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Insight in Schizophrenia: A Meta-Analysis

by

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Abstract

Insight is defined as the patient's awareness of mental disorder, awareness of the social consequences of disorder, awareness of the need for treatment, awareness of symptoms and attribution of symptoms to disorder. Previous studies have yielded inconclusive results regarding the nature of the relationship between insight and symptomatology. A meta-analysis was conducted to determine the magnitude and direction of the relationship between insight and symptom domains and to determine moderator variables that were associated with the variations across studies. Results indicated that there was a small negative relationship between insight and global, positive and negative symptoms. There was also a small positive relationship between insight and depressive symptoms. Acute status and mean age of onset of the disorder moderated the relationship between insight and symptoms. The possible reasons for the relatively modest effect sizes, the examination of the role of moderator variables, and the directions for future research are provided.

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Dedication

In loving memory of my grandparents, Dr. David Mintz and Sylvia Yalowsky.

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Introduction

Schizophrenia is a complex disorder that is prevalent in approximately 0.5% to 1.5% of the population (American Psychiatric Association [APA], 2000). Schizophrenia usually presents as a constellation of symptoms that include perceptual misinterpretation, cognitive impairment and emotional dysfunction. In addition, depression is common in schizophrenia, with many individuals experiencing depressive symptoms once the psychotic episode resolves (Iqbal, Birchwood, Chadwick, & Trower, 2000). People with schizophrenia, must cope with the reality that they suffer from a debilitating, chronic illness for which there is no known cure. Patients must not only cope with their own thoughts and feelings regarding schizophrenia, but also the conceptions of the general population, who often regard schizophrenia with a stigmatizing attitude (Crisp et al., 2000).

In ordinary usage, insight is defined as the capacity to discern the true nature of a situation. Medically, the definition of insight has evolved over the years, however, the current definition of insight is that it is a multidimensional concept that includes: 1) awareness of mental disorder, 2) understanding of the social consequences of disorder, 3) awareness of the need for treatment, 4) awareness of specific signs and symptoms of disorder, and 5) the attribution of symptoms to disorder (Amador & David, 1998).

It is commonly understood that a majority of patients with schizophrenia do not have awareness into the nature of the disorder. The *Diagnostic and Statistical Manual Fourth Edition Text Revised (DSM-IV-TR)* (APA, 2000) addresses the issue of insight in schizophrenia with the following statement; "A majority of individuals with schizophrenia have poor insight regarding the fact that they have a psychotic illness.

Evidence suggests that poor insight is a manifestation of the illness itself rather than a coping strategy" (p. 304).

Previous studies estimate that between 50 to 80% of patients with schizophrenia do not believe they have an illness (Amador & Gorman, 1998). Many patients feel that they should only accept treatment because of pressure from family and friends. Other patients may understand that they experience symptoms but may not accept the label of mental disorder. Finally, some patients are aware of the symptoms of the disorder but misattribute these symptoms to other causal origins.

Insight is an important prognostic indicator in schizophrenia, as its presence can enhance treatment compliance, thus reducing the risk of clinical deterioration or relapse (McEvoy et al., 1989). Furthermore, patients with schizophrenia are at a higher risk for suicide and insight may play an important role in evaluating suicide risk (Fennig, Naisberg-Fennig, & Craig, 1996b).

In the last 20 years, there has been a surge of research into the conceptualization and assessment of insight, as well as its relationships with prognosis, compliance, neuropsychological impairment, and severity of psychopathology in schizophrenia. However, these studies have yielded inconsistent results and as such, authors of traditional literature reviews have highlighted potential reasons for the inconsistencies among studies of the relationship between insight and psychopathology (Amador & Gorman, 1998; Fennig et al., 1996b; Schwartz, Skaggs, & Petersen, 2000). However to date, there appeared to be no quantitative reviews of the existing body of literature regarding the relationship between insight and psychopathological symptoms.

The purpose of this study was to perform a meta-analysis on the relationship between insight and symptomatology in schizophrenia. Meta-analysis is a statistical

technique that can lead to conclusions that are considered more accurate and reliable than conclusions presented in any one primary study or in a nonquantitative, narrative review (Rosenthal & DiMatteo, 2001). In correlational research, the strength of the relationship between two variables is considered the effect size and the correlation coefficient (r) is used as an estimate of the effect size. Effect sizes were gauged by the direction and magnitude of the correlation coefficients between insight and schizophrenic symptomatology. If the effect sizes were heterogeneous, moderator variables, which are associated with these variations in effect sizes across studies, were sought. The meta-analysis was restricted to the results from published research.

Prior to describing the particular variables analyzed in this study, a review of the critical concepts is provided. These include: the definition of schizophrenia, the issues concerning the definition and assessment of insight, the relationship between insight and symptoms of schizophrenia, and finally, a description of the meta-analytic technique.

Schizophrenia Defined

The contemporary view of schizophrenia is that its clinical presentation varies across patients, making the classification and diagnosis of the disorder particularly challenging. Schizophrenia is characterized by a diverse set of symptoms that may present differently in individual patients. The course of the disorder is also variable, as the onset can occur either abruptly or gradually, and the outcome can range from full or partial recovery to total debilitation (Cornblatt, Green & Walker, 1999).

Schizophrenia is classified in the *DSM-IV-TR* according to five subtypes which include, paranoid, disorganized, catatonic, undifferentiated, and residual (APA, 2000). However, an alternative classification system is the distinction between positive and negative syndromes in schizophrenia (Kay, Fiszbein, & Opler, 1987). The positive

symptoms of schizophrenia consist of hallucinations, delusions, positive thought disorder, bizarre or disorganized behavior and catatonic motor behavior. The negative symptoms include affective blunting, impoverished thinking and cognition, anhedonia, avolition-apathy, and attentional impairments (Kay et al., 1987). It has been speculated that the positive and negative syndromes consist of two different underlying pathologies. It is hypothesized that the positive syndrome is the result of dopamine dysfunction, and characterized by an acute onset, good response to neuroleptic medication, and a relatively good prognosis. In contrast, it is hypothesized that the negative syndrome is the result of irreversible brain structure abnormalities and the course of the disorder is characterized as chronic, with poor response to medication, and a poor outcome (Crow, 1980, as cited in Cornblatt et al., 1999).

For all subtypes of patients with schizophrenia, it is generally understood that the degree of insight is an important factor to consider when assessing mode of treatment and the patient's compliance to medications. In the following section, issues in the definition and assessment of insight are discussed.

Definition and Assessment of Insight

The lack of a consistent definition of insight in relation to psychopathology poses an important problem in its measurement (Markova & Berrios, 1995a). Measurement procedures have included clinical description of free response (McGlashen & Carpenter, 1981), use of psychopathology vignettes (McEvoy, Schooler, Friedman, Steingard, & Allen, 1993b), multiple choice questionnaires (Birchwood et al., 1994), and structured interviews (McEvoy et al., 1989). However, because of the lack of consensus regarding what "insight" means, the instruments used to assess insight depend on the researcher's operational definition (Fennig et al., 1996b). For example, early studies used a

unidimensional conceptualization of insight (McGlashen & Carpenter, 1981) whereas more recent studies have defined insight multidimensionally (Amador et al., 1993).

The earliest researchers used vague definitions of insight and a categorical method of assessment. According to Eskey (1958), insight was defined as a "verbal recognition by the patient of existing psychological difficulties" (p. 428). Patients were then categorized as having full insight, partial insight, or no insight. Patients were asked questions regarding insight but the reasons behind their responses were not explored. This method of assessment was considered reliable but the validity of the method has been criticized. For example, patients' responses may have been based on delusional thinking, not a true awareness of their illness per se. Another difficulty was that it employed a categorical approach in which insight was measured on a three-point scale and the assessment of finer gradations of insight was not possible.

Later investigations conceptualized lack of insight in terms of two dimensions, such as, patient's failure to acknowledge illness and need for treatment (McEvoy et al., 1989). Patients with schizophrenia were then administered the Insight and Treatment Attitudes Questionnaire (ITAQ) in which insight was assessed according to whether or not patients agreed with the doctor about the accuracy of their diagnosis and need for treatment. Patients were asked to elaborate on their responses, which were then rated along a continuum by three independent judges. The main criticism of this approach was that it failed to account for patients' perception of specific symptoms of the disorder, such as cognitive processes, emotions and behavior (Markova & Berrios, 1992).

