 1980). Goodness-of-fit indices such as chi-square, normed-fit-index, and others, indicate how likely the proposed model of LVs represents the causal structure of the MVs. If there is a good fit, the model is considered a plausible representation of the hypothesized causal structure of the observed variables.

Symptom Correlates of Insight

Between the late 17th and early 19th centuries, lack of insight was viewed as being synonymous with mental illness and interest in exploring the implications of varying degrees of insight in the mentally ill would have been considered nonsensical (Berrios & Markova, 1998). Even into the present century, the widely held belief that insight and acute psychosis were incompatible has hindered research and assessment of insight (David, 1990). Within the last fifteen years the assessment of insight has become more rigorous, yet the correlates of insight have yet to be fully articulated (David & Amador, 1998).

The view that symptoms of severe psychopathology are redundant with poor insight or that such symptoms precludes insight has not been supported (Cuesta & Peralta, 1994; David, Buchanon, Reed, & Almeida, 1992; David et al., 1995; McEvoy et al., 1996). David et al. (1992) found a correlation of $r = -.31$ between the Present State Examination (PSE; Wing, Cooper, & Sartorius, 1974) total score and the SAI total score. Similarly, comparing the Brief Psychiatric Rating Scale (BPRS; Overall & Gorham, 1962) total score with the SAI total score, Aga, Agarwal, and Gupta’s study (as cited in David, 1998) found a correlation of $r = .28$. 
McEvoy et al. (1996) did not find a significant correlation between the BPRS total symptom score and insight. Cuesta and Peralta (1994) demonstrated that insight was not correlated with either the total score for the Scale for the Assessment of Negative Symptoms (SANS; Andreasen, 1984a) or the total score for the Scale for the Assessment of Positive Symptoms (SAPS; Andreasen, 1984b). Finally, David et al. (1995) determined that the mean PSE total score was not correlated with the PSE insight item. The sum of these findings suggests that insight is largely independent of global psychopathology severity (David, 1998). As such, investigators have focused on more specific symptom dimensions.

Positive symptoms and insight. One particular area of interest has been the meaningfulness of the relationship between insight and positive, or psychotic, symptoms. Positive symptoms are phenomenon present in individuals with psychotic disorders (e.g., schizophrenia) that are not present in healthy individuals and include such experiences as delusions and hallucinations. The majority of investigations have found significant, if frequently moderate, inverse relationships between insight and positive symptoms (Amador et al., 1994; Carroll et al., 1999; Collins, Remington, Coulter, & Birkett, 1997; David et al., 1992; Dickerson et al., 1997; Kemp & Lambert, 1995; Lysaker, Bell, & Bioty, 1995; Markova & Berrios, 1992; McEvoy, Schooler, Friedman, Steingaard, & Allen, 1993; Michalakeas et al., 1994; Takai, Uematsu, Hirofumi, Sone, & Kaiya, 1992; Young, Davila, & Scher, 1993). While few studies have failed to find such a relationship (but see Cuesta & Peralta, 1994, for an example), some have demonstrated a dissynchrony between improvement in positive symptoms and insight (McEvoy et al., 1989b).

While research on specific symptom dimensions has been helpful, there are problems with simply studying the associations of insight and global positive symptoms. First, there is
considerable variability in the number of symptoms included in scales designed to assess positive, as well as negative, symptoms and there are still symptoms that are inconsistently classified between these two categories (Walker & Lewine, 1988). Additionally, positive symptoms are too frequently applied to schizophrenia alone while they are applicable to other psychotic disorders. Finally, David (1998) argues that continued attempts to understand the relationship between insight and different psychotic symptoms will hopefully further our understanding of both insight and psychotic symptomatology.

The current body of literature indicates that several specific symptoms of psychosis are significantly associated with insight. For instance, moderate to large inverse correlations have been found between insight and: delusions (Dickerson et al., 1997; Neumann, Walker, Weinstein, & Cutshaw, 1996; Sanz et al., 1998), grandiosity (Kemp & Lambert, 1995; Neumann et al., 1996; Neumann & Walker, 1998; Sanz et al., 1998; Van Putten, Crumpton, & Yale, 1976), disordered thought (Amador et al., 1994; Kim, Sakamoto, Kamo, Sakamura, & Miyaoka, 1997), and disorganized behavior (Amador et al., 1994). Interestingly, researchers have found no relationship between hallucinations and insight (David et al., 1992; Nayani & David, 1996), while others have found that hallucinatory behavior was related to increased insight (Neumann et al., 1996). These results suggest that it may be important to study positive symptoms separately, and that not all positive symptoms are specifically associated with deficits in insight.

**Affective symptoms and insight.** Another area of interest is the association between specific affective symptoms and insight. Several researchers have noted an inverse relationship between elated mood (or more specifically mania) and insight (Bartko et al., 1988; David, 1990; Heinrichs, Cohen, & Carpenter, 1986; Kemp & Lambert, 1995; Sanz et al., 1998; Van Putten et al., 1976). Additionally, the majority of studies have found positive correlations between
depression, and to some extent anxiety, and insight in psychotic patients (Amador et al., 1994; Carroll et al., 1999; David et al., 1995; Dickerson et al., 1997; Kemp et al., 1995; Michalakeas et al., 1994; Mintz, Addington, & Addington, 2004; Moore et al., 1999; Neumann et al., 1996; Peralta et al., 1994; Sanz et al., 1998; Smith et al., 1998; Smith et al., 2000). Across these studies, (absolute) correlations were found to range from .39 to .58 and averaging approximately .48.

**Symptoms and the factor structure of insight.** It could be argued that support is lent to a multi-dimensional model of insight if it were determined that specific symptoms were associated with specific dimensions of insight. Table 1 is a sampling of research studies that have explored the relationship between proposed dimensions of insight and symptoms correlates. Note that this sampling is not meant to be exhaustive, but rather represent those studies that have been published since the introduction of more modern conceptualizations of insight.

Overall, a review of Table 1 suggests consistent relationships between symptoms and the different subscales of insight, at least in patients who have recently experienced an exacerbation of symptoms. More specifically, the findings indicate a positive association between (better) insight and depression and inverse relationships between the other symptoms, delusions and disorganized symptoms in particular. It should be noted, though, that none of the studies found a significant relationship between negative symptoms and relabeling and that the relationship between negative symptoms and treatment compliance is ambiguous with two studies suggesting an inverse relationship while a third reported a positive relationship. Thus, the relationship between negative symptoms and the insight dimensions is mixed. Notably, some longitudinal research (Cuesta, Peralta, & Zarzuela, 2000) has suggested that a stable relationship exists...
between insight and negative symptoms, though further longitudinal research will be necessary
to replicate these limited findings.

