Insight in Schizophrenia: Meta-analyses of the relationships between insight and functioning, and insight and quality of life.

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Declaration

I hereby certify that the work embodied in this thesis is the result of original research and has not been submitted for a university degree or other similar qualification to any other University or Institution.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my thesis, when deposited in the University library**, being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.

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Abstract

**Background:** The clinical importance of insight in schizophrenia is in its ability to predict or determine outcome. This question has so far not been clearly answered in respect to quality of life and functioning. A review of the literature assessing the relationships between insight, and both quality of life and functioning, suggested complex and inconsistent relationships.

**Aims:** The aim of this study was to synthesise the data using meta-analytic techniques, on insight and functioning, and insight and quality of life, to determine whether the inconsistency and disparity found amongst the studies, when combined, may uncover a relationship between these variables.

**Method:** For inclusion in the two meta-analyses, studies had to report on a relationship between insight and quality of life or functioning in individuals with schizophrenia. Studies also had to be in English and published in a peer-reviewed English language journal. A literature search was conducted in the electronic databases of Medline and PSYCINFO from the period of January 1985 to December 2010. Reference lists of recent reviews and key papers were also screened for relevant studies, and a manual search of key journals was conducted for the period of June 2007 to December 2010. Correlation coefficients were the measure of effect size, and the random-effects model was utilised when computing the effect sizes for both meta-analyses. All analyses were computed using the Comprehensive Meta-Analysis package. The data was
tested for heterogeneity using the Q statistic. In the event that the test for heterogeneity was significant, a search for moderator variables was conducted.

**Results:** A modest positive relationship was found between insight and functioning, such that good insight correlated with good functioning, but a paucity of prospective data means that the ability of insight to predict functioning remains unknown. It is also unclear as to what extent this correlation between insight and functioning is mediated by symptoms. The results showed no significant relationship between insight and quality of life.

**Discussion:** The implications of these findings are discussed, as well as possible explanations for the lack of relationship. It appears that the body of research would benefit from a shift in focus from purely cross-sectional research to more prospective data, which would yield important information on the predictive importance of insight in regards to functioning and quality of life. Some prospective studies were published too recently to be included in the sample, and some presented results that could not be converted into correlation coefficients. It should be noted however that these gave slender support for the ability of insight to predict functioning at follow-up. It is suggested that the most effective way to improve outcomes such as functioning and quality of life for individuals with schizophrenia may be to design interventions that address these outcomes directly, rather than via insight.
Insight in Schizophrenia: Meta-analyses of the relationships between insight and functioning, and insight and quality of life

Impairment in insight has long been recognised as a core feature of schizophrenia (Subotnik, Nuechterlein, Irzhevsky, Kitchen, Woo & Mintz, 2005), with many individuals lacking having poor awareness, or none at all, into the nature of the disorder, its symptoms, its social consequences and the need for treatment (Mintz, Dobson, & Romney, 2003). In a World Health Organisation study on schizophrenia, it was found that a lack of insight was present in 85% of patients, and that lack of insight was the most discriminating symptom between schizophrenia and affective disorder (Carpenter, Strauss & Bartko, 1973).

The effect of insight on mental disorder is two-fold. On one hand, insight, in particular the acknowledgement of a disorder, can play an important role in an individual’s ability to make informed decisions about the future. It also plays an important role in the ability to anticipate needs and develop realistic goals. On the other hand, the acceptance and awareness of a disorder also means acknowledging that one’s individuality and dignity are at risk of being diminished, and that in accepting that one has a disorder, one is accepting that it may be a barrier to social equality (Lysaker, Campbell & Johannesen, 2005). From this dichotomy, it would appear that insight can be considered a ‘double-edged sword’. Although insight is necessary for an individual to make plans and set realistic goals, it also means the individual accepts that their abilities and functioning may not be what they once were, which has far-reaching consequences. The literature seems to reflect this split, with some studies showing that greater awareness is associated with better psychosocial
functioning (Lysaker et al., 1998, 2002) and neurocognitive functioning (Drake & Lewis, 2003; Mohamed et al., 2009; Young et al., 1998), while other studies show associations with insight and greater despair and poorer life satisfaction (Kravetz et al., 2000; Warner et al., 1989).

The test of clinical importance of insight in schizophrenia is in its ability to predict or determine outcome, and this question has so far not been clearly answered in respect to functioning and quality of life. There is evidence for this ability, as the literature demonstrates, in the relationship between insight and treatment compliance, dysphoria, low self-esteem, self-harm, social function, (Drake & Lewis, 2003) and response to vocational rehabilitation (Lysaker, 2002). However, to date, there has been no synthesis of the research relating to insight and quality of life and functioning. Results have varied widely and ‘quality of life’ as a concept has been ill-defined. Indeed, the impact of awareness of a disorder remains unclear (Lysaker, Campbell & Johannesen, 2005). It also appears that the complete literature is too large to be synthesised by a narrative review. Hence, the aim of this study is to produce a meta-analysis of the effect of insight on functioning and quality of life in schizophrenia.

**The evolution of insight as a construct and the development of insight measures**

Poor insight was first observed and described by Kraepelin in 1896 when he noticed that patients with dementia praecox seemed to have limited understanding of the seriousness of their disorder (Dam, 2006). During the early twentieth century, interest in the concept of insight grew, as this phenomenon soon came to be perceived as important in the diagnosis and classification of psychosis and related disorders. It was Jaspers (in Dam, 2006) who first
distinguished between ‘insight’ and ‘awareness of illness’. He viewed ‘awareness of illness’ as applicable when the patient expressed an understanding of being ill and being somehow changed, whereas when a patient had ‘insight’, this understanding was extended to an ability to estimate the severity and type of their disorder, as well as correctly judge their symptoms.

The early conceptualizations of insight were unitary, viewed as either present or absent, and remained so until the latter part of the twentieth century when insight began to be viewed quantitatively, and later as more multidimensional. It appears that with each new insight measure, dimensions have not been discarded, but more have been identified and included, as the term ‘insight’ becomes broadened. As early as 1958, Eskey (in Amador & David, 2004) defined insight as a “verbalized awareness on the part of the patient that impairment of intellectual functioning existed”. He then classified patients into those with insight, those with partial insight and those without insight.

Carpenter, Strauss and Bartko (1973) described insight as a symptom of schizophrenia, evaluated as simply present or absent. Indeed, it was common at this time to determine a patient’s insight by asking them whether they felt they should be hospitalized or not, or whether they felt they needed to see a doctor or psychiatrist (Dam, 2006).

Others such as David (1990) viewed insight as a symptom of psychosis, as ‘insight during an acute psychosis is a contradiction in terms’, and in such circumstances ‘renders the assessment of insight impossible’. However the DSM-IV-TR does not view insight or the lack of it as compulsory to the diagnosis of schizophrenia, but does state that, “Evidence suggests that poor insight is a manifestation of the disorder itself, rather than a coping strategy. It may be
comparable to the lack of awareness of neurological deficits seen in stroke, termed anosognosia” (p. 304).

Around the late 1980’s there was a distinct move away from viewing insight as a singular construct or dichotomous variable and towards a broader, multidimensional phenomena. The unitary construct was challenged by McEvoy et al. (1989), who believed that insight was more complex. It was noticed by McEvoy et al. (1989) that insight was not completely reliant on severity of symptoms, such that it often did not improve when symptoms abated, and that some patients with acute psychosis had intact insight, which led them to conclude that insight and psychosis could be viewed as separate phenomena with complex interactions. They defined insight as the ability of the patient to judge some of their own perceptual experiences, cognitive processes, emotions or behaviours as pathological, and in a manner that is in line with the view of mental health professionals. They believed that it thus followed that insight would also incorporate the belief that they required treatment, which could mean hospitalization and medication. These authors developed the Insight and Treatment Attitude Questionnaire (ITAQ) for the measurement of insight as a continuum, rather than a categorical phenomenon. This was the first standardized instrument for the measurement of insight in schizophrenia as a continuum (Dam, 2006).

**Insight measures**

Following soon after the ITAQ, David (1990) introduced the Schedule for the Assessment of Insight (SAI), a semi structured interview that also measured three continua. The use of a continuum as a measurement of insight is thought to be more naturalistic and clinically informative than categorical measures of
insight. As David (1990) has noted, patients who have fixed false beliefs often do not have absolute conviction, and there are more continuous gradations of severity. They are not the all-or-none phenomena as previously described by clinicians in the earlier part of the twentieth century.