Markova and Berrios (1992) proposed that the definition of insight needed to incorporate additional factors. They argued that insight was considered a subcategory of self-knowledge about not only how the disorder affects the patient, but also about how

the disorder affects the patient's interaction with the world. Patients were asked to answer thirty-two questions regarding hospitalization, mental illness in general, perception of being ill, changes to self, control over the situation, perception of the environment, and wanting to understand one's situation.

An alternative multidimensional method of assessment and conceptualization of insight is the Scale to Assess Unawareness of Mental Disorder (SUMD) (Amador et al., 1993). The SUMD assesses current and retrospective awareness of having a mental disorder, the effects of medication, the consequences of mental illness, and the awareness and attributions for the specific signs and symptoms of the disorder. In recent years, this scale has increased in popularity and has been used frequently to assess insight in schizophrenia and its relationship to psychopathology (Amador & Gorman, 1998).

In sum, the assessment of insight has differed in its sophistication and complexity of definition over time, although these definitions do share a certain commonality. The common denominator that emerges in the existing body of literature is that all the definitions of insight incorporate the awareness of having a mental illness (Fennig et al., 1996b). In addition, measures of awareness of the consequences of mental disorder, awareness of the need for treatment, and awareness and attribution of symptoms are also considered important aspects of insight (Amador et al., 1994).

The Relationship between Insight and Psychopathology

In the last 20 years, several studies have examined the relationship between insight and psychopathology in schizophrenia. The relationship between lack of insight and global symptoms (David, Buchanan, Reed, & Almeida, 1992), positive symptoms (Amador et al., 1994), negative symptoms (Amador et al., 1994), and depression (Moore, Cassidy, Carr, & Callaghan, 1999) has been investigated. The hypothesis in these

investigations was that there would be a negative correlation between insight and severity of global, positive, and negative symptomatology. In contrast, these investigations hypothesized that there would be a positive correlation between insight and severity of depressive symptoms. However, these studies yielded conflicting results regarding the nature of these relationships, with some studies finding significant relationships, while others finding that no significant relationship existed. In the following sections, examples of studies that investigate the relationship between insight and different symptom domains are provided.

Insight and Global Symptomatology

Global symptomatology in schizophrenia refers to the overall severity of symptoms which include anxiety, somatic concern, emotional withdrawal, conceptual disorganization, guilty feelings, mannerisms and posturing, grandiosity, depressive mood, and hostility. In addition, suspiciousness, hallucinatory behaviour, motor retardation, tension, uncooperativeness, unusual thought content, and blunted affect are also included in the assessment of global symptomatology (Overall & Gorham, 1962). Global symptomatology is commonly investigated using clinical rating scales such as the Brief Psychiatric Rating Scale (BPRS; Overall & Gorham, 1962) or the general subscale of the Positive and Negative Symptom Scale (PANSS; Kay et al., 1987). In an early study investigating whether a positive attitude toward illness correlated with good outcome, McGlashan and Carpenter (1981) found that no relationship existed between the attitude toward psychosis and global psychopathology among 30 patients with schizophrenia. However, a later study (David et al., 1992) measuring the relationship between insight and a global measure of psychopathology (Present Status Examination) in 91 patients with schizophrenia found a moderate correlation. Yet a third study (Markova & Berrios,

1992) found a strong correlation between insight and global psychopathology in 43 patients with schizophrenia.

Insight and Positive Symptoms

Positive symptoms represent distortions of normal thinking and behaviour (Kay et al., 1987). Some studies have found relationships between insight and positive symptoms whereas others have not. For example, McEvoy et al. (1989) found no significant relationship between insight and acute psychopathology, nor did they find any significant improvement in insight with the diminution of acute psychopathology in 83 patients with schizophrenia. However, Amador et al. (1994) investigated the relationship between insight and symptoms in 24 psychotic and 14 non-psychotic patients with schizophrenia. They found no relationship between insight and total severity of symptoms. However, they did find significant relationship between severity of *some* symptoms and insight, such as delusions, thought disorder, and disorganized behaviour.

Insight and Negative Symptoms

Negative symptoms of schizophrenia include those that constitute a deficit in behaviour, cognition, and emotion (Kay et al., 1987). Few authors have found a significant relationship between insight and negative symptoms. Amador et al. (1994) found no significant correlation between any SUMD score and negative symptoms although increased social isolation was modestly correlated with less awareness of mental disorder, the social consequences of mental disorder, and the efficacy of medication. In a more recent study of neurocognitive functioning, Smith, Hull, Israel, and Willson (2000) found a small relationship between awareness of current symptoms and negative symptoms.

Insight and Depressive Symptoms in Schizophrenia

Some researchers have speculated that lack of insight is a psychological defense mechanism in the form of *denial* of the illness (Moore et al., 1999). Thus, lack of insight is viewed as a method of warding off depressive symptoms that may result from awareness that one suffers from a chronic illness. It is predicted that those patients with schizophrenia who are also depressed will have greater insight. There have been only a few studies measuring the relationship between insight and depression in schizophrenia. An early study found no relationship between SUMD scores measuring insight and depression (Amador et al., 1994). However, Moore et al. (1999), in a study of insight and its relationship with depression and self-deception in schizophrenia, found a positive relationship between degree of insight and depressive symptoms.

Possible Reasons for Inconsistent and Conflicting Results

As described above, there is a great deal of controversy regarding the nature of the relationship between insight and specific psychopathological symptom clusters. Traditional literature reviews have sought reasons to explain these contradictory findings. It has been argued that the main reason for the contradictions in the literature is due to the inconsistency in the operational definition of insight (Schwartz, 1998a). Other criticisms include failure to report effect size, nonrandom sampling methods, and inappropriate statistical methods (Schwartz et al., 2000). Other potential limitations include methodological problems such as small sample sizes, heterogeneous samples (e.g., mixing chronic and acutely psychotic patients), and the use of measurement tools of questionable reliability and validity.

What is clearly lacking in the area of insight in schizophrenia is a systematic, *quantitative* review of the existing body of published research investigating the

relationship between insight and psychopathological symptoms. A meta-analysis is a popular form of quantitative study in which the magnitudes of the effect sizes across studies can be investigated and any moderator variables that are contributing to the variability in effect sizes can be tested. In the section that follows, the history, purpose, and advantages of meta-analysis are provided.

Meta-analysis: History, Purpose and Advantages

Meta-analysis is a form of quantitative review in which results can be combined across studies. Meta-analysis is a statistical technique that evolved out of the growing pessimism in the 1970s regarding the slow progress in the social and behavioural sciences. The main criticism of the social sciences research was the problem of small effects (Rosenthal, 1991). There were many research studies that investigated the same research question. However, even when these studies agreed with one another, the magnitude of the effect was often quite small, which suggested that even if a result was statistically meaningful, the size of the effect was likely to have little practical significance for individuals.

In 1976, Glass was the first to introduce a technique he termed "meta-analysis" (Rosenthal, 1991). Meta-analysis allows for an estimation of the average effect of outcomes, or the relationship between two variables across a large number of studies. The method to determine the effect size is dependent on the type of study. In correlational research, the effect size is defined as the strength of the relationship between two variables and the correlation coefficient (r) is used as an estimate of the effect size. Another purpose of meta-analysis is to identify specific factors, or moderator variables in the research design, that could affect the magnitude of the effect size.

Meta-analysis has several advantages over the traditional literature review. It allows for more systematic and more quantitative review of the literature than the traditional literature review (Rosenthal, 1991). Meta-analysis can lead to summary statements of greater thoroughness, greater precision, and greater objectivity (Rosenthal, 1991). In addition, meta-analysis allows for differential weighting of studies depending on the sample size of studies. Thus, when averaging effect sizes across studies, those studies that incorporate a large sample and, therefore, have smaller standard errors than other studies, can be given greater weighting. Finally, unlike a traditional qualitative review, meta-analysis allows for a search of moderator variables that may be influencing the variations in the effect sizes across studies.

Purpose of Study

The goals of this study were (1) to summarize the direction and magnitude of the relationship between insight and symptomatology in schizophrenia and (2) to determine moderator variables that were associated with possible variations in effect sizes across studies. A meta-analysis was performed on the results from the existing body of English-language published literature, which measured the relationship between (1) insight and global psychopathology, (2) the relationship between insight and positive symptoms, (3) the relationship between insight and negative symptoms, and (4) the relationship between insight and depression in schizophrenia.