Statement of Problem

Interest has increased in recent years on the nature of insight (or awareness of mental
disorder) in psychotic disorders. What was once viewed as a secondary feature fundamental to
psychosis, insight is now considered an independent factor separate from symptoms and
neurocognitive deficits of psychosis, and this notion has been supported by research (Cuesta &
Peralta, 1994; David 1998; Peralta & Cuesta 1994; Van Os et al., 1996). What is less clear is
whether insight is a truly multi-dimensional phenomenon as it is currently defined in the
literature, and whether symptoms of psychopathology are differentially related to these
dimensions.

Several studies have explored this issue with exploratory factor analysis employing
principle component analysis with orthogonal rotation with results indicating that all the separate
dimension subscales load onto one higher order factor (Birchwood et al., 1994; David et al.,
1992; McEvoy et al., 1989a; Peralta & Cuesta, 1994). It is worthy to note that all of these
studies entered subscale scores into the analysis. Since some insight subscales have been found
to be highly intercorrelated, something principle component analysis often does not allow for,
this failure to find dimensions of insight is not conclusive.

Other research has lent support to the multi-dimensional approach to insight. One study
utilizing significantly more subscale scores (fourteen versus three to five in the latter mentioned
studies) did find two dimensions for insight: general awareness and treatment compliance
(Cuesta et al., 2000). The work of Kim et al. (1997), which explored the factor structure of
insight at the level of individual items, also supports a multi-dimensional model with their
findings of three insight domains that closely resemble the dimensions proposed by David (1990).

To date, all research into the factor structure of insight has been exploratory with limitations such as bias from exploratory statistical methods that do not allow for error terms or high intercorrelations amongst the data entered. Therefore, further research is needed utilizing statistical methods that can test a proposed multi-dimensional model of insight while allowing for the intercorrelations known to be present among insight subscales and controlling for the effects of error.

The current study proposes to test the multi-dimensional model of insight underlying the SAI-E using structural equation modeling. The SAI-E is assumed to have three main dimensions: awareness of illness, relabeling of symptoms as pathological, and treatment compliance. The current model of insight tested can be found in Figure 1.

Based on the literature review and conclusions drawn, the following model hypotheses were tested:

**Model hypothesis 1.** The three-factor model of insight currently proposed will have an acceptable goodness of fit score for the current sample. The goodness of fit score for the three-factor model will be significantly better than the goodness-of-fit score for the one factor (null) model of insight.

**Model hypothesis 2.** A five factor model will result in good model fit when the three insight factors are modeled in conjunction with a depression symptom factor and a delusion symptom factor. The depression factor will correlate positively with insight, while the delusion factor will correlate negatively with insight.
CHAPTER 2

METHOD

Participants

The sample for this study consists of 106 patients with one of the following diagnoses: schizophrenia, schizoaffective disorder, psychotic disorder not otherwise specified (NOS), or bipolar disorder with psychotic features. Patients were recruited from the North Texas Veterans Health Care System (NTVHCS), Terrell State Hospital (TSH), and Vernon State Hospital (VSH). The current study is part of a large project on the biological and cognitive factors associated with insight in patients with psychotic symptoms.

The NTVHCS, formerly known as the Dallas Veterans Affairs Hospital, serves veterans and their qualified family members living in the Dallas/Forth Worth area, as well as the surrounding rural areas. The sample from this site was comprised of both inpatients (hospitalization was voluntary) and outpatients with diagnoses of schizophrenia, schizoaffective disorder, or psychotic disorder NOS.

TSH located in Terrell, Texas is a modern psychiatric facility serving 22 counties in the northeastern part of Texas. All participants in this sample were recruited from locked acute inpatient wards, at least some of whom had been placed there under civil commitment. Diagnoses present in this sample include schizophrenia, schizoaffective disorder, psychotic disorder NOS, and bipolar disorder.

The final study site, VSH, is a maximum security forensic facility to which patients are committed for various criminal offenses. Participants with diagnoses of schizophrenia or schizoaffective disorder were recruited from a ward of relatively stabilized patients. This unit is
designated for those patients who have earned the highest levels of privileges available to that population.

The presence of a recent exacerbation (within two weeks of testing) of psychotic symptoms served as the primary inclusion criteria for the samples collected at the NTVHCS and TSH. Those patients found to have at least one psychotic symptom (i.e. hallucination, delusion, thought disorder, grandiosity) occurring in absence of delirium were included in the data set. Psychotic symptoms were measured and a diagnosis was determined based upon the results of the either the Brief Psychiatric Rating Scale (BPRS) (Terrell and Vernon State Hospitals) or the Positive and Negative Syndrome Scale (PANSS) (North Texas Veterans Health Care System), the Positive and Negative Affect Scale (PANAS), chart notes, and past diagnoses. Exclusion criteria included participants with the following: substance-induced psychotic disorder, psychotic disorder due to a general medical condition, delirium, dementia, amnestic and other cognitive disorders, dual diagnosis of mental retardation, epilepsy, thyroid disease, an inability to speak English, or those receiving electroconvulsive therapy.

Materials

Symptoms. The BPRS, Expanded Version (4.0) was used to assess the presence of psychopathological symptoms which were then cross referenced with the participant’s charts. The BPRS is a semi-structured interview consisting of 24 items rated on 7-point ordinal scales. The first fourteen items are rated based on self-reports and observed behavior; while the remaining items are rated based on observed behavior and speech (Ventura et al., 1993).

The BPRS has been used extensively in American and European psychiatric research for almost three decades and has been found to be a reliable instrument (Ventura et al., 1993). Ventura et al. (1993) studied interrater reliability on the expanded BPRS for researchers with
advanced training degrees and those without. Interviewers participating in the study were trained in the guidelines for rating as well as provided with structured questions to illicit the necessary information from interviewees. They reported Median ICCs of .81 and .83 respectively.

Interrater reliability was measured for the first 16 items (Overall & Gorham, 1962) on a group of newly admitted schizophrenic patients and was found to range from .56 to .87 with 10 of the items falling at .80 or above. Suggestions for interview style were provided, but the raters in this study did not use a structured interview format.

The BPRS has also been found to be associated with other instruments used to assess psychopathology. Newcomer et al. (1990) reported that the BPRS depression subscale was highly correlated with the Hamilton Rating Scale for Depression (HRSD) total score ($\rho = .80$). To examine the potential impact of single symptom factors being defined by different combinations of BPRS symptoms, Nicholson, Chapman, and Neufeld (1995) pulled several different BPRS definitions of positive and negative symptoms from research literature and compared them to each other and to the Schedule for the Assessment of Negative Symptoms (SANS) and the Schedule for the Assessment of Positive Symptoms (SAPS; Andreasen, 1984). They found all the negative symptom definitions to be highly correlated with each other and the SANS, and all the positive symptoms definitions to be highly correlated with each other and the SAPS. Czobor, Bitter, and Volavka (1991) found the SANS and the BPRS to be highly intercorrelated with the SANS composite score being highly redundant with the anergia factor of the BPRS. Another study also found the SANS to be highly correlated with the BPRS withdrawal-retardation scale, and after a comparison of the interrater reliabilities proved unfavorable for the SANS, deemed little was gained by using the SANS instead of the BPRS. In a comparison of the BPRS and the Positive and Negative Syndrome Scale (PANSS; Kay,
Fiszbein, & Opler, 1987), Bell, Milstein, Beam-Goulet, Lysaker, and Cicchetti (1992) found the negative syndromes were correlated at .82, the positive syndromes correlated at .92, the general scales correlated at .61, and the scale total scores were correlated .84.