Like the ITAQ, the SAI also measured the dimensions of acceptance of having a disorder and the perceived need for treatment. However, the SAI included the dimension of the ability to re-label mental events such as hallucinations and delusions as abnormal. The most common example of this last dimension is the patient who experiences auditory hallucinations and describes the voices in a way that distinguishes them from ordinary perceptions and acknowledges that they are a symptom of a mental disorder (David & Kemp, 1997).

The SAI, although broader in definition than the ITAQ, does not consider how insight may vary from symptom to symptom, and it does not consider differences between current and retrospective insight into mental disorder (Amador & Kronengold, in Amador & David, 2004). Amador and Strauss (1990), building upon previous insight measures, further developed this multidimensional view, introducing the Scale to Assess Unawareness of Mental Disorder (SUMD). This scale has increased in popularity in recent years and is frequently used to assess insight in schizophrenia (Mintz et al., 2003).Similarly, the SUMD incorporates the dimensions of acceptance and awareness of disorder, as well as a treatment dimension. However, it differs in that it distinguishes between two main components that had previously been lumped together; that of awareness of disorder and attribution regarding disorder. Unawareness of disorder "reflects an individual’s failure to acknowledge the presence of a
specific deficit or sign of illness even when confronted with it by an examiner” and incorrect attribution “reflects the individual’s expressed belief that the specific deficit, sign or consequence of illness does not stem from mental dysfunction” (Amador & Kronengold, 2004, p. 6).

The SUMD also incorporates a previously ignored aspect of insight; that it fluctuates and changes over time. In addition to the independent assessment of awareness and attribution, the SUMD assesses current and retrospective awareness of (1) having a mental disorder, (2) awareness of particular signs and symptoms, (3) the benefits of treatment and (4) the psychosocial consequences of having a mental disorder (David & Kronengold, in Amador & David, 2004).

Another scale that has been widely used in the assessment of insight is a single item from the Positive and Negative Syndrome Scale (PANSS) (Kay, Fiszbein & Opler, 1987) that appears on the General Psychopathology subscale (item G12). This rating scale is uni-dimensional, as the patient is rated on a scale from 1 to 7 with 1 signifying the “absence of lack of judgement and insight” and 7 the “extreme lack of judgement and insight”. Although the rating is singular, the PANSS has recommended interview questions to elicit the patient’s insight on different dimensions, but of course the singular rating gives no room for the breakdown of these different dimensions of insight. This has caused investigators to criticize this measure as being unreliable and lacking in construct validity (David & Kronengold, 2004).

**Self-report insight measures**

Markova and Berrios (1992) added another dimension to the concept of insight with their rating scale, simply called the Insight Scale (IS). The authors considered insight as a dynamic process, and also viewed it as a subcategory of
self-knowledge, rather than as an independent feature of a psychotic disorder (David & Kronengold, 2004). Importantly though, this measure was one of the first self-report scales.

Another self-report measure of insight was designed by Birchwood et al. (1994), known as the Birchwood Insight Scale (Birchwood IS). This measure is quite useful for clinical purposes, as it was developed for the purpose of measuring individual differences and individual change over time (Birchwood et al., 2004). Another significant aspect of this measure is that it addresses the same three dimensions of insight advocated by David (1990). These dimensions include the awareness of suffering from a mental disorder or condition, the acceptance of the need for treatment, and the ability to re-label mental events such as hallucinations and delusions as abnormal.

The most recent self-report insight measure is the Self-Appraisal of Illness Questionnaire (SAIQ), developed by Marks et al. (2000). This measure was developed for use in community settings, and was closely adapted from the Patient’s Experience of Hospitalisation (PEH) (Carsky et al., 1992 in Marks et al., 2000), which was originally used in psychiatric inpatient settings. The SAIQ was designed as a measure of attitude toward mental disorder, and was validated against the SUMD and G12 of the PANSS, with two of the three subscales relating to clinician’s assessments of the patient’s insight into their disorder. The third subscale, the ‘worry’ subscale, did not correlate with these scales as this captured another dimension that was not measured by the other scales.

Comparisons of measures of insight

Comparing outcomes of studies of insight in schizophrenia is extremely difficult due to the many different measures. As previously discussed, many of
the insight measures include different dimensions of insight. Some are unitary in nature and some multidimensional, with a number of scales that are not combined to give a categorical outcome. However, most of the scales share at least one similar dimension, if not more. So how do the measures fare when inspected further?

In a review of clinical psychiatric studies on insight in psychotic and affective disorders, Ghaemi and Pope (1994) found four types of definitions of insight used in empirical studies. They observed that different definitions of insight have been hypothesized and validated in the literature, and that at present there is still not one definition that has been decided upon. They asserted that the most appropriate approach is to view insight as multidimensional, and that it is not definable in terms of only one of its aspects alone. One may possess good insight on one dimension, but poor insight on another. Ghaemi and Pope also observed that the investigations in their review were open to questions of reliability and validity in their measurement of insight. They contended that comparing studies of insight with one another may be misleading, due to the lack of standardization of definition and measurement of insight.

However, a study by Cuesta, Peralta and Zarzuela (2000) that explored the correlations between insight scales found concurrent validity. Three scales were used, the SUMD, the ITAQ and three insight items from the Manual for Assessment and Documentation in Psychopathology (AMDP). The authors suggested that the discrepancies found between studies may be due to methodological factors, such as the course or phase of disorder, or selection of patients, rather than great differences between the scales. Also, a factor analysis
was conducted on the three different insight scales. The factor analysis yielded two factors; one factor representing a general awareness dimension, and the second factor reflecting attitudes to treatment. Given that the SUMD purports to measure five dimensions and the ITAQ three dimensions, this raises the question of whether ‘multidimensional’ is actually a misnomer. This finding is actually reflected when one looks at the similarities between the insight scales. For example, the SUMD, ITAQ, PANSS and SAI all measure the ‘acceptance of illness’ by the patient. The dimension of ‘awareness of having a mental disorder’ is measured by the SUMD and SAI. The ITAQ and SAI both measure ‘perceived need for treatment’, and the SUMD measures the ‘awareness of benefits of treatment’, which could be argued as another facet of the treatment dimension, as is ‘perceived need for treatment’.

A comparative study by Sanz et al. (1998) of insight scales and their relationship to psychopathological and clinical variables also demonstrated concurrent validity between insight measures. An inpatient cohort of 33 patients was administered with a battery of tests, including the Insight Scale, the SAI, the SAI-E, the ITAQ and the insight item of the PANSS. Strong correlations between the SAI, the SAI-E, the ITAQ and the insight item of the PANSS were found. The correlation between these scales and the Markova and Berrios scale was lower. The authors concluded that the high correlation between these scales lent them concurrent validity. These studies indicate that despite the many differences in scales, such as unitary measures as seen in the PANSS, or the multidimensional approach utilized in other scales, the differences in measurement are in fact minimal and it can be argued that any of these measures can be used to
determine the insight of an individual with schizophrenia, and that results from studies using different insight measures are comparable.

**Validity of self-report and expert-rated measures of insight**

There has long been a question of validity in relation to self-rated measures being used by patients with schizophrenia, for obvious reasons. Issues such as deficits in reading comprehension, interpretation biases, and the inability to use contextual information are common and can directly affect a patients’ ability to report accurately (Jovanovski et al., 2007). The most obvious variable that their validity and reliability depends upon is the individual’s willingness and ability to accurately report their experience (Bell et al., 2007). Given that schizophrenia is a disorder that directly affects perceptions of reality, and is often associated with poor insight, the likelihood of a patient being able to answer a self-report questionnaire with any accuracy becomes much less when taking this difficulty into consideration.

On the other hand, using self-rated insight measures has some advantages, including eliminating the need for inter-rater reliability when used in research. These insight measures are also usually quite brief, and can counteract some of the biases inherent in clinician-rated insight measures (Jovanovski, et al., 2007). These clinician biases can include the tendency to rate patients with lower intelligence or poor communication skills as having less insight (Marks et al., 2000), as well as the patient response bias that can result from the presence of an examiner.

Research into the use of self-report measures is widespread in psychological science, although there is a paucity of studies examining the correspondence of self versus clinician rated measures in psychiatric samples.
(Bell et al., 2007). Only a very few studies have addressed the differences between self-rated insight and expert-rated insight.

One notable study in this area directly compared expert-rated and self-rated insight measures. Jovanovski et al. (2007) administered the SUMD and SAIQ to 21 patients with schizophrenia using a counterbalanced research design. They discovered that insight scores correlated with each other only when the self-report scale, the SAIQ, was administered prior to the expert-rated SUMD. When the SUMD was administered first, no significant correlations were found.