Method

Based on a preliminary review of the literature, it was apparent that insight was conceptualized in terms of several dimensions. However, three basic components -

awareness of mental illness, awareness of the consequences of mental disorder and awareness of the effects of medication - were measured in most studies (Birchwood et al., 1994; Debowska, Grzywa, & Pietura, 1998). In addition, awareness of individual symptoms and attribution of symptoms to mental disorder were also considered important dimensions of insight but measured in far fewer studies (Amador et al., 1993). For meta-analytic purposes, insight was operationally defined as having five components: awareness of mental disorder, awareness of the social consequences of disorder, awareness of the need for treatment, awareness of symptoms of mental disorder and attribution of symptoms to mental disorder. Studies in which insight was conceptualized in any one of these five ways were analyzed.

The inclusion criteria for the studies were publication in scientific, English journals, at any time from 1974 to the present. The reasons for these inclusion criteria were that it would be very difficult to have non-English studies translated and that unpublished studies are more difficult to locate and tend to be less well designed. Also, beginning in 1974, the Schizophrenia and Affective Disorder Schedule (SADS) was primarily used for the diagnosis of patients (Spitzer, Endicott, & Robins, 1975). With the creation of this schedule, the reliability and validity of diagnoses was enhanced and, consequently, these criteria were incorporated into the third edition of the *Diagnostic and Statistical Manual* (DSM-III; APA, 1980) and remained in later editions. Therefore, to maintain consistency in diagnosis, only studies that use established diagnostic criteria were included.

MEDLINE and the PSYCINFO databases were used to locate studies. Keywords that were used in the search included insight, awareness, schizophrenia, psychopathology, positive and negative symptoms, and depression. Also, the reference lists of published

articles were used to manually locate other relevant studies. Studies were searched until May 2001.

Fifty-five studies met the inclusion criteria. Three studies were excluded from the analysis because they measured insight according to the discrepancy between clinicians' or parents' ratings and patients' ratings of symptoms (Dixon, King, & Steiger, 1998; Seltan, Wiersma, & Bosch, 2000; Swanson et al., 1995). The reason for removing these studies was because this method of assessment was not reliable or valid, since the discrepancy rating did not significantly correlate with the insight scale (Selten et. al., 2000). Therefore, it would not have been appropriate to make comparisons between discrepancy ratings of insight and rating scales of insight.

Study Characteristics

A database was created that included study characteristics. The study characteristics were recorded on a coding sheet and then entered into a database on SPSS. The coding sheet can be found in Appendix A. The study characteristics that were coded included:

1. Publication year,
2. Country of origin,
3. Sample characteristics:
    a. Sample Size
    b. Gender of sample (Males/Females)
    c. Mean age of onset of illness
    d. Mean age of sample
    e. Mean number of years of education
    f. Mean value of Intelligence Quotient (IQ)

g. Homogeneous for schizophrenia vs. heterogeneous (sample contains schizoaffective disorder or affective disorder with psychotic features)

h. Percent acute

i. Patient status (Outpatient/ Inpatient)

j. Type of admission (Voluntary/Certified)

k. Mean illness duration (Years)

l. Mean number of hospitalizations

m. Mean duration of hospitalization

n. Percent medicated

o. If medicated, type of medication (Percent typical neuroleptics)

4. Criteria used to formulate diagnosis,

5. Measurement tool for assessing insight,

6. Measurement tool used to assess psychopathological domains,

7. Conceptualization of insight (Unidimensional / Multidimensional),

8. Quality of study (Internal validity)

Quality of Studies

The quality of studies was rated on the basis of judgement of the internal validity of the study. In a recent critique of the research in the area, Schwartz et al., (2000) identified several characteristics that enhance study quality. Based on their recommendations, the overall quality rating was determined by averaging the ratings on a scale of 0 to 7 on the following study characteristics:

1. Appropriateness of operational definition of insight:

   0= unidimensional and dichotomous,

   1= use of a multidimensional or continuous construct,

2= multidimensional and continuous.

2. Use of psychometrically sound scales to measure both insight and symptomatology rather than reliance on clinical judgment:

   0= psychometrically sound scales not used,

   1= used for insight or used for symptoms,

   2= used for both insight and symptoms.

3. Having different raters to evaluate insight and symptomatology:

   0= different raters not used,

   1= different raters used.

4. Interrater reliability of data:

   0= no interrater reliability or < 0.4,

   1= interrater reliability between 0.4 and 0.6,

   2= interrater reliability greater than 0.6.

Inter-rater agreement was established by having two raters independently rate fifteen studies using the four criteria for study quality. The quality ratings for each rater were then correlated by means of a Pearson correlation (r), which resulted in $r = 0.83$, suggesting that there was good interrater reliability for measuring the quality of studies.

Analysis

The meta-analysis computer program by Ralf Schwarzer (1991) was used to analyze the data for each study. The effect sizes for the relationship between total insight and global/positive/negative/ depressive symptoms were calculated where reported. Total insight was determined by averaging the effect size across all five dimensions of insight. In addition, the effect size for each of the five components of insight was also calculated where reported.

The correlation coefficient (r) was used as a measure of the effect size. One advantage of the correlational coefficient (r) as an estimate of the effect size is the relative simplicity of converting to r from other statistics available in a given study. In addition, r is simply interpreted in terms of its practical importance (Rosenthal & DiMatteo, 2001). In the case of longitudinal designs, where the relationship between insight and symptoms were measured repeatedly, the Time 1 correlation was used as an estimate of effect size within the study

If an effect size was not reported, it was calculated from other available statistics. In the case where the t-value and degrees of freedom were available, the following transformation was performed:

$$r = \sqrt{[t^2/(t^2 + df)]}$$

where r is the correlation coefficient, t is the t-value and df is the degrees of freedom.

In the case where the chi square was available, then the following transformation was performed:

$$r = \sqrt{[\chi^2 / (\chi^2 + N)]}$$

where r equals the correlation coefficient, χ^2 equals chi square and N is the sample size.

If the effect size could not be determined by the information in the study, then attempts were made to locate the primary author of the study. Cuesta and Peralta (1994) and Pyne, Bean, and Sullivan (2000) were able to provide the correlations or t-values. Twelve studies were omitted altogether either because the authors did not provide the needed information, or the authors could not be located on email or postal mail (David et al., 1995; Drake, Bentall, Kinderman, & Lewis 1999; Drake, Haley, & Lewis, 1998; Drake, Kinderman, Bentall, Dunn & Lewis, 1998; Goldberg, Green-Paden, Lehman, &

Gold, 2001; Iqbal et al., 2000; Kemp & David, 1996; Lysaker & Bell, 1995; Markova & Berrios, 1992; McEvoy, Hartman, Apperson, & Wilson, 1996; McGlashan & Carpenter, 1981; Roback & Abramowitz, 1979).

Although these omitted studies were not included in the meta-analysis, the results were examined to determine the type of relationships that were reported. Seven studies reported a nonsignificant relationship between insight and global symptomatology, while one study reported a significant relationship between insight and global symptoms, without providing the statistics. One study found non-significant relationships between insight and positive symptoms, and insight and negative symptoms. One study found a non-significant relationship between insight and depressive symptoms while three studies reported a significant relationship between insight and depressive symptoms without providing the information needed to compute the effect size.

The effect size was then weighted by the sample size of the study using the Schmidt-Hunter method (Hunter, Schmidt, & Jackson, 1982), which allows for a good approximation of sampling error variance s^2e using the following computation:

$$s^2e = \{(1-r^2)^2 \times k\}/N$$

where r^2 is the squared weighted mean of the effect sizes, k is the number of studies and N is the total sample size (Schwarzer, 1991).

Three indicators of homogeneity were used to determine whether the variability in effect size estimates exceeds that expected from sampling error alone (Schwarzer, 1991). The first indication, as recommended by Hunter et al. (1982), was that at least 75% of the observed variance could be accounted for by sampling error. Once the sampling error, s^2e, was known, the population variance, s^2res, was calculated by subtracting the sampling error from the observed variance s^2r:

$$s^2res = s^2r - s^2e$$

If less than 75% of the observed variance was accounted for by the sampling error, then a state of heterogeneity was inferred, which required searches for moderator variables (Schwarzer, 1991). The second indicator of homogeneity was that the actual amount of the remaining population variance, or residual standard deviation, was smaller than ¼ of the population effect size (Hunter et al., 1982). And, the third indicator of homogeneity was that a chi-square test yielded a statistically significant result, which would suggest that the variation in effect sizes across studies exceeded a result that would be expected by chance.