The BPRS has been previously utilized in insight research to provide measures of psychopathology and specific symptoms (McEvoy et al., 1989a; McEvoy, Applebaum, Apperson, Geller, & Freter, 1989c; McEvoy et al., 1993; Neumann et al., 1997; Sanz et al., 1998; Takai et al., 1992; Young et al., 1998).

Symptoms were measured in the veteran sample using the PANSS. The PANSS is a 30-item, 7-point severity scale designed to measure positive and negative syndromes as well as general psychopathology among inpatients with schizophrenia. It follows the same general format as the BPRS (Overall & Gorham, 1962) and Psychopathology Rating Schedule (Singh & Kay, 1975) with the addition of strict operational criteria for the interview and detailed rating criteria for each level of severity (Kay, Opler, & Lindenmayer, 1988). The PANSS, with its combination of measures of psychopathology as well as an item measuring lack of insight, has been widely used in the recent insight literature (e.g. Carroll et al., 1999; Collins, Remington, Coulter, & Birkett, 1997; Debowska et al., 1998; Kemp & Lambert, 1995; Schwartz, 1998).

Kay et al. (1988) reported interrater reliability on the individual items ranging from .69 to .94 and mean interrater correlations for the four PANSS scales ranging from .83 to .87. Bell, Milstein, Beam-Goulet, Lysaker, & Cichetti (1992) also reported interrater reliability for individual items ranging from .54 to .93. To determine criterion-related validity, the same authors compared the PANSS to the SAPS and SANS and found a correlation of .77 between both the positive scales and negative scales of each test. Norman, Malla, Cortese, and Diaz (1996) reported high convergent validity between the positive and negative subscales of the
PANSS and the summary total scores of the SAPS (.91) and SANS (.88). The PANSS has also been found to reliable and valid for use with outpatients diagnosed with schizophrenia or major mood disorders (Purnine, Carey, Maisto, & Carey, 2000).

**Insight.** Patient insight was measured using the Schedule for the Assessment of Insight – Expanded Version (SAI-E; Kemp & David, 1997). This measure is a semi-structured interview where the number of questions answered is determined by the answers given to key questions. The number of items answered on the test can range from six to nine. The first six items are rated on a 3-point scale with ratings as follows: 2 = often; 1 = sometimes; 0 = never. Items 7 and 8 regard specific symptoms, and are scored on a 5-point scale with 4 = to full awareness and correct attribution and 0 = no awareness or bizarre/delusional attribution. Item 9 assesses the client’s response to a hypothetical contradiction of his or her delusions or hallucinatory experiences. This item is rated on a 5-point scale with the following ratings: 0 = They’re lying; 1 = I’m still sure despite what others say; 2 = I’m confused and don’t know what to think; 3 = I wonder whether something’s wrong with me; and 4 = That’s when I know I’m sick. The SAI-E also contains three items regarding treatment compliance that are completed by the patient’s primary nurse. The maximum score is 24 points. The SAI-E has been demonstrated to have high concurrent validity with other measures of insight, namely the insight question of the PANSS (Kay et al., 1987) (r = .895), the Insight and Treatment Attitudes Questionnaire (ITAQ, McEvoy et al., 1989a) (r = .845), and the Schedule for the Assessment of Insight (SAI) (r = .977) (Sanz et al., 1998).

Additionally, patient insight was measured with the Birchwood’s Insight Scale, a self-report insight scale for psychosis (Birchwood et al., 1994). The Birchwood’s Insight Scale consists of eight uncomplicated and direct statements that patients rate on a 3-point scale (agree,
disagree, unsure) and can be completed quickly by even seriously disturbed patients. The test items were designed to assess each of the three dimensions of insight advocated by David (1990): awareness of illness, ability to relabel symptoms, and awareness of need for treatment.

Research on the reliability and validity of the Birchwood’s Insight Scale found the test to have a high internal consistency (Cronbach’s alpha = .75) and high test-retest reliabilities (.90) over a 1-week interval (Birchwood et al., 1994). Birchwood et al., (1994) also demonstrated the Insight Scale to have adequate construct, criterion, and concurrent validities and sensitivity to individual difference and change.

Procedure
Patient charts and hospital staff were consulted to ascertain which patients were diagnosed with a psychotic disorder and did not meet any of the exclusion criteria. These patients were then approached in a public area of the unit or contacted by phone (in the case of outpatients), told about the study, and asked if they would be interested in participating. If they agreed to participate, testing times were arranged that were convenient for the patients. Testing typically began immediately following completion of the informed consent.

All participation was on a voluntary basis. Informed consent was obtained from each participant after the procedures involved were explained. Volunteers at TSH and the NTVHCS were reimbursed for their participation. Patients at TSH were compensated with $5.00 voucher books that could be used at the hospital canteen, and NTVHCS were paid $20.00 cash.

The symptom and insight assessments utilized for the present study were conducted as part of a larger assessment battery also including neurocognitive and social knowledge assessments. Testing was conducted in one or two sessions and lasted between 1 ½ to 3 hours.
Data Analysis

Structural equation modeling (SEM). SEM was utilized to test the proposed insight model (see figure 1). SEM allows the researcher to determine the plausibility of the proposed theoretical model within a particular population by testing the specified causal structure among a set of variables. The EQS Structural Equations Program published by Multivariate Software, Inc. was utilized to perform the SEM analyses for this study (Bentler, 1995). The EQS program, developed by Bentler (1989), uses generalized least squares (GLS) procedures or maximum likelihood (ML) procedures to examine the patterns of relationships among latent variables. It incorporates a mathematical and statistical approach to the analysis of linear structural relationships using matrix algebra and includes parameter estimates and several goodness of fit indices. EQS generates a matrix specification and designates independent and dependent variables in accordance with the representation system of Bentler and Weeks (1980).