This study replicated the findings of a previous study by Young et al. (2003), who found that insight scores correlated only when the self-rated measure was administered first. This study used the self-rated Insight Scale instead of the SAIQ. The fact that these two studies, although they used different self-report insight measures, found the same order effect would indicate that context plays a strong influence in the evaluation of insight (Jovanovski et al., 2007).

**The clinical significance of insight**

The assessment of insight has always been seen as an important part of phenomenology and psychopathology (David, 2004, in Amador & David, 2004). The psychiatric mental status examination (MSE) includes insight as a significant section of the assessment (Trzepacz & Baker, 1993). It is of great importance to ascertain the insight of an individual because adequate insight is vital for compliance with ongoing treatment and informed consent. Additionally, insight and judgement are inextricably linked; the ability to make a sound judgement or decision presupposes an adequate level of insight.
Dam (2006) has said that for insight to be seen as clinically important it needs to demonstrate an ability to predict outcome. Cross-sectional data is abundant in insight research, but this type of data restricts the drawing of causal inference (Lysaker et al., 1998). Prospective studies are required to determine what effects insight has in the long term (Startup et al., 2010). Insight is now seen as a particularly important predictor of long-term outcome in psychosis (Emsley et al., 2008). However, recent reviews have found that associations between insight and long-term outcomes in schizophrenia have provided inconsistent results (Emsley et al., 2008; Lincoln et al., 2007).

Possessing good insight has long been thought to be beneficial for individuals with schizophrenia, given that it is usually associated with good outcomes (Emsley et al., 2008). This relationship is generally believed to be mediated by cognitive ability. General intellectual functioning appears to influence insight (Sanz et al., 1998) with studies indicating that the better intellectual functioning a patient has, the more likely they are to have good insight. It is well established that good insight leads to increased compliance, which, it has been claimed, in turn leads to better outcomes (Lincoln et al., 2007). Indeed, good insight is associated with outcomes such as reduced rates of hospitalisation, (Drake et al., 2007) less episodes of relapse (Drake et al., 2007), less substance misuse (Kamali et al., 2001), better compliance with treatment regimes (Yen et al., 2002), better interpersonal functioning (Lysaker et al., 1998) and less chance of violence (Arango et al., 1999). However, as previously stated, the consequences of good insight are not always positive. Good insight has been linked with higher rates of depression, along with increased suicidality (Kim et al., 2003).
Insight and violence

Violent or abusive incidents that occur in health care settings are of extreme concern. Individuals with schizophrenia are at higher risk of engaging in acts of aggression that are more frequent and severe than those individuals with other psychiatric disorders. At a societal level however, the proportion of violent crime attributable to individuals with schizophrenia is low (Foley et al., 2005).

A study by Arango et al. (1999) evaluated several variables in the prediction of violence in 63 inpatients with a diagnosis of schizophrenia or schizoaffective disorder and discovered that insight into psychotic symptoms was a predictor of violence in inpatients with schizophrenia. At admission, violent patients had significantly less insight into delusions, greater thought disorder, poorer control of aggressive impulses, and continued to have significantly poorer awareness at discharge. Despite this being a ‘prospective’ study, the time between when insight was first measured at admission and an act of violence was not specified, although it can be assumed it was a short time as the data was taken from the same stay in hospital. This may mean that the data demonstrated more of an association between insight and violence, rather than providing evidence that insight can predict violence in the long term.

Foley et al. (2005) also found similar results. They attempted to identify the incidence and clinical correlates of aggression and violence in first episode psychosis, and discovered that violence in the week following presentation was associated with poor insight, as well as drug misuse. Goodman et al. (2005) found an association between poor insight and increased risk of violence in a cohort of forensic inpatients, as did Buckley et al. (2004) in a sample of
inpatients. Again, these studies are more cross-sectional in nature, indicating that poor insight may be associated with violence in the short term.

A recent review by Lincoln et al. (2007) concluded that despite the intuitive link between insight and violence, present research does not provide clear support for a causal relationship. In a prospective study by Yen et al. (2002) assessments of insight were done on 73 outpatients with schizophrenia, and follow up assessments of violence, suicidality, hospitalisation and social adjustments were performed one year later. They found no causal relationship between insight and violence, which suggested that the predictive efficacy for insight into violence may be short term, and diminishes as patients’ psychopathology abates.

However, it remains clear from the literature that most violent or aggressive acts committed by individuals with schizophrenia undoubtedly occur at a time when their insight into their disorder is poor (Buckley et al., 2004).

**Insight, non-compliance and hospitalisation**

The relationship between good insight and compliance with medication has long been recognised (Yen et al., 2002). A recent review by Lincoln et al. (2007) found that the majority of studies demonstrate a clear association between good insight and high treatment adherence. This positive relationship also extends to treatment compliance and rates of hospitalisation; that is, the more insight an individual has, the more compliant they are with their treatment and the less likely they are to require hospitalisation.

This relationship was clearly evinced in a prospective study by Novak-Grubic and Tavcar (2002). They found that poor insight at discharge strongly predicted non-compliance, observing high relapse and hospitalisation rates in
the following year. In a cohort of 56 male patients with psychosis, half were deemed non-compliant, refusing to attend appointments and changing medication regimes. This non-compliant half of the cohort suffered significantly higher rates of rehospitalisation than the compliant half.

Further to this, McEvoy et al. (1989) found that in a study of voluntary and involuntary patients with psychosis, patients who were committed involuntarily had lower scores on the ITAQ at initial assessment, and were more likely to require further inpatient treatment in the future than those who presented to hospital voluntarily.

In a study by Drake et al. (2007), insight was found to predict both relapse and readmission. A cohort of patients with first-episode psychosis was followed up over an 18-month period to estimate the effect of insight on time to relapse and readmission. Those with the best insight scores had an estimated rate of relapse that was 39% of that of those patients with the worst insight scores.

Similar results were found in a prospective study by Yen et al. (2002), in a cohort of 74 subjects recruited from outpatient psychiatric settings. They found that at follow-up, the patients who had not been hospitalised in the year from the time of baseline measure had significantly higher index SAI scores for treatment than those who had been hospitalised. They also found that the more previous hospitalisations a patient had, the higher the chance of rehospitalisation. These prospective studies clearly demonstrate the ability of insight to predict treatment compliance and rates of hospitalisation.

Kamali et al. (2001) discovered a relationship between poor insight and non-compliance in a study of 87 patients with schizophrenia or schizoaffective
disorder. This study examined the complicated relationship between insight, noncompliance and substance misuse. They discovered no association between insight and compliance on the group as a whole, except when patients with comorbid substance misuse were excluded. Insight may influence compliance among patients with schizophrenia, but comorbid substance abuse may prevent patients from complying with medication regimes whatever their level of insight. When comorbid substance misuse and other confounding variables were controlled for, level of insight was a significant factor in determining whether a patient was compliant.

**Insight and interpersonal functioning**

The question of whether insight is associated with social deficits and interpersonal functioning has been examined by Lysaker et al. (1998) and Startup (1998). Lysaker et al. (1998), explored whether poorer interpersonal function is associated with impaired insight. In a study of 111 subjects, it was found that despite equivalence in level of deficit and negative symptomatology, subjects with impaired insight had quality of life ratings indicating poorer interpersonal function. This group also demonstrated more impairment in basic psychological functions that underlie social function. In an examination of the dimensions of insight, Lysaker et al. (1998) also found that awareness of the consequences of disorder was more closely linked to social impairments than either awareness of disorder or awareness of need for medication.

Startup (1998) examined which interpersonal problems were identified by people suffering long-term schizophrenia and then compared these with ratings of the same patients made by their community workers. The author also compared the measure of insight into interpersonal problems with a measure of
insight into disorder. The results showed that patients with schizophrenia have
good insight into the severity of their interpersonal problems, but are poor at
judging the precise nature of their problems. Unexpectedly, there was little
evidence that insight into interpersonal problems was associated with insight
into disorder, suggesting that different cognitive processes enter into the
recognition that one has a mental disorder and is in need of treatment versus
recognition that one has interpersonal problems.

Vaz et al. (2002) looked at correlations between insight and
psychopathology, insight and interpersonal relationships, and psychopathology
and interpersonal relationships. The results showed that the ability to re-label
unusual mental events as abnormal was strongly associated with the ability to
understand social causality, that is, with the logic and accuracy made by the
subjects. This supported the hypothesis that a more complex and accurate
relationship with social reality is associated with higher levels of insight.