If the test of homogeneity was statistically significant, meaning that there was a great range of effect sizes across studies, then a search for variables that *moderate* the relationship between insight and psychopathological symptoms was initiated. The possible moderating role of each of the coded study characteristics was assessed. Correlating the effect sizes with the study characteristic determined the extent of its moderating effect when the study characteristic was a continuous variable. If the correlation was statistically significant, then the study characteristic was considered a moderator variable. In the case of categorical variables, a one-way analysis of variance (ANOVA) was conducted using the various levels of the moderator as the between groups variable.

The "File Drawer" Problem

By only including published studies, the "file drawer" problem arises. This problem has been described as the tendency for studies with nonsignificant results to be more likely buried away in file drawers and not published in scientific journals (Wolf, 1986). Recent research suggests that the publication bias affects the results in less than

10% of meta-analysis. Nonetheless, it is recommended that researchers conduct a sensitivity check for the presence of the publication bias (Sutton, Duval, Tweedie, Abrams, & Jones, 2000). Two procedures were carried out to deal with the file drawer problem. The first procedure was the Fail Safe N calculation, which is a calculation of the number of studies with non-significant results that would be needed to reverse a conclusion that a significant relationship existed (Wolf, 1986). For the purposes of this study, it was decided that the correlation of 0.1 would be used as the indication of a non-significant result. However, for comparative purposes, the Fail Safe N for r= 0.2 was also calculated.

A funnel plot was also conducted in which effect sizes were plotted against sample sizes (Taylor & Tweedie, 2000). If there was no publication bias, the plot was expected to be "funnel shaped," with the neck of the funnel showing little spread among the larger studies and the base of the funnel showing wider spread among the smaller studies. The funnel plot suggested publication bias if either tail of the funnel is weak or missing because the small nonsignificant studies were not present.

Results

Funnel Plot Analysis

Prior to examining the results of the meta-analysis, an analysis of possible publication bias was conducted, using the funnel plot (Taylor & Tweedie, 2000). For each symptom domain, the total effect size was plotted by the sample size for each study (see Appendix B). For each symptom domain, the graph resulted in a funnel shaped scatter plot, with both tails of the funnel well-formed, suggesting that the nonsignificant results were not missed and no publication bias existed.

Overall Insight and Symptomatology

A total of 40 studies provided data for computing the average effect size for the relationship between insight and symptom domains in schizophrenia (see Table 1). The descriptive data for the 40 studies are shown in Table 2.

As shown in Table 3, the weighted effect size for each of the four symptom domains was modest and significant ($p< 0.001$). Nineteen studies, using 1361 subjects, were used for the analysis of the global symptom domain, which resulted in a mean effect size of –0.27 (95 % confidence interval [CI]= -0.41 to -0.13), indicating that as global symptoms increased, patients with schizophrenia demonstrated less overall insight. Thus, 7.2% of the variance in insight was accounted for by the variance in global symptomatology. The test of homogeneity for this effect size was non-significant, p> 0.05, indicating that there was no significant variation in the effect size across studies that measure the relationship between insight and global symptoms. The Fail Safe N calculation suggested that 33 studies failing to reject the null hypothesis would be required to reduce the relationship between overall insight and global symptoms to $r= 0.1$, while 7 studies with non-significant results would be required to reduce the relationship to $r= 0.2$.

The positive symptom domain was made up of 22 studies (1616 subjects) and resulted in a weighted effect size of –0.25, $p< 0.001$ (CI= -0.64 to 0.13), suggesting that as positive symptoms increased, insight decreased. Also, this result suggested that 6.3% of the variance in insight was accounted for by the variance in positive symptoms. The test of homogeneity for the effect size resulted in $\chi^2= 92.32$, $p< 0.001$, suggesting that there was variance across studies in the effect size for positive symptoms. The Fail Safe N calculation indicated that 34 non-significant studies would be required to reduce the

relationship between insight and positive symptoms to r= 0.1, while 6 studies with non-significant results would be required to reduce the relationship to r= 0.2.

Twenty studies, with a total of 1487 subjects, provided the data for the mean effect size for the negative symptom domain. The mean effect size was –0.23 (CI= -0.48 to 0.02), indicating that as negative symptoms increased, overall insight decreased. Thus, 5.2% of the variance in insight was accounted for by the variance in negative symptoms. The test of homogeneity for the negative symptom domain was significant, χ^2= 47.69, p< 0.001, suggesting that there was variance in the effect size across studies. The Fail Safe N calculation indicated that 26 non-significant studies would be needed to reduce the significant relationship between insight and negative symptoms to r= 0.1, while 3 studies with non-significant results would be required to reduce the relationship to r= 0.2.

For the depressive symptom domain, 15 studies, with a total of 1218 subjects, were used to compute the mean effect size. This analysis resulted in a mean effect size of 0.18 (CI= -0.14 to 0.49), indicating that as depressive symptoms increased, insight increased. Thus, 3.2% of the variance in insight was accounted for by the variance in depressive symptoms. The test of homogeneity was again significant, χ^2= 48.63, p< 0.001, suggesting that there was variance in the effect size across studies that investigate the relationship between insight and depressive symptomatology. The Fail Safe N calculation indicated that 12 studies would be required to reduce the significant relationship between insight and depressive symptoms to r= 0.1.

Insight Dimensions and Symptomatology Domains

In addition to computing the above effect sizes for the relationship between overall insight and symptom domains, the mean effect size was computed for specific dimensions of insight and symptom domains. These dimensions included, awareness of

mental disorder, awareness of the social consequences of disorder, awareness of need for treatment, awareness of the symptoms of disorder and attribution of symptoms to disorder. Also, to maintain consistency with the SUMD method of measuring insight, awareness of mental disorder, awareness of social consequences of disorder and awareness of need for treatment were averaged to derive a composite score (Amador et al., 1993). Where reported, the weighted effect size was computed from the correlation coefficient *(r)* for the relationship between each of these dimensions of insight and the symptom domains.

As shown in Table 4, there was a significant, negative relationship between each of the five dimensions of insight and global symptomatology. The weighted effect size for the dimensions of insight was modest, and ranged from –0.20 for awareness of mental disorder to –0.41 for awareness of the symptoms of disorder. The mean effect sizes for dimensions of insight and positive symptoms are shown in Table 5. The results indicated that the effect size was significant and negative for the relationship between positive symptoms and each of the insight dimensions. The effect sizes were modest and ranged from -0.16 for attribution of symptoms to disorder to –0.33 for awareness of the social consequences of disorder. As shown in Table 6, the weighted effect sizes for dimensions of insight and negative symptoms were negative and significant for the dimensions of awareness of mental disorder, awareness of the social consequences of disorder, awareness of need for treatment and attribution of symptoms to disorder. The effect sizes were modest and ranged from –0.20 for awareness of mental disorder to –0.40 for awareness of the social consequences of disorder and need for treatment. The weighted effect sizes for the dimensions of insight and depressive symptoms in schizophrenia are shown in Table 7. The effect sizes were modest and positive for each dimension of

insight. The effect sizes for depressive symptoms ranged from 0.11 for awareness of mental disorder to 0.39 for awareness of symptoms of disorder.

In Figure 1, the effect size was plotted for each of the specific dimensions of insight and the four symptom domains in schizophrenia. As can be seen in Figure 1, there was a great deal of variability in the relationships between different dimensions of insight and global, positive, negative and depressive symptomatology.

Search for Moderator Variables

The influence of other variables on the effect size for overall insight and symptomatology was also examined. It was decided to conduct the moderator analysis using the effect sizes for overall insight and symptom domains, as the overall insight effect sizes were computed based on a relatively larger number of studies compared to the effect sizes for the specific dimensions of insight. Also, the test of homogeneity indicated that there was variance in the effect size for positive, negative and depressive symptoms. Therefore, only these three effect sizes were included in the moderator analysis.

Demographic, clinical and coded study characteristics (i.e. quality of the study) were examined for their potential moderating effect using Pearson's correlation coefficient *(r)* or a one-way ANOVA where appropriate.

The results from these analyses indicated that few of these variables had influenced the effect sizes for positive, negative and depressive symptoms. The percent of acute patients in the sample was identified as a moderator variable for the effect size for positive symptoms, $r(8)= 0.94$, $p< 0.001$, suggesting that 88.1% of the variance was accounted for by the percent of acutely psychotic patients in the sample. Thus, it appeared that the effect size for the negative relationship between insight and positive

symptoms was stronger for samples that were comprised of a larger percentage of acutely psychotic patients. In addition, the mean age of onset of disorder was identified as a moderator for negative symptoms, $r(7)= 0.82$, $p < 0.05$, indicating that 67.1% of the variance in effect size was accounted for by mean age of onset of the disorder. Thus, it appeared that the negative relationship between insight and negative symptomatology was stronger for patients that have an older age of onset. However, mean age of onset and acute patient status did not correlate significantly with one another. None of the demographic, clinical or study characteristics was identified as moderators for the effect size for the relationship between overall insight and depressive symptomatology.