EQS provides several goodness of fit indices indicating the degree of “fit” for a proposed model to the sample data. The chi-square test serves as a test of the null hypothesis. A small chi-square and large $p$ value would indicate that the null hypothesis is correct and the model is a good representation of the causal structure for the observed data. Use of chi-square can be problematic, though, due to its sensitivity to sample size and multinormality. With large samples, small non-meaningful discrepancies between the model and data can result in the rejection of a model that is a good representation of the data. In addition, chi-square assumes multi-normality and thus can result in the rejection of a model due to the data distribution not being multi-normal rather than due to conceptual inaccuracies. As a result of these limitations, the use of additional goodness of fit indices is recommended (Bentler, 1989).
Three additional indices are available through the EQS program will also be used to address goodness of fit. These indices are the normed fit index (NFI; Bentler & Bonnett, 1980), the nonnormed fit index (NNFI; Bentler & Bonnett, 1980) and the comparative fit index (CFI; Bentler, 1980). These fit indices tend to provide an accurate assessment of how well the model fits the data, regardless of sample size. Large values such as .9 and higher indicate a good fit, while values of .7 and less indicate the model is a poor fit for the data.

For those instances when multinormality may not be met, EQS can compute robust standard errors and test statistics. Chou, Bentler, and Satorra (1989) suggest that these robust statistics may offer more reliable construct equations, variances, and covariances when the distributional assumptions of normality are not fully met. This EQS feature provides the option of an additional fit index, the robust comparative fit index (RCFI), based on the calculation of the CFI fit index utilizing robust parameter values. Additional options available to address concerns regarding assumptions of normality are the Satorra-Bentler chi-square (a modification of the standard goodness-of-fit test yielding distributional behavior that more closely approximates the chi-square) and Mardia’s (1974) kurtosis test of multivariate normality.

The root mean square residual (RMR) and the root mean square error of approximation (RMSEA) are also available estimates of model fit. The RMR is the square root of the average squared difference between each sample and estimated covariance divided by all of the variables in the covariance matrix (Ullman, 1996). A small RMR value is associated with better fit. A benefit of the RMSEA is that it provides an estimation of the lack of fit of the model to the estimated population covariance matrix (Browne & Cudeck, 1993). Thus, a value of zero would indicate an exact fit of the model while values of .05 or less would indicate a close fit of the model. The overall fit of the proposed models in this research will be assessed using the Satorra-
Bentler chi-square, CFI, RCFI, standardized root mean squared residual (SRMR), and the RMSEA.
CHAPTER 3

RESULTS

Sample Characteristics

Data was collected from 110 participants of whom 106 were included in the final analyses due to completeness of their data and appropriateness of diagnosis. The sample consisted of 96 adult inpatients and 10 adult outpatients with a diagnosis of schizophrenia, schizoaffective disorder, psychotic disorder not otherwise specified (NOS), or bipolar disorder with psychotic features between the ages of 19 and 66 (M = 41.1, SD = 11.17). The study population was 84% male with 52% of the population being Caucasian, 45% African-American, and 3% other. Participants were recruited from Vernon State Hospital (VSH) (36%), Terrell State Hospital (TSH) (38%), and North Texas Veterans Health Care System (NTVHCS) (26%).

Descriptive Analyses

Descriptive statistics from the present study are provided, including mean and standard deviations, for the manifest variables used for modeling (see Table 2). In addition, the distributional properties of each measured variable were examined for normality for both univariate and multivariate analysis. Univariate analysis indicated relatively mild skew (range .00 to -1.85) and kurtosis (range -.20 to 2.36). Multivariate kurtosis was in the modest range for Model 1 and very low for Model 2. Due to the presence of mild to modest skew and kurtosis, robust parameters will be presented in the discussion of the modeling.

Insight was measured using the Schedule for the Assessment of Insight – Expanded Version (SAI-E). The mean SAI-E total score for the sample was 12.25 (SD = 6.51) with 51% demonstrating poor insight. The mean scores for depression (M = 3.0, SD = 1.61) and grandiosity (M = 3.0, SD = 1.97) fell in the mild range, while the sample mean for unusual
thought content (UTC) ($M = 3.8, SD = 1.77$) was closer to the moderate range of severity. This sample demonstrated a very low degree of guilt with the mean score ($M = 2.3, SD = 1.51$) falling in the very mild range.

A correlation matrix was run to examine the relationships between measured variables (see Table 3). Correlations were inspected for unusual or unexpected relationships between demographic and measured variables. One significant inverse correlation was noted between age and guilt ($r = -.202, p = .05$) with a largely nonsignificant trend of the psychopathological symptoms of interest being negatively correlated with age. Data regarding level of educational attainment and chlorpromazine equivalence was only available for the Terrell subset of the sample. Correlations previously run with this group noted a fairly consistent pattern of nonsignificant positive relationships (mean $r = .20$) between insight dimensions and education and a significant correlation between chlorpromazine equivalence and the SAI-E treatment composite. This latter relationship may be artificially inflated, to some extent, due to the composites inclusion of nurses’ reports of medication compliance.

A review of the correlations between the variables proposed for inclusion in structural equation modeling revealed that SAI-E item 6 (assessing patient’s opinion of the need for treatment) did not correlate as expected with the other items proposed for inclusion in the treatment domain (nurses’ observations of treatment compliance). While item 6 was significantly correlated with all three compliance items (range .37 - .23), this range was markedly lower than the significant correlations between item six and the three items assessing awareness of mental illness (range .67 - .49). Due to the conceptual differences from the other treatment items and the lower than expected correlations, item six was not included in the structural equation modeling.
Analyses of the Combined Sample

Correlations, a multivariate analysis of variance (MANOVA), and the Box’s test of equality of covariance matrices (Box’s M) were performed to determine if combining data from three sites would violate the assumptions of the statistical procedures to be used. SAI-E items included in the models were combined to form subscale scores and correlations were run using these subscale scores and the symptoms items for each site. Visual inspection suggested no substantial differences in the correlation patterns between sites.

A one-way MANOVA was calculated examining the effect of site (Vernon, Terrell, or Dallas) on SAI-E total score, depression, guilt, grandiosity, and unusual thought content. A significant effect was found ($\Lambda (10, 200) = 2.955, p < .002$). Follow-up univariate ANOVAs indicated significant differences between the sites for SAI-E total score ($F (2, 107) = 4.407, p = .014$) and unusual thought content ($F (2, 105) = 8.336, p = .000$). Tukey’s HSD was used to determine the nature of the differences among the sites on these two variables. These analyses revealed that participants at the NTVHCS had a significantly greater degree of insight ($M = 15.05, SD = 5.99$) than participants at VSH ($M = 10.52, SD = 5.71$). Participants at TSH ($M = 11.62, SD = 7.19$) were not significantly different from either of the other two groups. Patients at TSH had significantly higher ratings of unusual thought content ($M = 4.63, SD = 1.43$) than the patients at VSH ($M = 3.16, SD = 1.91$) and patients at the NTVHCS ($M = 3.55, SD = 1.62$) (the latter samples did not significantly differ from each other). The Box’s M was not significant (Box’s M = 40.207, $p = .168$).
Structural Equation Modeling (SEM)

SEM was utilized with the data of 106 participants to test the models proposed in hypotheses 1 and 2. The demographics of the 106 participants did not differ from the demographics of the 110 total study population.