These studies demonstrate that the relationship of insight to
interpersonal functioning is a complex one. An association between insight and
interpersonal functioning may well exist, however the direct associations
between particular aspects of insight and aspects of interpersonal functioning
require further exploration. More longitudinal research is also required to
determine whether insight can predict interpersonal functioning.

*Insight and depression*

The relationship between insight and depression is complicated and up
until recently it has been thought that the direction of associations between
insight and outcome are positive, that is, the better insight the better the
outcome. However there is evidence to suggest that too much insight into a
disorder such as schizophrenia, which has long-lasting social, economic, physical and mental consequences for an individual may lead to demoralization, depression, hopelessness and suicide (Amador & David, 2004).

Mintz et al. (2003) attempted to determine the relationship between depression and insight in schizophrenia in a meta-analysis of insight and symptomatology in schizophrenia. In an analysis of 15 studies, they discovered a small positive effect size, indicating that the better the insight of the patient, the more depressive symptoms they suffered. Research suggests that depressive symptoms in schizophrenia can emerge due to appraisals of loss, humiliation, entrapment, shame and self-blame regarding their psychosis (Mintz et al., 2003), and can occur when patients are more aware of their psychoses and associated consequences. However, the authors concluded that the temporal role of insight in depression in individuals with schizophrenia was still unresolved, given that the study mainly involved correlations between measures of insight and depression taken at the same point in time. The authors suggested that prospective studies that measure insight and depression over time from their initial treatment would shed light on the ability of insight to predict depression.

**Insight and suicide**

Suicide is the leading cause of early mortality in individuals with schizophrenia and rates of suicide are 20 to 50 times that of the general population (Lewis, 2004). Drake et al. (1984) noted that key features of the mental status of individuals with schizophrenia before suicide include an awareness of their disorder, depression and hopelessness about the future. In this study of suicide among people with schizophrenia, they found that the individuals in the study who committed suicide had previous high educational
achievements, high non-delusional expectations of themselves and were also highly aware of their disorder and its effects on their functioning. The suicides occurred during relatively non-psychotic phases of the disorder.

Amador et al. (1996) examined the relationship between suicidal behaviour and insight in a cross-sectional study of 218 patients with schizophrenia. The results of this study also partially supported the notion that insight was associated with greater suicidality. In particular, patients with schizophrenia with recurrent suicidal thoughts and behaviour were more generally aware of their negative symptoms than were the non-suicidal patients. Also, patients who were aware of having delusions were also more likely to experience suicidal thoughts and behaviour. These results suggested that awareness of particular aspects of disorder may be more demoralizing than awareness of others. The authors also make the point that although particular aspects of awareness of disorder were associated with greater suicidality, others were not. This indicates that awareness of disorder is not always associated with greater hopelessness and suicidality. General awareness of having a mental disorder was not associated with suicidal behaviour. However, there was a small proportion of patients with poor awareness of negative symptoms who still had suicidal behaviour, leading the authors to suggest that individual differences need to be addressed carefully.

The results of this study typify the complicated nature of the relationship between insight, depression and suicide, with the authors finding that insight was indeed associated with greater suicidality, yet patients with poor awareness are not protected from suicidality by this lack of insight.
Other cross-sectional studies have found support for the idea that greater insight into their disorder is associated with increased suicidality in individuals with schizophrenia, including studies by Schwartz & Petersen (1999), Schwartz (2000), and Pompili et al. (2004). Others such as Kim et al. (2003) and Carroll et al. (2004) demonstrated that greater insight into mental disorder was associated with high levels of hopelessness, a known risk factor for suicide.

**Insight, depression and suicide**

The relationship between depression and suicide is obvious, as the presence of depression is a known risk factor for suicide, in both individuals with schizophrenia and the general population (Lewis, 2004).

Crumlish et al. (2005) examined insight, depression and suicide in a longitudinal study on first presentation psychosis. The development of insight was mapped over four years on 101 individuals, with its effects on depression and likelihood of attempted suicide. Individuals who presented with first-episode schizophrenia were included and it was hypothesised that insight would improve with time. They also hypothesised that one dimension of insight, recognition of mental disorder, would predict depression and suicide attempts, but that the other dimensions, such as recognition of need for treatment and ability to re-label psychotic symptoms, would not. These hypotheses were accepted, with the results showing that insight did indeed improve over the first four years, and that the majority of the improvement is on the dimension of recognition of mental disorder. The ability to re-label psychotic symptoms did not significantly improve, nor the recognition of need for treatment, which remained almost static. Six months after presentation, the greater the recognition by individuals that they had a mental disorder, the more depressed
they were going to be at four years and the more likely they were to attempt suicide in that period. They concluded that the risk of suicide is highest early in the course of a disorder (Crumlish et al., 2005). This study clearly shows the pathway and interaction between insight, depression and suicidality.

Schwartz-Stav et al. (2006) examined the interrelationships between depressive symptoms of schizophrenia, post-psychotic depression, negative signs, and suicidal behaviour and insight in adolescents. They found a similar pattern, with adolescents with schizophrenia who have insight into their disorder being at higher risk of suicidal behaviour and the development of post-psychotic depression.

Overall, the associations found between insight, depression and suicide indicate that greater insight into their disorder can be demoralising for individuals with schizophrenia. More research is required to fully understand whether awareness of particular aspects of the disorder are more demoralising than others, which may assist in determining the ability of insight to predict suicidality and further inform clinical practice.

**Associations between insight and outcome**

Insight appears to be able to assist in the prediction of compliance, hospitalisation rates and relapse rates, which are clinically important outcomes. Relationships also appear to have emerged between insight and violence, interpersonal functioning, depression and suicide. However, without strong longitudinal data, these relationships remain associations, and insight cannot be said to be a reliable predictor of these outcomes. These associations appear to be more complex, with particular aspects of insight interacting with particular outcomes; these require further research. Being able to predict outcomes such as
depression, suicide, violence, and compliance are all important for clinical work with individuals with schizophrenia. Other outcomes, such as functioning and quality of life, are equally important and the relationship between insight and these outcomes requires closer examination.

**Insight and its relationship to functioning in individuals with schizophrenia**

Schizophrenia can greatly affect a person’s ability to function, and much emphasis has been placed in recent years on discovering what factors affect functioning, and how to encourage recovery. Insight has been identified as playing a role in functioning, along with others such as cognitive functioning, medication compliance, and the amelioration of psychopathological symptoms (Stefanopoulou et al., 2009).

**Scales and measures of functioning**

The concept of ‘functioning’ is varied and wide, and can include an individual’s ability to engage in daily activities of living, such as their ability to care for themselves, and to participate in social or personal relationships. It can also include their performance and ability at work. Other terms such as psychosocial functioning, social adjustment, social behaviour and global functioning are often used when discussing functioning as a concept. The literature reflects this variety, with many different measures being utilized in research on functioning. These measures include the Global Assessment Scale (GAS), which has been superseded by the Global Assessment of Functioning Scale (GAF) (American Psychiatric Association, 2000) to better describe its purpose. This measure requires raters to evaluate on a continuous scale of 0 to 100 an
individual's overall level of symptomatology and social function in the previous
month. This is the most commonly used measure of functioning in the literature.

Heinrich's Quality of Life Scale (HQoL) is also widely used and, despite its
name, is traditionally regarded as a measure of social function due to the heavy
weighting it has on social function concepts as determinants of quality of life. The
measure has four scales; intrapsychic foundations, interpersonal relations,
instrumental role and common objects and activities (Lysaker et al., 1998).

Lysaker et al. (1998) used this measure to test hypotheses concerning insight
and social function. Others have also used this scale to measure social
functioning, including Saeedi et al. (2006) and Browne et al. (1998).

Other scales focus on social functioning as well, including the Social
Function Scale (SFS) (Birchwood et al., 1990), and the Community Life Scale
(CLS) (Hwu et al., 1987), while others measure psychosocial adjustment,
including the Life Skills Profile (Rosen et al., 1989) and the Social Behaviour
Schedule (SBS) (Wykes & Sturt, 1986). Other scales that could be considered as
measuring functioning focus more on work performance, such as the Work
Behaviour Inventory (Bryson et al., 1997) and the Work Personality Profile
(WPP) (Bolton & Roessler, 1986, in Lysaker et al., 1994).