An additional result came out of the correlation analysis, which was that the correlation between the definition of insight and the year of publication of the study was also statistically significant, $r(40)= 0.34$, $p< 0.05$, suggesting that more recently published studies incorporated a multidimensional definition of insight.

Discussion

The purpose of this study was to estimate the magnitude and direction of the relationships between insight and symptom domains in schizophrenia and also, to determine moderator variables that were influencing the relationships in published English studies. The results from this meta-analysis indicated that the relationships between insight and symptom domains in schizophrenia were significant, yet modest. To summarize, the results indicated that there was a negative correlation between insight and global, positive and negative symptomatology, suggesting that as global, positive and negative symptoms increased, the degree of insight decreased. In contrast, there was a

positive correlation between insight and depressive symptoms in schizophrenia, suggesting that as the degree of insight increased, depressive symptoms increased.

Although the meta-analytic results indicated that there were statistically significant effect sizes between overall insight and the four symptom domains in schizophrenia, the issue of the practical significance of these modest relationships arises. These results indicated that merely 3 to 7% of the variance in insight was accounted for by the severity symptomatology, suggesting that symptomatology may play a small role in the degree of insight. Therefore, there may be other clinical factors, such as patient status and premorbid functioning, which are involved in insight in schizophrenia.

Effect sizes are *estimates* of the relationship between insight and symptomatology, and therefore, can be reduced further by studies with nonsignificant results. The Fail Safe N calculations suggested that the number of studies that would be required to reduce the effect sizes to 0.2 was far fewer then the number of studies that would be required to reduce the effect sizes to 0.1. There are likely few practical differences between an effect size of 0.1 and an effect size of 0.2. Thus, the Fail Safe N calculations for each effect size also indicated that these results might not be practically significant.

An alternative explanation for the relatively small effect sizes is that there exists a nonlinear relationship between insight and psychopathology such that it will be more difficult to deny severe psychopathology. Therefore, schizophrenic patients have more symptoms will have enhanced insight into the disorder. Indirect support for a nonlinear relationship between insight and clinical factors can be found in a previous study that that suggested that a curvilinear relationship exists between insight and neurocognitive test performance (Startup, 1996). However, based upon this review, no study has investigated

the possibility of a curvilinear relationship between insight and symptomatology in schizophrenia. A limitation of meta-analysis is that it can only investigate linear relationships between two variables and therefore, tests of curvilinear relationships cannot be conducted. It is possible that some studies found stronger relationships than other studies due to differences in the clinical status of the patients sampled, resulting in low average effect sizes across studies. Thus, the existence of a curvilinear relationship between insight and symptomatology cannot be ruled out. Further research using a larger sample of participants with a wide range of symptom severity could examine this possibility.

The results from this meta-analysis indirectly speak to the etiology of insight, which researchers have speculated in recent years (Markova & Berrios, 1995b). Theorists suggest two potential pathways to insight. One theory proposes that lack of insight is the consequence of cognitive dysfunction, resulting in the patients' inability to recognize that they suffer from disorder. An alternative model suggests that insight is a cognitive strategy, where the patients are aware of their illness in some sense but are motivated to deceive themselves to preserve their self-esteem or maintain a positive outlook (Startup, 1996). Furthermore, unawareness, as a cognitive strategy, may be the result of misassumption and stigmatization regarding mental disorder, possibly held by patients and other significant people in their lives. The meta-analysis results suggest that the disorder process in schizophrenia cannot entirely explain insight and thus, the possibility that insight is a coping strategy cannot be completely ruled out at this time. Rather, there may be multiple factors beyond symptom severity that are involved with insight, such as past experiences with mental health professionals, attitudes toward mental disorder in general, and pre-morbid knowledge regarding mental disorder and its treatment. In

addition, the level of distress experienced in reaction to the symptoms of schizophrenia may also contribute to the degree of insight.

The results from this meta-analysis support the notion that changes have been made to the definition of insight over the years. Specifically, researchers have moved from a unidimensional definition to a more multidimensional conceptualization of insight. As demonstrated in Figure 1, there was some variation in the magnitude of the relationships between the different dimensions of insight and symptom domains, suggesting that insight may be composed of multiple independent dimensions. Despite the high degree of variability among the dimensions of insight and symptom domains, which makes it difficult to adduce firm conclusions regarding these relationships, some patterns emerge.

First, as can be seen in Figure 1, compared to the other symptom domains, there seems to be relatively less variance among the relationships for the dimensions of insight and positive symptoms, as indicated by the fair degree of consistency in the magnitude of the relationships between positive symptoms and unawareness of mental disorder, unawareness of social consequences and unawareness of need for treatment. A possible explanation for this consistency is that insight may be closely linked to the severity of specific positive symptoms, particularly delusions and hallucinations. By virtue of their definition and presentation, delusions and hallucinations would suggest a high degree in unawareness across most dimensions of insight. When delusions are severe, patients typically experience erroneous beliefs that usually involve a misinterpretation of perceptions. In addition, patients with strong delusions often believe with great conviction that certain ideas are true, despite evidence to prove otherwise. Hallucinations can be intrusive and multifaceted, as they are often experienced across the auditory,

visual, olfactory, gustatory and tactile sensory modalities (APA, 2000). Thus, it is possible that for some patients, it may be more difficult to understand that the hallucinations are the result of a disorder and as such, they may misattribute these experiences to reality. Thus, lack of insight may be related to the severity of delusions and hallucinations. It is possible that once the psychotic episode resolves and the positive symptoms ameliorate, patients are more accurate in their interpretations of perceptions, are able to think more clearly, and therefore, become more aware of the disorder, its consequences, and the need for treatment.

Second, Figure 1 demonstrates that the relationship between the dimensions of insight and negative symptoms is quite varied. A relatively moderate, negative relationship was found for awareness of social consequences and negative symptoms. Research suggests that patients with severe negative symptomatology experience severe multimodal impairments, including social functioning (Kay et al., 1987). The constellation of negative symptoms, which includes severe passivity and social withdrawal, as well as apathy and difficulty experiencing pleasure, may reduce the patient's ability to understand the extent of the social consequences of the disorder.

Thirdly, Figure 1 demonstrates that as opposed to the other symptom domains, the relationships between the dimensions of insight and depressive symptoms were positive. Research suggests that depressive symptoms in schizophrenia can emerge due to appraisals of loss, humiliation, entrapment, shame and self-blame regarding their psychosis (Iqbal et al., 2000). This proposed mechanism of depression might occur when patients are more aware of their psychosis and its consequences. The results of this meta-analysis support the view that insight and depression are positively related. What remains uncertain is the temporal role of insight in the pathway to depression in schizophrenia. A

prospective study that measures insight and depressive symptoms in patients over time from their initial treatment of the psychotic episode, its resolution, and the emergence of depressive symptoms will likely provide support for the role of insight in the pathogenesis of depression in schizophrenia.

The moderator analysis indicated that acute patient status correlated significantly with the relationship between insight and positive symptoms. This result suggests that during acute episodes, the relationship between insight and positive symptoms is stronger, with patients displaying severe positive symptoms and impairments in overall insight. However, when patients have been stabilized and the acute episodes have resolved, the relationship between insight and positive symptoms is less clear.

Furthermore, the moderator analysis indicated that the relationship between lack of insight and negative symptoms was stronger for patients with an older age of onset of disorder. This result is contrary to the literature, which suggests that patients with a younger age of onset are typically male, have greater negative symptoms, and cognitive impairment (Moriarty et al., 2001). Therefore, it seems unclear why an older age of onset would moderate the relationship between insight and negative symptoms.