Model 1. The proposed three-factor model of insight (Model 1, see figure 1) discussed in hypothesis one was examined first. SAI-E items 1, 2, and 3 were manifest variables (MVs) for the construct of awareness. SAI-E items 4 and 8 were MVs for the construct of relabeling. Finally, SAI-E items A, B, and C were MVs for the construct of treatment compliance. All of the measured variables loaded significantly on the identified latent factor (z-values and robust z-values > 1.96). A review of the average absolute standardized residuals (.0395) and the average off-diagonal absolute standardized residuals (.0508) supports the present model by indicating that the covariances observed are due to the underlying factors of the proposed model. Moreover, using the difference between model chi squares (and degrees of freedom), the three-factor insight model fit significantly better than a one-factor model of insight ($X^2(3)_{\text{diff}} = 85.49$, $p < .001$). In an effort to be comprehensive, the three-factor model was also tested against a two-factor model in which awareness of illness and the ability to relabel symptoms was collapsed into the first factor and treatment compliance served as the second. The two-factor model did not result in a significant improvement in fit ($X^2(2)_{\text{diff}} = 3.1$, $p > .20$) and produced a slight decrease in good model fit and slight increase in standardized residual sizes.

With respect to the first model hypothesis, a three-factor insight model was initially run with SAI-E item 7 included (rating awareness of prominent individual symptoms, up to a maximum of four). A review of the average absolute standardized residuals (.0510) and the average off-diagonal absolute standardized residuals (.0638) suggested some model mis-
The twenty largest standardized residuals revealed that 25% involved item 7, including large residuals with the two other items from the relabeling factor, and that 65% involved one of the three nurse rated compliance items, including one large residual between items A and B. It should be noted that there is overlap in these percentages. While all of the factors loaded significantly, a review of the standardized solution demonstrates that items 7 (.375/.927), 8 (.586/.810), and B (.598/.801) had the lowest factor loadings and the highest error, respectively. Based on theoretical considerations and concern for the generalizability of the model, the decision was made to remove item 7 from the model.

The standardized parameter latent variable and error loadings for hypothesized Model 1 are presented in Table 5. Review of this table reveals that all loadings are relatively high and statistically significant. The confirmatory factor analysis latent variable intercorrelations are presented in Table 8 and included in Figure 1. Overall, the intercorrelations are consistent with previous findings.

Model 2. The second model hypothesis stating that insight domains could be modeled in conjunction with two separate psychopathological symptom factors reflecting depression and delusions was also examined. The appropriate Brief Psychiatric Rating Scale (BPRS) or Positive and Negative Syndrome Scale (PANSS) depression and guilt scores were MVs for the depression construct. The appropriate BPRS or PANSS unusual thought content (UTC) and grandiosity scores were MVs for the delusions construct. The MVs and latent variables (LVs) for insight used to test hypothesis one were utilized again for this model (see Figure 2). All of the measured variables loaded significantly on the identified latent factor (z-values and robust z-values > 1.96). A review of the average absolute standardized residuals (.0472) and the average
off-diagonal absolute standardized residuals (.0558) supports the present model by indicating that the covariances observed are due to the underlying factors of the proposed model.

The standardized parameter latent variable and error loadings for Model 2 are presented in Table 6. Review of this table reveals that all loadings are relatively high and statistically significant. The loading for guilt (Model 2 = .58) may be lower due to low endorsement of this symptom by the participants in this sample.

The confirmatory factor analysis (CFA) LV intercorrelations for model 2 are presented in Table 9 and are also included in Figure 2. The most interesting insight-to-symptom factor intercorrelations were as follows: delusions were most strongly related with the ability to relabel symptoms (-.425, p < .05) while the relationship between delusions and treatment compliance was not significant; depression was only modestly correlated with treatment compliance (.30, p < .05) compared to robust relationships between depression and awareness of illness (.79, p < .05) and relabeling of symptoms (.62, p < .05); and finally, the relationship between depression and delusions was not significant.

Model 3: Additional Analyses. Due to the current findings that SAI-E item 6 (participant awareness of the need for treatment) did not correlate as expected with the other SAI-E treatment items, an additional SEM was used to determine if a need for treatment factor could be modeled in conjunction with the three initially proposed insight factors and two separate psychopathological factors. SAI-E item 6 and the mean score for Birchwood’s Insight Scale treatment items were MV’s for the construct of need for treatment. The MVs and LVs for insight and psychopathology used to test hypothesis two were utilized for this model as well. All of the measured variables loaded significantly on the identified latent factor (z-values and robust z-values > 1.96). A review of the average absolute standardized residuals (.0459) and the
average off-diagonal absolute standardized residuals (.0530) supports the present model by indicating that the covariances observed are due to the underlying factors of the proposed model.

The standardized parameter latent variable and error loadings are presented in table 7. Review of this table reveals that all loadings are relatively high and statistically significant.

The CFA LV intercorrelations for Model 3 are presented in Table 10. The most interesting intercorrelations were as follows: the correlation between the patient’s awareness of need for treatment and the delusion factor (-.12, p > .05) and treatment compliance and the delusion factor (-.15, p > .05) are quite similar while patient’s awareness of need for treatment and the depression factor (.50, p < .05) is nearly twice the size of the correlation between treatment compliance and the depression factor (.29, p < .05); awareness of the need for treatment was more strongly related to the other insight factors (.89 & .76, p < .05) than treatment compliance (.78 & .62, p < .05); while, the moderate correlation between awareness of the need for treatment and treatment compliance (.45, p < .05) represented the strongest relationship between treatment compliance and any of the other factors.