Despite the different concepts measured in these scales, it appears that
there may be a singular ‘functioning’ concept that the scales capture. In a 2004
study, Simon et al. found no associations between insight and psychosocial
adjustment in patients with schizophrenia but they did find that the measures
they used to assess psychosocial adjustment were strongly inter-correlated.
Generally the term ‘psychosocial adjustment’ includes a vast array of dimensions
and results may depend on which of these dimensions are tapped. Simon et al.
(2004) used the GAF, Life Skills Profile (LSP) and the SBS to measure psychosocial adjustment. The correlation between the GAF and SBS was -.68. Correlations between the GAF and LSP and the LSP and SBS were .67 and -.73 respectively. The moderately strong correlations between these measures indicate that common aspects of functioning were captured.

Other researchers have used multiple measures of functioning in studies for the purpose of determining the relationship between insight and functioning in individuals with schizophrenia. In a study by Schwartz et al. (1997), the Functional Skills Rating Form (FSRF) and the GAF were used to measure functioning, and similar cross-sectional correlations between these measures and the SUMD (for insight) were found; 0.7 and 0.65 respectively, suggesting that these measures also capture related functioning concepts.

Evidence for a positive relationship between insight and functioning

The relationship between insight and functioning has been increasingly investigated over the past decade, with variable results. Amador et al. (1994) evaluated the clinical correlates of self-awareness (a central component of insight) in patients with schizophrenia in a cohort of 221 patients. Amongst the battery of tests given to patients, the SUMD (insight measure) and the GAS (functioning measure) were administered at the same point in time. It was found that the GAS scores negatively correlated with all nine of the SUMD scores, indicating that in patients with schizophrenia, less insight into their disorder corresponded to poorer psychosocial functioning.

This was a trend that other researchers were to emulate. In 1997, Schwartz et al. investigated whether there was an association between degree of insight and long-term outcome in patients with chronic schizophrenia. Using a
cohort of 23 chronically unwell yet stabilized inpatients, to determine the correlation between insight and functioning, the patients were administered the SUMD to measure insight, and the GAF and the FRSF as measures of functioning. The FRSF in particular is designed to measure psychosocial functioning. Strong cross-sectional correlations between the SUMD and GAF and FRSF were found, indicating that the degree of insight is strongly related to both specific functional skills and global functioning, again in a positive direction.

Other research continued to find a positive relationship between insight and functioning, including Lysaker et al. (1998) and Lysaker et al. (2002). Lysaker et al. (1998) found a moderate correlation between insight and functioning in a study of 101 patients with schizophrenia who were in a post-acute or stable phase. The SUMD was used to measure insight, and the HQoL was used to measure social function. Lysaker et al. (2002) continued to explore the relationship between insight and functioning, this time examining the association between insight and work performance. Again using the SUMD for measuring insight, the 121 participants of this study were also given the WBI (a measure of work-based performance) whilst on a work rehabilitation program. The impaired insight group did indeed show poorer work performance ratings for cooperativeness, work habits, work quality and personal presentation, but no differences were found for social skills. Overall, the results led the authors to support the hypothesis that impairments in insight in schizophrenia contribute to poorer vocational function.

Another cross-sectional study that found support for the link between insight and functioning was the one published by Smith et al. (1999) who examined the role of symptoms, insight and neurocognition on social adjustment.
in schizophrenia. The SUMD was again used as an insight measure, and a test called the Social Behaviour Schedule (SBS) measured social adjustment, in particular, the subscale of social behaviour. A modest positive correlation was found between scores on the SUMD and the social behaviour subscale of the SBS, indicating that patients with good insight have better social behaviour.

Laroi et al. (2000) also utilized the SUMD to measure insight in their exploration of poor insight in schizophrenia and frontal lobe dysfunction. Additionally they measured other clinical variables including functioning, measured by the GAF. Similarly, they found a moderate positive correlation between insight and functioning.

The SBS was used in another study by Holloway and Carson (1999) to investigate the relationship between insight and functioning. They found that in a group of 70 patients with schizophrenia who were deemed ‘hard to treat’, there was a low to moderate correlation found between insight and the SBS severe problems subscale, again indicating the better a patient’s insight the better their functioning.

This trend of positive cross-sectional correlations between insight and functioning continued with research by Puschner et al. (2006) in a large multi-centred randomized controlled trial that included 409 people with schizophrenia. Within the battery of tests given to these patients were the GAF and the SAI. Indeed the correlation between these measures was of a moderate positive correlation, as was the correlation found by Crumlish et al. (2007), who used the same measures on a group of 60 patients with schizophrenia.

An international trial by Gharabawi et al. (2007) explored the role of insight as a mediator of functioning. The study involved 323 patients with
schizophrenia or schizoaffective disorder who were receiving long acting injectable risperidone. The PANSS was used to assess insight, and the Strauss-Carpenter Levels of Functioning test and the Personal and Social Performance Scale were used to measure functioning. The authors found significant moderate correlations, consistent with the results of prior studies linking higher levels of insight with better functioning.

**Studies that failed to find a relationship between measures of insight and functioning**

Many studies that employed a cross-sectional methodology have however failed to find any association between insight and functioning. Earlier studies from Cuesta and Peralta (1994), and Lysaker et al. (1994) both found no relationship between these two variables in research on groups of 40 and 47 patients with schizophrenia respectively.

Dickerson et al. (1997) used the PANSS to measure insight and the Social Function Scale (SFS) for functioning in a sample of 87 patients and found a very small negative relationship, so small the authors suggested that there was no relationship.

A study by Schwartz (1998) found no relationship between degree of insight and global functioning on a cohort of 66 patients with schizophrenia. This finding is contrary to the Schwartz et al. (1997) study that found a strong relationship between these variables, using the same measures. Using multiple regression analyses in this study, it was found that the GAF scores were not predictors of the SUMD scores, which indicated that there was little or no relationship between insight and global functioning. The sample in this study
was patients with chronic schizophrenia who were currently outpatients, as opposed to the 1997 study that included inpatients.

Simon et al. (2004) studied a group of 38 stabilised patients with schizophrenia to determine whether a higher degree of insight was related to better psychosocial adjustment. The researchers used the SUMD to measure insight, and a battery of tests to measure psychosocial adjustment, including the GAF, the Life Skills Profile, the Social Behaviour Schedule, and the Dysexecutive Questionnaire. An analysis was performed using the psycho-social measures, which yielded a one-factor model, called the ‘psychosocial adjustment index’. It was found that there were no significant correlations between this index and the SUMD, which led the authors to suggest that their hypothesis that better insight was related to better psychosocial adjustment was not supported. They proposed that the term ‘psychosocial adjustment’ may have indeed covered a vast array of dimensions, other than functional outcome, and the results may vary depending on which dimension was tapped. Another explanation given for the results was that patients may have overestimated their psychosocial skills in self-report measures, and that as this is often related to impaired insight, such self-reported data may have biased the results.

Mutsatsa et al. (2006) examined the clinical correlates of insight in first-episode schizophrenia. In a cohort of 94 patients, the SAI was administered to measure insight, and the SFS for social functioning. Insight did not correlate with any of the subscales on the SFS with the exception of ‘independent performance’, with which it correlated negatively. The authors suggested that this result may have been due to the fact that the population were patients who were experiencing first episode psychosis, or possibly due to the fact that this study
was based on self-report data and not assessments from clinicians or carers, leading to an overestimation of the patient's actual social functioning.

More recent studies such as the ones by Hofer et al. (2006) and Drake et al. (2007) also found no relationship between insight and functioning in patients with schizophrenia. Hofer et al. used the ITAQ to measure insight and the GAF for functioning as this measures functioning across psychological, social and occupational domains via a single anchored measure. These measures, amongst others, were administered to a sample of 60 outpatients with schizophrenia. Insight did not correlate with functioning as measured by the GAF.

**Longitudinal studies**

Much research has been conducted on insight and functioning using cross-sectional data, however, as previously discussed, to be able to draw causal inferences and determine the predictive ability of insight, longitudinal data are necessary.

The longitudinal data available on insight and functioning is mixed. Research by Yen et al. (2002), and Mohamed et al. (2009), would indicate that insight does have some ability to predict functioning, whilst studies by Drake et al. (2007) and Startup et al. (2010) found no evidence for this.