There are several limitations to this study, some of which are ubiquitous in meta-analytic investigations (Rosenthal, 1991). Specifically, the results from this study are limited to English journals and therefore, it is possible that relationships were missed from non-English journals. While the funnel plot analysis suggested that a publication bias was not likely, the meta-analysis is nonetheless limited by the possibility of a publication bias, as studies that find non-significant results are rarely published. Furthermore, most of the published studies that found small, non-significant results, had to be omitted from the meta-analysis because the relevant information was not available

from the publication and the researchers could not provide the missing information. Upon examination of the number of omitted studies that reported non-significant results, it appeared as though the Fail Safe N calculation for the positive and negative symptom domains was not met. However, for the global and depressive domains, the number of omitted studies reporting non-significant results equaled the Fail Safe N calculations, suggesting that these estimates of effect sizes may be affected by a publication bias and therefore, must be considered with caution. Finally, the definition of insight has changed over time and thus, as other literature reviewers have suggested, it may be difficult to make meaningful comparisons across studies (Schwartz, 1998a).

The results from this meta-analysis have important implications for future research. The relationship between insight and symptoms has been repeatedly investigated, and the meta-analytic results suggest that while these relationships are statistically significant, they are moderate at best. At present, it remains uncertain if the relationship between insight and symptomatology is non-linear and therefore, a large mulitfactorial study, which samples patients in varied stages of the disorder and considers clinical factors such as acute status and age of onset, is needed.

At present, few studies have investigated the extent to which insight can predict other clinical factors, such as treatment adherence and the engagement of the client in the therapeutic process. In the few studies that have investigated the relationship between insight and treatment compliance, there appears to be a beneficial impact of insight on adherence to drug therapy for patients with schizophrenia (Bartko, Herczeg, & Zador, 1988; Cabeza, Amador, Lopez, & Gonzalez de Chavez, 2000; Kemp & David, 1996; Smith, Barzman, & Pristach, 1997). However, to date, these studies have been limited to chronic groups of patients (Cabeza et al., 2000), and to patients with a high degree of

insight (Smith et al., 1997). Thus, other research questions arise: how do the specific dimensions of insight, particularly awareness of the need for treatment, predict adherence to medication? Does insight predict engagement of the patient in psychotherapy? In terms of patients in the early phase of psychosis, what is the impact of insight on prognosis? Research that investigates these questions may lead to a better understanding of schizophrenia and the effect that it has on the cognitive and emotional well-being of people who live with the disorder.

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Table 1

Studies Included in the Meta-Analysis

Authors	Publication Date	Sample Size	Type of Effect Size Extracted
Amador et al.	1993	43	p
Amador et al.	1994	221	g, p, d[1]
Baier et al.	2000	37	p [2]
Buckley et al.	2001	41	p, n, d
Carroll et al.	1999	100	p, n, d
Collins et al.	1997	58	p, n, d
Cuesta et al.	2000	75	p, n, d [3]
Cuesta et al.	1998	100	p, n
Cuesta et al.	1994	40	p, n
Cuffel et al.	1996	89	g
David et al.	1992	91	g
Debowska et al.	1998	61	g, p, n [2]
Dickerson et al.	1997	87	g, p, n [2]
Fennig et al.	1996a	86	g, p, n [4]
Heinrichs et al.	1985	39	g [4]
Kemp & Lambert	1995	29	d
Kim et al.	1997	63	p, n, d
Kirkpatrick et al.	2000	200	n [5]

Note: g = global symptoms, p = positive symptoms, n = negative symptoms, d= depressive symptoms

[1] Reported range was averaged, [2] correlations for symptoms clustered and averaged, [3] correlations for current awareness extracted and averaged into symptom domains, [4] t-value extracted and transformed, [5] chi square transformation, [6] t-score derived and transformed, [7] average of CGI and BPRS, [8] averaged across psychometrically sound scales only

Table 1 (continued)

Studies Included in the Meta-Analysis

Authors	Publication Date	Sample Size	Type of Effect Size Extracted
Lysaker & Bell	1994	92	p, n [6]
Lysaker et al.	1999	74	p
McEvoy et al.	1989	52	g [7]
McEvoy et al.	1993a	25	g, p [6]
McEvoy et al.	1993b	26	n
Michalakeas et al.	1994	89	g
Moore et al.	1999	46	d
Nakaya et al.	1998	70	d
Peralta & Cuesta	1994	115	g, d
Pyne et al.	2001	137	d [4]
Rossi et al.	2000	30	g
Sanz et al.	1998	33	g, d [8]
Schwartz	1998a	66	p [4]
Schwartz	1998b	64	p, n, d [4]
Schwartz et al.	1997	23	g
Smith et al.	1998	33	p, n, d
Smith et al.	2000	46	p, n, d
Takai et al.	1992	57	g, p, n
Warner et al.	1989	42	g
White et al.	2000	150	g, p, n, d
Young et. al.	1993	31	g
Young & Zakzanis	1998	77	g

Note: g = global symptoms, p = positive symptoms, n = negative symptoms, d= depressive symptoms.

[1]Reported range was averaged, [2] correlations for symptoms clustered and averaged, [3] correlations for current awareness extracted and averaged into symptom domains, [4] t-value extracted and transformed, [5] chi square transformation, [6] t-score derived and transformed, [7] average of CGI and BPRS, [8] averaged across psychometrically sound scales only

Table 2

Descriptive Statistics for Studies Included in the Meta-Analysis

Study Characteristic	N of studies	Mean (standard deviation)	Range
Mean age of Sample	37	36.4 (4.1)	28.4 to 44
Percent Male	39	66.4 (17.6)	0 to 96
Percent Acute	13	39.8 (49.7)	0 to 100
Percent Outpatient	27	53.7 (44.7)	0 to 100
Mean age of onset of illness	16	23.9 (5.4)	17.1 to 41.9
Illness duration	23	11.9 (4.8)	5.3 to 19.5
Mean number of hospitalizations	21	6.7 (3.4)	3.3 to 16.2
Percent married	8	19.1 (9.3)	7.7 to 36.2
Percent medicated	18	95.6 (12.1)	59 to 100

Table 3

The Relationships between Insight and Symptomatology

Symptom Domain	Total N	N of studies	Weighted Effect Size	Confidence Interval (95%)	Test of Homogeneity Chi-square	Fail Safe N r= 0.1	Fail Safe N r= 0.2
Global	1361	19	-0.27***	-0.41 to -0.13	ns	33	7
Positive	1616	22	-0.25***	-0.64 to 0.13	92.32***	34	6
Negative	1487	20	-0.23***	-0.48 to 0.02	47.69***	26	3
Depressive	1218	15	0.18***	-0.14 to 0.49	48.63***	12	0

Note:
* p< .05, **p< .01, *** p< .001

Table 4

Effect Sizes for the Different Dimensions of Insight and Global Symptomatology

Dimension of Insight	Total N	N of studies	Weighted Effect Size	Confidence Interval (95%)	Test of Homogeneity Chi-square	Fail Safe N r= 0.1	Fail Safe N r= 0.2
Composite	926	14	-0.24***	-0.54 to 0.06	38.01***	19	3
Awareness of Mental Disorder	742	8	-0.20***	-0.54 to 0.13	31.24***	8	0
Awareness of Social Consequences	251	2	-0.27***	-0.27 to -0.27	ns	3	1
Awareness of Need for Treatment	323	4	-0.25***	-0.25 to -0.25	ns	6	1
Awareness of Symptoms	108	2	-0.41***	-0.61to -0.22	ns	6	2
Attribution of symptoms	108	2	-0.21*	-0.43 to 0.01	ns	2	0

Note:
* p< .05, **p< .01, *** p< .001

Table 5

Effect Sizes for the Different Dimensions of Insight and Positive Symptoms

Dimension of Insight	Total N	N of studies	Weighted Effect Size	Confidence Interval (95%)	Test of Homogeneity Chi-square	Fail Safe N r= 0.1	Fail Safe N r= 0.2
Composite	807	9	-0.18***	-0.35 to 0.00	16.02*	7	0
Awareness of Mental Disorder	686	9	-0.32***	-0.68 to 0.04	37.59***	20	5
Awareness of Social Consequences	191	3	-0.33***	-0.33 to -0.33	ns	7	2
Awareness of Need for Treatment	136	2	-0.31***	-0.31 to -0.31	ns	4	1
Awareness of Symptoms	100	3	-0.23**	-0.23 to -0.23	ns	4	0
Attribution of Symptoms to disorder	146	3	-0.16*	-0.72 to 0.39	15.28***	2	0