Goodness of Fit

The overall fit of the models was assessed using the Satorra-Bentler chi-square, comparative fit index (CFI), robust comparative fit index (RCFI), standardized root mean square residual (SRMR), and the root mean square error of application (RMSEA). In general, the fit indices indicate good model fit for all three models with all but one of the fit indices within desirable ranges. See Table 4 for model fit results. Good model fit indicates that the specified relations between the MVs and LVs (see figures 2 & 3) are adequate representations of the observed data. The Satorra-Bentler chi-square was significant for Model 2 (χ² (44) = 74.59, p = .003) and Model 3 (χ² (62) = 84.99, p = .028). As mentioned previously, there are problems
associated with the use of chi-square statistics as a goodness of fit measure. Though the Satorra- Bentler is more robust than the traditional chi-square, it is still hazard to the same issues as the chi-square. It is likely in this instance that the sample size (n = 106) has resulted in a minor discrepancy between the observed and proposed covariance matrixes achieving statistical, but not clinical, significance. In support of this, it is important to note that the average and average off-diagonal absolute standardized residuals, CFI, RCFI, SRMR, and RMSEA are all within good ranges.
CHAPTER 4
DISCUSSION

Poor awareness of illness, often referred to as lack of insight, is a distinctive feature of severe psychotic disorders, which has recently gained more attention in the literature. Research demonstrating associations between insight and less time spent in the hospital (Van Os et al., 1996), better treatment compliance (Bartko, Herczeg, & Zador, 1988; Sanz et al., 1998; Van Putten, 1974), more contact with mental health services (Sanz et al., 1998), and better vocational rehabilitation (Lysaker and Bell, 1995) helps to underscore the importance of this construct and the need to understand it better. Insight has been defined as a multi-dimensional phenomenon that is a separable component from pathological symptoms and neurocognitive deficits of psychosis. So far, the use of exploratory factor analysis to determine if insight is multi-dimensional has been mixed. The current research examined whether there was evidence for a three factor model of the insight construct using a confirmatory factor analysis (CFA) which can provide stringent statistical tests of hypothetical factor models while accounting for measurement error. The three-factor model of insight was also examined along with two separate psychopathological symptom factors (depression, delusions), which have been shown to be significantly associated with insight. Principal findings from the current study were that the three-factor model of insight was supported and that the insight factors were meaningfully correlated to the two symptom factors. Moreover, the three-factor insight model provided significantly better fit than a single factor model of insight. Thus, the present results support and extend the findings for a three-factor model of insight, consistent with the results reported by Kim et al. (1997).
The discussion that follows is organized into six sections: (a) analyses of the combined sample; (b) Model 1 results; (c) Model 2 results; (d) clinical implications of the findings; (e) limitations of the current study; and (f) suggestions for future research.

Analyses of the Combined Sample

The sample for the current study was created by combining the data from samples collected at three separate sites. While doing so increased the total N for the structural equation modeling (SEM) analyses and variability on the manifest variables, it created the potential confound of combining significantly different covariance matrices. The significant findings of the multivariate analysis of variance (MANOVA) and subsequent related analyses demonstrated that the samples did differ significantly from each other in terms of mean level of total insight and unusual thought content (UTC). Veterans from the North Texas Veterans Health Care System (NTVHCS) were found to have significantly more insight that the patients at Vernon State Hospital (VSH), a forensic facility. This difference is not surprising given the findings of Arango, Calcedo-Barba, Gonzalez-Salvador, and Calcedo-Ordonez (1999) demonstrating that insight into symptoms helped accurately predict future violence. An additional finding was that the sample from Terrell State Hospital (TSH) had a significantly higher UTC mean that either of the other samples. This finding makes sense due to a large portion of this sample having been civilly committed compared to none of the NTVHCS sample and VSH sample all having been hospitalized (and treated) for a sufficient period of time in order to earn enough privileges to be placed on the least restrictive unit in the adult section of the facility.

Variability in the covariance matrices was explored by visual examination of the pattern of correlations for the three subsamples and the Box’s test of equality of covariance matrices (Box’s M). All sites showed similar trends in their pattern of correlations and the Box’s M
statistic was not significant. In sum, these results suggest that combining the data across these sites provided the variance on traits helpful in factor analysis, and did not involve a combination of substantially different covariance matrices that could have hindered the modeling process. Moreover, if the subsamples had differed substantially in terms of variable relations, then the model results would not have resulted in such good fit.

Model 1

The results indicate good model fit to the data in terms of large manifest variable loadings onto their respective latent variables along with small residual error. Thus, it can be concluded that the specified manifest variables are excellent indicators for their respective latent constructs. Specifically, Schedule for the Assessment of Insight – Expanded Version (SAI-E) items 1, 2, and 3 represent awareness of illness; and SAI-E items 4 and 8 represent ability to relabel symptoms as signs of psychopathology. The SAI-E items A, B, and C represent nurses’ ratings of patients’ treatment compliance, a key indicator of patients’ awareness of need for treatment (see figure 1).

Two modifications were made from the originally proposed model to achieve the goodness of fit reported for the current model. Based upon the results of the initial correlation matrix, item 6, the SAI-Es best measure of patient’s awareness of the need for treatment, demonstrated higher correlations with the items assessing awareness of illness than with the items assessing treatment compliance (though item 6 did correlate significantly with the other treatment items). It has been suggested that awareness of the need for treatment and treatment compliance are not equivalent concepts, particularly in settings where important privileges, such as greater freedom within the hospital or release to the community, are dependent upon treatment
compliance. Thus, the decision was made, *a priori*, to exclude item 6 from the modeling procedures.

The deletion of item 7 was part of the model modification process. When Model 1 was initially run nearly all of the goodness of fit indices were approaching but fell just below what is traditionally considered good fit. When the 20 largest standardized residuals were reviewed, problems were identified with items 7, A, and B. From a theoretical standpoint, deleting item B (which had a lower factor loading and higher error variance than item A), while potentially justifiable with this sample, would have risked maximizing fit to a sample while reducing generalizability to the population.

Meanwhile there were some theoretical problems with item 7 that would likely apply to the population. In particular, item 7 is potentially a poor indicator of the capacity to relabel symptoms due to the potential for averaging across diverse symptoms, such as hallucinations and delusions, which previous research has suggested are differentially related to insight (David et al., 1992; Nayani & David, 1996; Neumann et al., 1996). Additionally, different symptoms were evaluated for item 7 with different patients resulting in a lack of consistency regarding what was measured. These problems also exist with item 8 to some extent, however, but item 7 requires a higher level of abstractive reasoning and capacity for personal responsibility for symptoms which increased the potential for confounding factors such as intelligence and locus of control that were beyond the scope of the current study. Thus, the present modifications of model 1 were based on theoretical grounds and resulted in better model fit and parsimony.

After the deletion of item 7, item 8 showed the lowest loading of the examined variables. This result is likely due to the initial problems discussed in relation to item 7 (i.e., inconsistency in what was measured across participants and less meaningful scores due to averaging across
symptoms with a differential relationship to insight). However, the loading was adequate, and it can be concluded that all manifest variables represent their specified constructs.