The SAI-E (the expanded version of the SAI) was used by Yen et al. (2002) in a prospective study of 74 outpatients who were diagnosed with schizophrenia. The aim of this study was to explore the value of insight in predicting suicide, violence, hospitalization and social adjustment. The Community Life Scale was utilized as the measure of social adjustment, which can be viewed as a component of social functioning. The participants’ level of insight was measured at baseline and then a follow-up interview was conducted one year later. The
results showed a low to moderate correlation between insight and social adjustment, such that the poorer the insight the worse the social adjustment was. However, the exclusion of hospitalized patients at the follow-up interview may have influenced the estimation for social adjustment, leading the authors to conclude that more study in this area needed to be undertaken to determine the predictability of insight in social adjustment.

Mohamed et al. (2009) evaluated both cross-sectional and longitudinal association of measures of insight and attitude toward medication with outcomes that included psychopathology and functioning. The Insight and Treatment Attitudes Questionnaire, the Drug Attitude Inventory, and the Heinrichs-Carpenter Quality of Life Scale (HQOL) were administered to participants at baseline, and follow-up assessments at 3, 6, 9, 12, 15 and 18 months. Cross-sectional correlations at baseline showed that insight significantly correlated with functioning (r = 0.2) such that the better the insight an individual had, the better their functioning was. Using regression modelling in the longitudinal analysis, it was found that insight was associated with total scores on their measure of psychosocial functioning, however this was only the case once attitudes to medication were excluded from the model.

In comparison, Drake et al. (2007) found no association between insight and functioning in a sample of 158 patients with first-episode non-affective psychosis. This study examined the effect of insight on functioning, as well as a number of other outcome variables such as time to relapse and readmission, and severity of symptoms. The Birchwood Insight Scale was used, as was the SFS, a scale previously used by Mutsatsa et al. (2006), and Dickerson et al. (1997) to measure functioning. The time from baseline to follow-up was 18 months. The
authors concluded that insight had no significant effect on the SFS at final interview.

Similar results were found by Startup et al. (2010), who examined the question of whether insight predicts subsequent readmission to hospital and social functioning, as well as when improvement in insight predicts improvement in functioning. Utilising the SBS, SFS (informant version) and GAF as measures of psychosocial functioning and the ITAQ for insight, 90 participants with a diagnosis on the schizophrenia spectrum were assessed on two to four occasions over a two-year period following their index admission to an acute psychiatric hospital. Using a mixed model regression analysis, they found no evidence that on average across time, insight assessed at one time predicted social functioning at the subsequent follow-up.

**Summary of the literature on insight and functioning**

Many authors have asserted that insight is important for long-term outcomes, including functioning (Cooke et al., 2005; McEvoy et al., 1989; Schwartz et al., 1997). However, the literature regarding insight and functioning demonstrates inconsistencies, with some authors finding evidence that good insight in individuals with schizophrenia means better functioning (Lysaker et al., 1998, 2002; Puschner et al., 2006; Crumlish et al., 2007) whilst other other authors find no relationship between these two variables (Schwartz, 1998; Schwartz et al., 1997; Mutsatsa et al., 2006; Hofer et al., 2006; Drake et al., 2007). A qualitative review by Lincoln et al. (2007), of the correlates of insight and long-term outcome, including functioning, found that the majority of studies supported the assumption that good insight correlates better functioning. Of the cross-sectional studies in this review, eight studies found significant or partially
significant results indicating a relationship between insight and functioning. The remaining five studies found no associations. The five longitudinal studies in this review found at least partially significant results, leading the authors to conclude from this that insight correlates with better long-term functioning. However, they suggest that this correlation may be mediated by symptoms.

Given the variance in results found in the qualitative review by Lincoln et al. (2007) and the disparity in more recent studies, it may be that striving to improve insight in individuals with schizophrenia is misguided. However, results from qualitative reviews cannot be considered as conclusive, and as such, a quantitative review such as a meta-analysis may be able to further determine if a relationship exists between insight and functioning, and to what strength.

**Insight and its relationship to quality of life in individuals with schizophrenia**

Quality of life has become an important outcome to researchers and clinicians who have intended to develop treatments to assist individuals with schizophrenia to lead more fulfilling and satisfying lives. The concept of quality of life is broad, with researchers differing in their definitions, ranging from a global evaluation of one’s life, to discrete indicators of social and material wellbeing, or even more narrowly on the absence of disease and health-related symptoms (Eack & Newhill, 2007). It can be defined as a person’s sense of wellbeing, and satisfaction with their life circumstances, as well as a person’s health status and access to resources and opportunities (Eack & Newhill, 2007). Typically though, quality of life is considered to consist of three main components; well-being or satisfaction, functional status and contextual factors (Katschnig in Katschnig, Freeman, & Sartorius, 1997).
The question of whether good insight is a requirement for good quality of life in individuals with schizophrenia remains questionable since the results of research in this area are ambiguous.

Good insight has often been regarded as a necessary condition for anticipating needs, developing realistic goals, and promoting positive social and health outcomes (Staring et al., 2009). Some studies have demonstrated that good insight can be related to better social functioning and better expert-rated quality of life (Schwartz, 1998). On the other hand, individuals with schizophrenia and good insight have been shown to experience depression, hopelessness, low self-esteem (Staring et al., 2009) and lower quality of life (Karow et al., 2008).

Insight appears to be a double-edged sword. Patients with better insight into their disorder may realize their restrictions more clearly, which may result in depression and therefore a decrease in quality of life (Karow et al., 2008). However, good insight can improve quality of life by other mechanisms. For example, good insight can lead to an increase in compliance with treatment, which improves functioning (Yen et al., 2002). It can also manifest as a better understanding of social causality, which results in better interpersonal relationships (Vaz et al., 2002). Interpersonal relationships can impact greatly on an individual’s quality of life, therefore an improvement in this aspect can lead to an improvement in an individual's overall quality of life.

**Measures of quality of life**

The use of quality of life measurements and scales has become more prevalent, particularly in assessing clinical outcomes in both the treatment of
acute care patients and the rehabilitation of chronic care patients (Khatri, Romney & Pelletier, 2001).

Many different measures have been employed, many measuring a slightly differing concept of quality of life from the next.

Most quality of life measures are subjective, including measures such as the WHOQoL-Bref (WHOQoL Group, 1998), which consists of 26 items that are scored in the four domains of physical health, psychological, social relationships and environment. The Lancashire Quality of Life Interview (Lehman, 1983) is a subjective measure of quality of life that asks interviewees to rate their satisfaction in life domains that include religion, leisure, living situation, health, family relationships, social relationships, work and education, finances, and legal and safety matters. Other subjective measures include the Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q) (Endicott et al., 1993), and the Modular System for Quality of Life (MS QoL) (Pukrop et al., 2000).

One of the few objective quality of life measures is the Standard of Living Questionnaire (SOL-I) (Doyle et al., 1999). This is a structured clinical interview in which information is collected regarding the interviewee's living situation, finances, work, leisure activities, family and social networks.

These varying conceptualizations have resulted in some researchers questioning the utility of this concept but Eack and Newhill (2007) proposed that quality of life can be viewed as a multidimensional model consisting of four components: (1) satisfaction with the individual's life as a whole, or general well-being, (2) observable social and material well-being, or objective quality of life, (3) satisfaction with the individual's social and material wellbeing, or subjective quality of life, and (4) health and functional status.
Studies that have investigated the relationship between insight and quality of life

The impact of insight on quality of life in individuals with schizophrenia is complex, and the body of studies reflects this, with studies differing in their results. Research into insight and its effect on quality of life is also hampered by a distinct lack of prospective or longitudinal data, making it difficult to determine whether insight plays a role in predicting quality of life.

In a cross-sectional study of insight and its relationship to quality of life by Hasson-Ohayon et al. (2006), it was found that people with higher levels of insight into their mental disorder, in this instance schizophrenia, reported less emotional well-being, less economic satisfaction, and lower vocational status. Also, insight into the symptoms of mental disorder was found to be negatively related to quality of life in the domain of emotional well-being. In this sample of patients with schizophrenia, the participants were administered the SUMD to measure insight and the Human Services Scale to measure quality of life.

Karow et al. (2008) also found a negative correlation between insight and quality of life, such that patients who were diagnosed with schizophrenia and who had greater insight into their disorder reported significantly lower quality of life compared to patients with poor insight. Staring et al. (2009) found similar results, with good insight being associated with lower quality of life, as well as depressed mood and negative self-esteem.

Other studies have found positive correlations between insight and quality of life, or found there to be no relationship between insight and quality of life at all.
Holloway and Carson (1999) found a positive, albeit small, correlation between insight and quality of life in a study of 70 patients with psychosis who were deemed ‘hard to treat’. These authors utilised the SAI to measure insight and the Lancashire Quality of Life Profile to measure subjective quality of life.