Note:
* p< .05, **p< .01, *** p< .001

Table 6

Effect Sizes for the Different Dimensions of Insight and Negative Symptoms

Dimension of Insight	Total N	N of studies	Weighted Effect Size	Confidence Interval (95%)	Test of Homogeneity Chi-square	Fail Safe N r= 0.1	Fail Safe N r= 0.2
Composite	800	11	-0.29***	-0.63 to 0.04	38.68***	21	5
Awareness of Mental Disorder	619	8	-0.20***	-0.45 to 0.04	18.63**	8	0
Awareness of Social Consequences	125	2	-0.40***	-0.40 to -0.40	ns	6	2
Awareness of Need for Treatment	136	2	-0.40***	-0.40 to -0.40	ns	6	2
Awareness of Symptoms	71	2	-0.16	-0.16 to -0.16	ns	1	0
Attribution of symptoms	146	3	-0.33***	-0.33 to -0.33	ns	7	2

Note:
* p< .05, **p< .01, *** p< .001

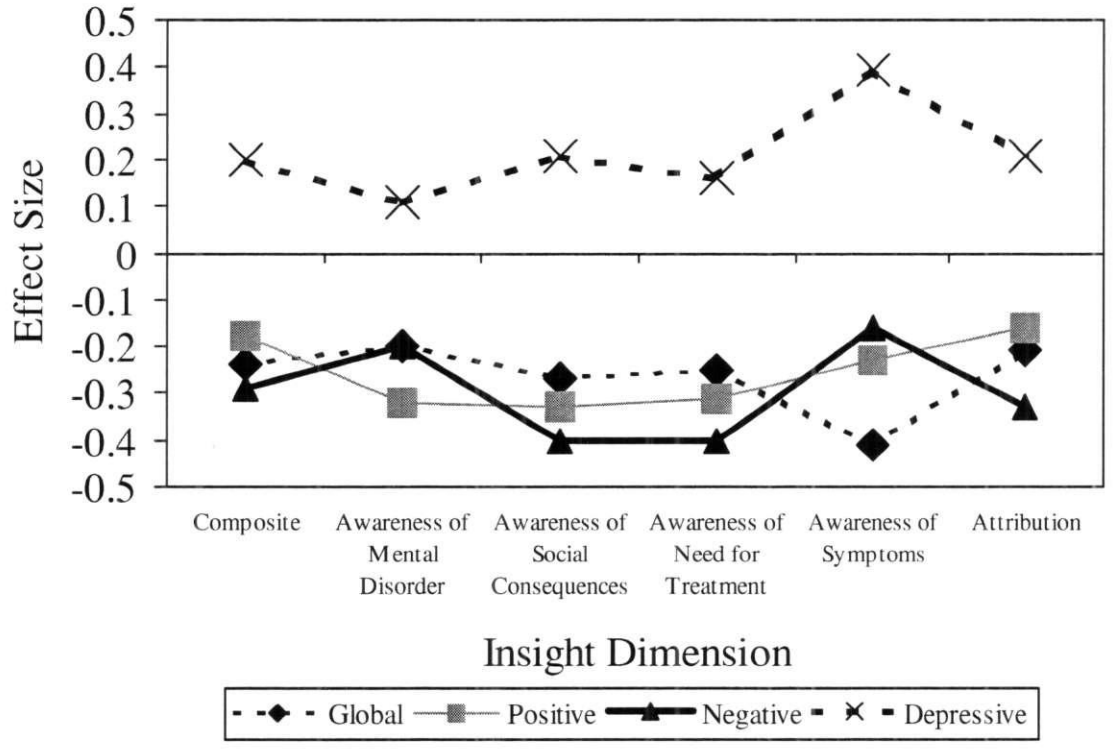
Table 7

Effect Sizes for the Different Dimensions of Insight and Depressive Symptoms

Dimension of Insight	Total N	N of studies	Weighted Effect Size	Confidence Interval (95%)	Test of Homogeneity Chi-square	Fail Safe N r= 0.1	Fail Safe N r= 0.2
Composite	545	6	0.20***	-0.01 to 0.40	12.25**	6	0
Awareness of Mental Disorder	579	7	0.11**	-0.24 to 0.46	26.14***	1	0
Awareness of Social Consequences	121	2	0.21**	-0.09 to 0.52	5.14*	2	0
Awareness of Need for Treatment	236	3	0.16**	0.16 to 0.16	ns	2	0
Awareness of Symptoms	215	4	0.39***	-0.39 to 0.39	ns	11	4
Attribution of symptoms To Disorder	175	4	0.21**	-0.16 to –0.60	11.26*	5	0

Note:
* p< .05, **p< .01, *** p< .001

Figure 1. The relationship between dimensions of insight and symptom clusters in schizophrenia.



APPENDIXES

APPENDIX A

Coding Sheet

Variable	**Data Representation**
ID number of Study	1-100
Publication Year	
Name of Study	
Name of Author (s)	Last name, First initial
Publication Source	1= Journal Article 2= other
Country of Origin	1= North America 2= Other
Definition of Insight	1= Awareness of mental illness 2= Awareness of the consequences of illness 3= Awareness of the need for treatment 4= 1 and 2 5= 1 and 3 6= 2 and 3 7= All of the above
The Relationship Between Insight and (Effect size)	1= Positive Symptoms 2= Negative Symptoms 3= Global Symptoms 4= Depressive Symptoms
Total Subjects	

Type of Sample	1= Homogeneous for Schizophrenia 2= Heterogeneous
Schizophrenia Subtypes: (N)	
Paranoid	
Disorganized	
Catatonic	
Undifferentiated	
Residual	
Deficit	
Non-deficit	
Gender of Sample	% Male
Acute v. Chronic	% Acute
Voluntary vs. Certified Patients	% Voluntary
Outpatients vs. Inpatients	% Outpatient
Mean Age of Sample	Years
Mean Age of Onset of Illness	Years
Illness Duration	Years
Mean duration of hospitalization (days)	
Mean Number of Hospitalizations	
Mean number of Years of Education	
Percent Married	
Intelligence: Mean value of IQ	
Medicated vs. Unmedicated	% medicated

Typical vs. Atypical Neuroleptics	% typical
Manual used for Diagnosis	1= SADS 2= DSM-III 3= DSM-III-R 4= DSM-IV 5 = ICD
Scale to Assess Insight	1= self-report 2= clinical rating 3= vignettes 4= ITAQ 5= SUMD 6= David's Scale (SAI) 7= Insight Scale (IS) 8= AMDP 9= PANSS 10= David's Scale-expanded version (SAI-E) 11= other
Scale to Assess Global Psychopathology	1= BPRS 2= PSE 3= Clinical Global Rating (CGI) 4= PANSS 5= GAF 6= GAS 7= SCL-90 7= other
Scale to Assess Positive Symptoms	1= PANSS 2= SAPS 3= BPRS 4= other