Model 2

Overall, the results for Model 2 also indicate good model fit, as well as, high latent variable loadings, especially for the insight items. A problem was noted with the Satorra-Bentler chi-square for this model, which indicated that there was a significant difference between the proposed model and what was observed in the sample. While the Satorra-Bentler was created to provide a more robust alternative to the standard chi square goodness-of-fit indices, it is still susceptible to the same problems. Specifically, when sample sizes become large enough, statistically but not theoretically significant differences between the proposed model and observed data can result. In support of this explanation for the present results, a review of the other fit indices suggests a good fit of the model with only minimal differences between the observed covariance matrix and the model-generated covariance matrix (e.g., small standardized residuals). Thus, it can be concluded that the specified manifest symptoms variables were also representative of their specific latent constructs. Model 2 differs from Model 1 in that the three-factor model of insight was again supported, but this time in the presence of symptoms of psychopathology that have been previously demonstrated to be associated with insight or the lack thereof. These findings are consistent with the literature suggesting that insight manifest variables (MVs) load onto their own latent factor, and are not simply alternative manifestations of latent variable (LV) symptom factors (David, 1998; Cuesta & Peralta, 1994; Cuesta et al., 2000; Peralta & Cuesta 1994). The current results also extend the past findings through use of confirmatory procedures demonstrating that three dimensions of insight can be modeled separately from psychopathology.
The CFA LV intercorrelations for Model 2 produced some interesting results that may help to further our understanding of the relationships between insight and symptoms of psychopathology. The ability to relabel symptoms as pathological was more strongly (inversely) correlated to the delusion factor compared to the correlation between the awareness and delusion factors. In addition, the relationship between the delusion and treatment compliance factors was not significant. This is somewhat consistent with findings on a related self-report measure of insight (Birchwood’s Insight Scale) that relabeling of symptoms was the only insight domain significantly correlated with delusions (-.45, \( p < .05 \)) (Gonterman 2002). It is also interesting that the relationship between delusions and treatment compliance was not significant since delusional explanations for discontinuing medication are not uncommon in clinical settings. Perhaps this finding is more a reflection of the subset of patients with psychosis who were sampled (i.e., hospitalized patients), unfortunately the number of outpatients in this sample was too small to provide a clear indication regarding whether this relationship would change with different conditions.

With respect to the associations between the depression and insight factors, the strongest correlation occurred between the awareness of illness and depression factors. The association between the depression factor and the relabeling factor was still quite robust, though the correlation was only modest between the depression factor and treatment compliance. These findings are fairly consistent with the previous literature (Amador et al., 1994; Carroll et al., 1999; David et al., 1995; Dickerson et al., 1997; Gonterman, 2002; Kemp et al., 1995; Michalakeas et al., 1994; Moore et al., 1999; Neumann et al., 1996; Peralta et al., 1994; Sanz et al., 1998; Smith et al., 1998; Smith et al., 2000). Taken together, the current findings highlight
the negative impact that awareness of having a mental disorder can have on individuals’ well being.

Another important finding from the Model 2 results involves the non-significant relationship between depression and delusions in psychotic individuals. This finding is inconsistent with the protective hypothesis that delusions develop as a way of warding off the depression associated with recognizing one has a serious illness that is highly stigmatized by society. Furthermore, the finding that delusions are more modestly intercorrelated with awareness suggests that delusions likely arise for other reasons. Perhaps a more plausible explanation is that delusions arise as a way to make sense of the disjointed and confusing pieces of information these persons perceive due to the neurocognitive deficits associated with psychotic (particularly schizophrenia spectrum) illnesses.

Clinical Implications

The findings of the current research have implications for clinical treatment; a summary of which follows. First, awareness of illness and the ability to relabel factors were only modestly to moderately related to the observable treatment compliance factor. Thus, programs designed to increase treatment compliance should include components beyond increasing the awareness of one’s illness and include components focusing on concrete positive reinforcements for ongoing compliance with psychotropic medication.

This type of a component would seem especially important when working with hospitalized patients since the data from this sample suggested that patients’ awareness of the need for treatment was more moderately correlated with treatment compliance than initially predicted. Supplemental SEM analyses demonstrated that awareness of the need for treatment could be modeled as a factor of insight in conjunction with a treatment compliance factor with
these two independent variables being moderately correlated. Nurses’ observations of treatment compliance were more strongly correlated with patients’ awareness of the need for treatment compared to the correlations between treatment compliance and the awareness and relabeling factors. While it is remarkable that two completely separate sources of measurement parallel to this degree, the current findings that the need for treatment factor is much more strongly related to the other insight factors and depression while being similarly associated with delusions, further supports the SEM findings that, at least in populations where treatment compliance results in secondary gain, awareness of the need for treatment and treatment compliance are separate, but related factors. In addition, the possibility that the treatment compliance factor may reflect more about the relationship between nurses and specific patients suggests that programs designed to increase treatment compliance might benefit from placing a strong emphasis on developing therapeutic relationships with their clients.

Second, clinicians involved in programs designed to increase patients’ insight should be aware of the risk of increased depression in patients’ whose level of insight improves. It would appear beneficial for such programs to closely monitor the degree of participant’s depression, particularly since research has suggested that increased insight into illness, fewer years of treatment, and more severe depressive symptoms each significantly increase patients’ risk of suicidality (Schwartz & Smith, 2004). Ongoing monitoring might allow for the implementation of steps to reduce resulting impairment in daily functioning or suicide risk while not introducing interventions that might reduce depression to the point that it could interfere with the mission of the program.

Third, the current findings do not support the protective hypothesis that delusions develop to protect against depression and anxiety. While increased awareness of illness is
associated with increased depression, at least cross-sectionally, it does not appear to follow that
delusions will increase as a way to protect oneself. To the extent that delusions arise from
neurocognitive deficits in perception, memory, and attention, neurocognitive rehabilitations
programs specially designed for psychiatric patients could result in a decrease in delusions over
time.

Limitations

The generalizability of these findings is hindered by the following limitations. First, the
majority of this sample consisted of hospitalized patients and 64% of the sample had experienced
a significant exacerbation in psychotic symptoms within two weeks of testing. Thus, these
results are most reflective of acute hospitalized patients. Second, the same rater conducted the
symptom and insight interviews, and this may have inflated the relationships between the
symptom ratings and the SAI-E. However, it is notable that results available for the TSH subset
demonstrated significant associations between a self-report measure of insight and symptoms.
Third, the study population consisted of a higher percentage of minorities than found in the
general population.

Future Directions

The current study suggests several new directions for research on insight. Research
should include additional samples beyond acute populations and hospitalized patients. Included
in this recommendation are inpatients ready for discharge to the community, patients with
exacerbations managed on an outpatient basis, and stabilized outpatients.

Furthermore, longitudinal studies exploring changes in symptom and insight levels over
time would be useful in explaining the role of insight in psychotic disorders. It would prove
particularly valuable for future research to include data collected during multiple acute, recovery,
and stabilized phases. Such research would help to determine if the current model of insight could be supported across different phases of the illness. Additionally, it may further elucidate whether insight fluctuations within the individual are the sole product of illness status or additional factors since the few longitudinal studies published so far have suggested that the relationship between insight and symptoms changes between acute and stable phases (Cuesta et al., 2000; Mintz, Addington, & Addington, 2004).