Gharabawi et al. (2006) explored whether long-acting risperidone would be associated with enhanced insight, which in turn might improve quality of life. The 614 patients with schizophrenia were given the Medical Outcomes Study Short-form 36-item Health Survey (SF-36), a patient-rated health status measure that is used to measure quality of life, as well as the PANSS to capture insight. The cross-sectional correlations between insight and quality of life were found to be non-significant. A study by Gharabawi et al. (2007) yielded similar results, when they measured insight, functioning and quality of life in patients with schizophrenia who were receiving risperidone. The PANSS was again used to measure insight and, as well as functioning measures, the Schizophrenia Quality of Life Scale (SGLS v3), a self-rated measure, was also administered. Again, no significant correlations between insight and quality of life were found.

No relationship between insight and quality of life was found in studies by Ritsner et al. (2000) and Hofer et al. (2006). These two studies used the ITAQ to measure insight, and the Q-LES-Q and WHO-QuOL-Bref respectively to measure quality of life. Other cross-sectional studies that explored the relationship between insight and quality of life in patients with schizophrenia and found no significant relationship include studies by Goldberg et al. (2001), Doyle et al. (1999), Smith et al. (1999), and Puschner et al. (2006).
Summary of the literature on insight and quality of life

The need for patient-centred outcome measures for individuals with psychiatric disorders has gained much attention in recent years (Doyle et al., 1999). Quality of life appears to capture concisely the notion that the ultimate goal of medical intervention is to improve the well-being of the patient, and thus has gained in popularity as an evaluation of outcome (Doyle et al., 1999). Concurrently, it has also become a central outcome criterion in research involving mental disorders (Puschner et al., 2006). The relationship between insight and quality of life remains unclear. The literature demonstrates positive relationships between insight and quality of life (Holloway & Carson, 1999), and negative relationships (Hasson-Ohayon et al., 2006; Karow et al., 2008) and many authors have found no associations between insight and quality of life (Gharabawi et al., 2006; 2007; Ritsner et al., 2000; Hofer et al., 2006). To date, there has been no quantitative review of the literature on insight and quality of life. Karow and Pajonk (2006) recently reviewed the literature on insight and quality of life and also found contradictory results. In particular, these authors found evidence to support a relationship between good insight and poor subjective quality of life, findings that potentially question the usefulness of improving insight as the main objective when delivering psycho-education to individuals with schizophrenia, an idea that has long been held in the treatment of schizophrenia (Cooke et al., 2005; McEvoy et al., 1989) These authors also acknowledged the complex relationship between insight and quality of life, and suggested that further investigation is required into the relationship between these two variables to increase the information available on short-term and long-term outcomes for individuals with schizophrenia. It is possible that a meta-analysis may uncover a
clear relationship between insight and quality of life, and in turn provide a clear
direction for treatment.

**Aims and hypotheses**

**Aims**

This review of the literature assessing the relationships between insight,
and both quality of life and functioning, although only preliminary, suggests
complex and inconsistent relationships. Meta-analysis is one approach that is
capable of finding effects or relationships that are obscured in other approaches
to summarising research (Lipsey & Wilson, 2001). The aim of this study is to
synthesize the data using meta-analysis techniques, on insight and functioning,
and insight and quality of life, to determine whether the inconsistency and
disparity found amongst the studies, when combined, may uncover a
relationship between these variables.

**Hypothesis 1**

Given the variance of results in studies that have examined the
relationship between insight and functioning, it is hypothesised that no
relationship will be found between these two variables.

**Hypothesis 2**

Again, given the variance in results in studies that have examined the
relationship between insight and quality of life, it is hypothesised that there will
be no relationship between these variables.
Method

For inclusion in the two meta-analyses, studies had to report on a relationship between insight and quality of life or functioning. Studies also had to be in English and published in a peer-reviewed English language journal. Other criteria that were required for inclusion were as follows:

(a) a patient group of individuals with a diagnosis of schizophrenia,
(b) sufficient information reported in the article to determine the direction of the relationship and to also compute an effect size
(c) a valid measure of either quality of life or functioning, including psychosocial functioning, global functioning, work performance, and interpersonal skills
(d) a valid measure of insight that was conceptualised in any of the following five ways: (1) awareness of a mental disorder, (2) awareness of the social consequences of disorder, (3) awareness of the need for treatment, (4) awareness of symptoms of a disorder, and (5) attribution of symptoms of mental disorder (Amador & David, 1998).

Studies that used scales that measured only one aspect of this definition were included as the evolution of this definition has occurred over the past thirty years, and many of the earlier papers used measures that involved only three of these facets of insight, and some even less. It was deemed that inclusion of these papers was important and they should not be excluded on the basis of measuring insight as uni-dimensional. In studies where there were two measures of insight taken, the average of the two effect sizes was included in the meta-analysis.
Three methods were employed to identify articles. Firstly, a literature search was conducted in the electronic databases of Medline and PSYCINFO from the period of January 1985 to December 2010. The year of 1985 was chosen as it was around this time that research on insight in schizophrenia began in earnest, and the first standardised tests for insight, such as the ITAQ, began emerging. Keywords used in the search included INSIGHT or UNAWARENESS combined with SCHIZOPHRENIA or PSYCHOSIS further combined with QUALITY OF LIFE or WELL-BEING or FUNCTIONING or PSYCHO/SOCIAL FUNCTIONING or PERFORMANCE or LIFE SKILLS. This search yielded 50 results in PSYCINFO for quality of life, and 58 in MEDLINE. Only 9 of these fulfilled criteria. Similarly for functioning, the search found 115 results in PSYCINFO, and 96 in MEDLINE, with 21 of the studies meeting criteria.

The second method employed was the screening of reference lists of recent reviews and key papers in the area of insight in schizophrenia. This method yielded one article for inclusion in the quality of life meta-analysis.

Finally, a manual search of key journals in the area of psychiatry was conducted for the period of June 2007 to December 2010 in order to not omit any new articles that may not have been electronically indexed as yet. This yielded no new articles.

Once the articles for inclusion were identified, data were gathered from each of the articles, including:

- number of participants,
- the insight measure,
- the quality of life or functioning measure,
- the average age of participants,
• the percentage of males and females,
• the year of publication,
• whether the study was longitudinal or cross-sectional,
• whether the participants were outpatients or inpatients, and
• whether the population was stable, acute or experiencing their first episode.

**Missing values**

Of some concern in meta-analysis is the issue of missing data. Unfortunately, some studies report that a result was non-significant without providing the exact statistics. Several ways to address this issue have been advocated but all have their disadvantages. One method, as utilised by Aleman et al. (2006), is to include the lowest value of the 95% confidence interval of the mean effect size for non-significant studies that do report precise statistics. This is a conservative approach but less conservative than the other approaches of either excluding such studies, which may bias the results when there are a number of studies in this situation, or ascribing a value of zero to such studies and including them in the analysis. This latter method may obscure the contribution of small effects. Another method is to assign such studies the mean effect size of the studies that report a non-significant effect size, which may yield an over-estimation of the non-significant effect sizes (Aleman et al., 2006). It was decided that the option of ascribing a value of zero to studies with missing data was, although conservative, less radically conservative than excluding these studies altogether. This was strengthened by the fact that many of these studies reported in the text that the data yielded no relationship between insight and quality of life and insight and functioning. Also, Rosenthal and DiMatteo (2000) emphasised the importance of ‘staying close to the data’, therefore it was decided
that ascribing zero to these values was the best representation of the missing data.

**Data Analysis**

Firstly, the effect size for each study was determined. When correlations had been reported these were taken straight from the publication. In other circumstances when the analysis did not involve correlations, estimates were calculated from $P$, $t$, $X^2$ or $F$ values using methods outlined in Rosenthal and DiMatteo (2000).

In the case of longitudinal studies, where the relationship between insight and either quality of life or functioning was measured repeatedly, the Time 1 correlation was used as an estimate of the effect size of the study. In studies where there were two or more measures used, the correlations were averaged using $r$ to $Zr$ transformations.