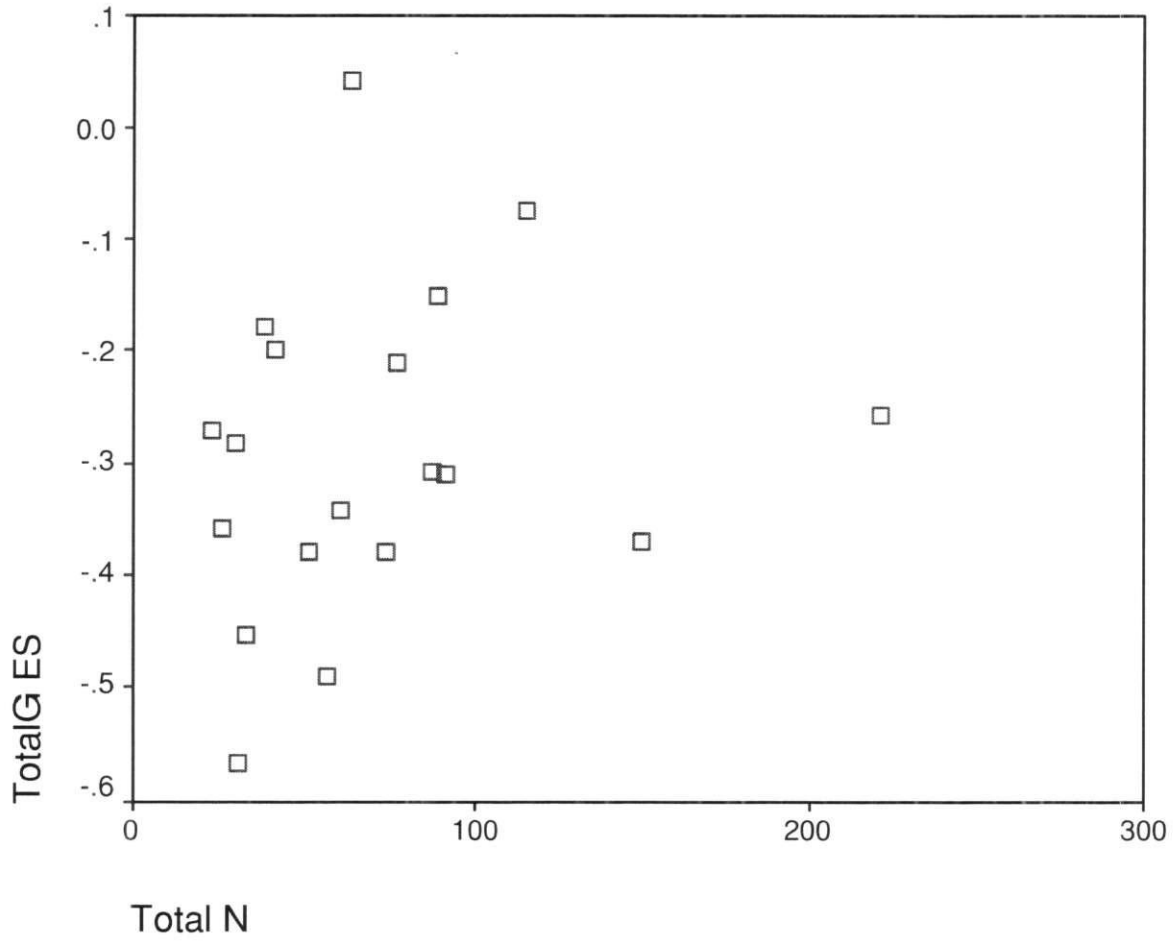
Scale to Assess Negative Symptoms	1= PANSS 2= SANS 3= BPRS 4= other
Scale to Assess Depressive symptoms	1= CDI 2= BDI 3= Hamilton Depression Scale (HDRS) 4= BPRS 5= DEQ 6= PANSS 7= other
Quality of Study	0 to 7

APPENDIX B

Graphs of Funnel Plot Analyses

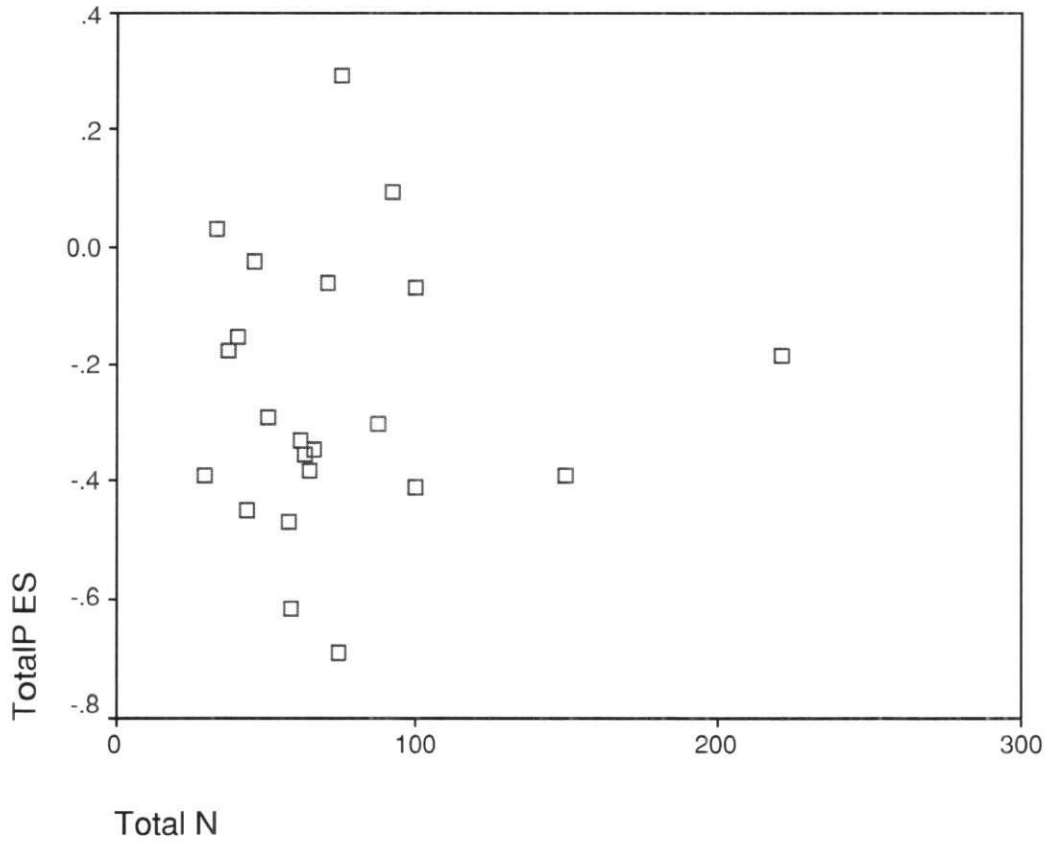
Funnel Plot Analysis

Graph of Effect Sizes for the Relationship between Insight and Global Symptoms



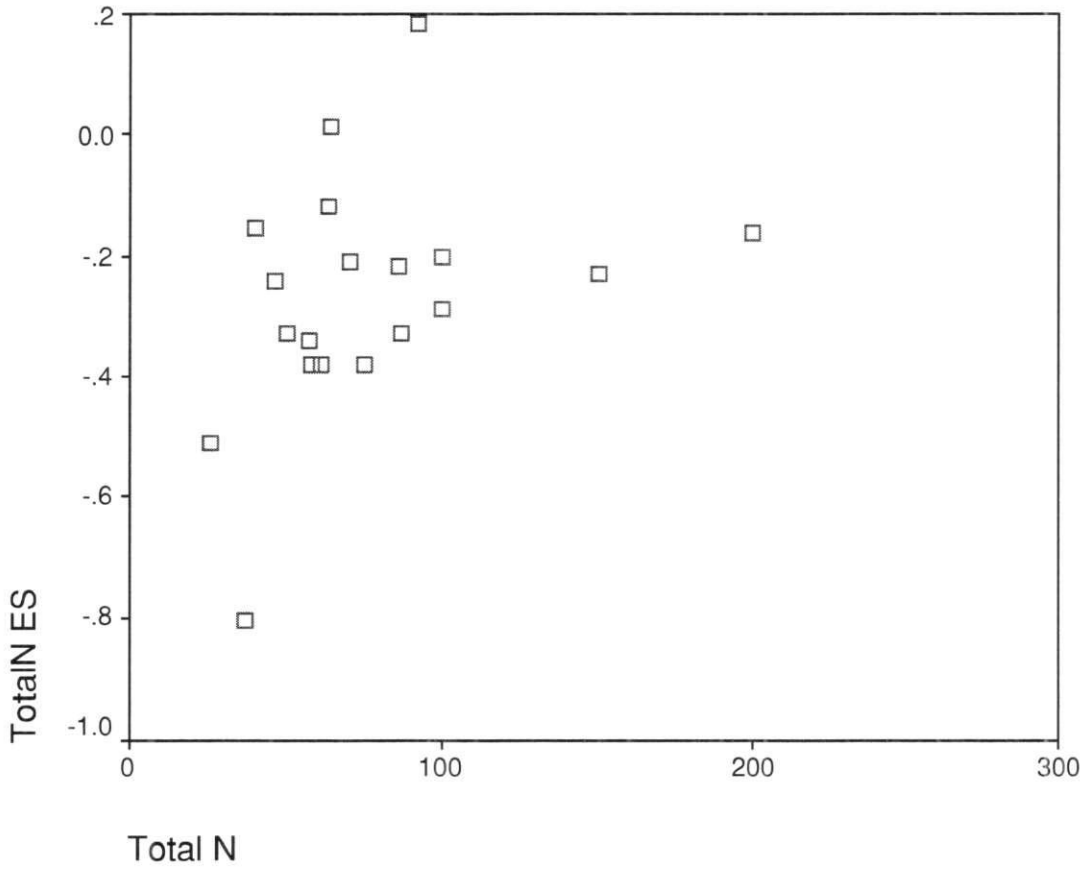
Funnel Plot Analysis

Graph of Effect Sizes for the Relationship between Insight and Positive Symptoms



Funnel Plot Analysis

Graph of Effect Sizes for the Relationship between Insight and Negative Symptoms



Funnel Plot Analysis

Graph of Effect Sizes for the Relationship between Insight and Depressive Symptoms