The relationship between awareness of the need for treatment and observable treatment compliance deserves closer consideration. The current study found that awareness of the need for treatment and observable treatment compliance were only modestly to moderately correlated. A more complete exploration of these factors and whether the relationship changes in different settings is warranted.
Table 1

Studies Showing Significant Associations across Insight Dimensions with Symptoms

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<th>Study</th>
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<th>Dis</th>
<th>Pos</th>
<th>Neg</th>
<th>Sym</th>
<th>Scale</th>
<th>Dimension</th>
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<td>-</td>
<td>I</td>
<td>NS</td>
<td>-</td>
<td>SUMD</td>
<td>Aware (P, C)</td>
</tr>
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<td>NS</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>NS</td>
<td>SUMD</td>
<td>Aware Illness</td>
</tr>
<tr>
<td></td>
<td>NS</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>NS</td>
<td>SUMD</td>
<td>Consequences, Treatment</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>NS</td>
<td>SUMD</td>
<td>Attributions</td>
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<td>-</td>
<td>-</td>
<td>-</td>
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<td>I</td>
<td>SAI</td>
<td>Relabel, Treatment</td>
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<td>David et al. 1995</td>
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<td>-</td>
<td>-</td>
<td>-</td>
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<td>SAI</td>
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<td>I</td>
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<td>I</td>
<td>I</td>
<td>PANSS, SALI</td>
<td>Aware Illness, Treatment Relapse Aware</td>
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<td>I</td>
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<td>P</td>
<td>-</td>
<td>IS</td>
<td>Treatment</td>
</tr>
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<td>I</td>
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<td>Aware (P), Attribute (P)</td>
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<td>I</td>
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<td>Attribute (C)</td>
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<td>I</td>
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<td>-</td>
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<td>Awareness, Relabel</td>
</tr>
<tr>
<td>Peralta &amp; Cuesta 1994</td>
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<td>-</td>
<td>-</td>
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<td>Awareness</td>
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<td>Awareness (C), Conseq. (C &amp; P)</td>
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</table>

(table continues)
### Table 1 (continued)

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<tr>
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<th>Del</th>
<th>Dis</th>
<th>Pos</th>
<th>Neg</th>
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<td>Smith et al. 1998</td>
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<td>SUMD</td>
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<td>Smith et al. 2000</td>
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<td>NS</td>
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<td>NS</td>
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<td>Attribute (P)</td>
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<td>-</td>
<td>-</td>
<td>I</td>
<td>SUMD</td>
<td>Awareness</td>
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</tbody>
</table>

**Note.** To simplify interpretation, all scales are reported so that a positive association (P) means increased (better) insight was associated with increased correlate, and a negative association (I) means increased (better) insight was associated with decreased correlate. (NS = not significant). Dep = depression, Del = delusions, Dis = disorganized, Pos = positive symptoms, Neg = negative symptoms, Sym = total symptoms, C = current, P = past.
Table 2

Descriptive Statistics for the Manifest Variables for Models 1 and 2

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<th>Variable</th>
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<th>N</th>
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Table 3

Spearman’s Rho Correlations between Model 1 & 2 Proposed Manifest Variables

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<th>S-3</th>
<th>S-4</th>
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<th>S-8</th>
<th>S-A</th>
<th>S-B</th>
<th>S-C</th>
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Note.

*denotes p ≤ .05
**denotes p ≤ .01
### Table 4

**Model Fit Results**

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<th>df</th>
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</table>

Note. S-B $X^2$ = Satorra-Bentler chi-square; CFI = comparative fit index; RCFI = robust comparative fit index; SRMR = standardized root mean squared residual; RMSEA = root mean square error of application

### Table 5

**Standardized Parameter Latent Variable and Error Loadings: Model 1**

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<tr>
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<th>Latent Variables</th>
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<td>SAI-E B</td>
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<tr>
<td>SAI-E C</td>
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Note. TX = treatment
Table 6

Standardized Parameter Latent Variable and Error Loadings: Model 2

<table>
<thead>
<tr>
<th>Manifest Variables</th>
<th>Latent Variables 1</th>
<th>Latent Variables 2</th>
<th>Latent Variables 3</th>
<th>Latent Variables 4</th>
<th>Latent Variables 5</th>
<th>Error</th>
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</table>

Note: 1 = Awareness; 2 = Relabeling; 3 = Treatment Compliance; 4 = Depression; 5 = Delusions; Dep. = Depression; UTC = Unusual Thought Content; Grand. = Grandiosity
Table 7

Standardized Parameter Latent Variable and Error Loadings: Model 3

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<tr>
<th>Manifest Variables</th>
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<td>5. GUILT</td>
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</table>

Note: 1 = Awareness; 2 = Relabeling; 3 = Need for Treatment; 4 = Treatment Compliance; 5 = Depression; 6 = Delusions; TX = Treatment; Dep. = Depression; UTC = Unusual Thought Content; Grand. = Grandiosity
Table 8

Model 1 Confirmatory Factor Analysis (CFA) Latent Variable Intercorrelations

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<th>Latent Variables</th>
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<td>1. Awareness</td>
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<td>.43*</td>
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<td>2. Relabeling</td>
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<td>.33*</td>
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</tr>
<tr>
<td>3. TX Compliance</td>
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Table 9

Model 2 Confirmatory Factor Analysis (CFA) Latent Variable Intercorrelations

<table>
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<th>5</th>
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<td>.41*</td>
<td>.79*</td>
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<tr>
<td>2. Relabeling</td>
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<td>.62*</td>
<td>-.43*</td>
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<td>3. TX Compliance</td>
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<td>-.19</td>
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<td>4. Depression</td>
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<td>5. Delusions</td>
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</tbody>
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*p<.05
Table 10

Model 3 Confirmatory Factor Analysis (CFA) Latent Variable Intercorrelation

<table>
<thead>
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<th>Latent Variables</th>
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<th>4</th>
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<th>6</th>
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<td>.62*</td>
<td>-.43*</td>
<td>.76*</td>
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</tr>
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<td>5. Delusions</td>
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<td>6. Need for TX</td>
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</tbody>
</table>

*p<.05
Legend
E = Measurement Error; Aware = Awareness of Illness; Relabel = Relabeling of Psychotic Symptoms; Treatment = Treatment Compliance

Figure 1. Model 1: Three Factor Model of Insight using SAI-E Items as Manifest Variables
Legend
E = Error; Aware = Awareness; Relab = Relabeling; Treat = Treatment Compliance; Del = Delusions; Dep = Depression; UTC = Unusual Thought Content; Grand = Grandiosity

Figure 2. Model 2: Three Factor Model of Insight and Psychopathology using SAI-E, BPRS, and PANSS Items as Manifest Variables
REFERENCES