All analyses were computed using the Comprehensive Meta-Analysis Version 2 (Borenstein et al., 2005). Effect sizes were weighted for sample size, in order to correct for upwardly biased estimation of the effect of small sample sizes (Rosenthal, 1991). The corresponding $z$-value provided an indication of the statistical significance of the association. The data was also tested for heterogeneity, using the $Q$ statistic to determine whether the variability in effect sizes exceeded that expected from sampling error alone, and therefore threatening a reliable interpretation of the results. If the test of heterogeneity was significant, this meant that the large range in effect sizes was not due to chance. The $I^2$ statistic was then employed to quantify how much of the variance could be attributed to between-studies effects, or in other words, true variance. In the event that the test for heterogeneity was significant, a search for
moderator variables was conducted. The moderator variables included variables such as mean age of participants, the year of publication of research, the percentage of males in the study, whether the cohort were inpatients or outpatients, the insight measure used, whether the insight measure was subjective or objective, whether the research was cross-sectional or longitudinal in design and whether the functioning measure used was subjective or objective. Regression analysis was utilised to identify moderator variables that were continuous in nature. The Q-statistic was employed to identify which of the categorical variables were acting as moderators. This statistic is analogous to the analysis of variance, where Q represents between group differences in the variation of effect sizes being estimated.

Analyses on the quality of life and functioning data were carried out using the random-effects model, as opposed to the fixed-effects model. The fixed-effects model has the advantage of yielding a more powerful test of an overall null hypothesis, but does not permit generalisation to studies other than those already in the sample. Although the random-effects model is more conservative it permits generalisation to studies not yet in the sample and is generally preferred (Rosenthal & DiMatteo, 2001). Borenstein et al. (2009) also agree with this, and believe that random effects model is more likely to fit this type of data, that is, data which has been taken from the literature, as it is plausible to assume that the subgroup memberships or the covariates explain some but not all of the dispersion in effect sizes. The fixed-effects model assumes that all studies share a common effect size, an assumption that cannot be made with this data.
Results

Quality of life

Characteristics of studies included in the meta-analysis of insight and quality of life are listed in Table 1. The mean weighted effect size for the relationship between insight and quality of life in patients with schizophrenia was \( r = -0.035 \) (95% CI -0.09 to 0.02, \( z = -1.2 \) \( p = 0.232 \), indicating that there is no relationship between insight and quality of life in this population. This analysis contained 13 studies with a total of 3615 individuals. Figure 1 shows a forest plot of the studies and their corresponding weighted effect sizes. There was heterogeneity found between the studies, \( I^2 = 50.06 \) (\( Q (12) = 24.03, p = 0.02 \)). The estimate of Tau, the standard deviation of the distribution of the true effects across studies (Borenstein et al., 2009) is 0.066. Guidelines by Higgins and Green (2008) suggest that an \( I^2 \) statistic of 50.06 falls in a moderate range of between studies variance (or true variance). Thus, the data were analysed for moderator variables, to determine which variable may be responsible for the differences.
### Table 1

*Characteristics of studies included in the insight and quality of life meta-analysis*

<table>
<thead>
<tr>
<th>Study</th>
<th>Diagnosis</th>
<th>Insight scale</th>
<th>QOL measure</th>
<th>N</th>
<th>Age</th>
<th>Subjective-objective QoL measure</th>
<th>Cross-sectional /longitudinal</th>
<th>Inpatient Outpatient</th>
<th>% males</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mohamed et al. 2009</td>
<td>Schizophrenia</td>
<td>ITAQ</td>
<td>Single item from Lehman QOLI</td>
<td>1432</td>
<td>40.5</td>
<td>Subj</td>
<td>C</td>
<td>I&amp;O</td>
<td>74%</td>
<td>-0.07</td>
</tr>
<tr>
<td>Staring et al. 2009</td>
<td>Schizophrenia spectrum disorder</td>
<td>Birchwood IS</td>
<td>Euro-QoL</td>
<td>114</td>
<td>38.3</td>
<td>Subj</td>
<td>C</td>
<td>O</td>
<td>71%</td>
<td>-0.21</td>
</tr>
<tr>
<td>Karow et al. 2007</td>
<td>Schizophrenia and schizoaffective disorders</td>
<td>Birchwood IS</td>
<td>MSQOL</td>
<td>57</td>
<td>34.7</td>
<td>Subj</td>
<td>C</td>
<td>I</td>
<td>63.15%</td>
<td>-0.23</td>
</tr>
<tr>
<td>Gharabawi et al. 2007</td>
<td>Schizophrenia /schizoaffective disorder</td>
<td>PANSS</td>
<td>Schizophrenia Quality of Life Scale</td>
<td>323</td>
<td>41</td>
<td>Subj</td>
<td>C</td>
<td>O</td>
<td>62%</td>
<td>0.033</td>
</tr>
<tr>
<td>Hasson-Ohayon et al. 2006</td>
<td>Schizophrenia /schizoaffective disorder</td>
<td>SUMD</td>
<td>Human Services Scale</td>
<td>131</td>
<td>36.1</td>
<td>Subj</td>
<td>C</td>
<td>O</td>
<td>65%</td>
<td>-0.27</td>
</tr>
<tr>
<td>Puschner et al. 2006</td>
<td>Schizophrenia</td>
<td>SAIE</td>
<td>MANSA</td>
<td>409</td>
<td>41.5</td>
<td>Subj</td>
<td>C</td>
<td>O</td>
<td>59.9%</td>
<td>0.052</td>
</tr>
<tr>
<td>Hofer et al. 2006</td>
<td>Schizophrenia /Schizoaffective disorder</td>
<td>ITAQ</td>
<td>WHO-QuOL Bref</td>
<td>60</td>
<td>37.6</td>
<td>Subj</td>
<td>C</td>
<td>O</td>
<td>71.7%</td>
<td>0.00</td>
</tr>
<tr>
<td>Smith et al. 1999</td>
<td>Schizophrenia /schizoaffective disorder</td>
<td>SUMD</td>
<td>Lehman QOLI</td>
<td>46</td>
<td>39</td>
<td>Subj</td>
<td>C</td>
<td>O</td>
<td>63%</td>
<td>-0.082</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Conditions</td>
<td>Measure/Scale</td>
<td>Study Design</td>
<td>Subj</td>
<td>Obj</td>
<td>C/O</td>
<td>Percentage</td>
<td>p-value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------------------------</td>
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<td>-----</td>
<td>------------</td>
<td>---------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doyle et al. 1999</td>
<td>Schizophrenia</td>
<td>Birchwood IS SOLQ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>62.5%</td>
<td>0.055</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lancashire QOLP QOL uniscale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ritsner et al. 2000</td>
<td>Schizophrenia / schizoaffective disorder</td>
<td>ITAQ Q-LES-Q</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>75%</td>
<td>0.025</td>
<td></td>
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<tr>
<td>Goldberg et al. 2001</td>
<td>Schizophrenia spectrum</td>
<td>PANSS Lehman QOLI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>58%</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holloway &amp; Carson 1999</td>
<td>Schizophrenia / schizoaffective disorder</td>
<td>SAI Lancashire QOLP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>65.7%</td>
<td>0.16</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>Schizophrenia / schizoaffective disorder</td>
<td>PANSS SF-36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>65.2%</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

Lehman QOLI = Lehman's Quality of Life Interview  
Euro-QOL = European Quality of Life Scale  
MSQOL = Modular System for Quality of Life  
MANSA = Manchester Short Assessment Quality of Life Scale  
WHOQuoL-Bref = World Health Organisation Brief Quality of Life Scale  
Lancashire QOLP = Lancashire Quality of Life Profile  
Q-LES-Q = Quality of Life Enjoyment and Satisfaction Questionnaire  
SF-36 = Medical Outcomes Study Short-form 36-item Health Survey  
QOL Uniscale = Quality of Life Uniscale  
SOLQ = Standard of Living Questionnaire
Quality of Life

<table>
<thead>
<tr>
<th>Model</th>
<th>Study name</th>
<th>Statistics for each study</th>
<th>Correlation and 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Correlation</td>
<td>Lower limit</td>
</tr>
<tr>
<td></td>
<td>Gharebawi et al 2007</td>
<td>0.033</td>
<td>-0.076</td>
</tr>
<tr>
<td></td>
<td>Hasson-Chayan et al 2006</td>
<td>-0.270</td>
<td>-0.422</td>
</tr>
<tr>
<td></td>
<td>Puschner et al 2006</td>
<td>0.052</td>
<td>-0.045</td>
</tr>
<tr>
<td></td>
<td>Hofer et al 2005</td>
<td>0.000</td>
<td>-0.254</td>
</tr>
<tr>
<td></td>
<td>Smith et al 1999</td>
<td>-0.082</td>
<td>-0.364</td>
</tr>
<tr>
<td></td>
<td>Doyle et al 1999</td>
<td>0.055</td>
<td>-0.261</td>
</tr>
<tr>
<td></td>
<td>Ritsner et al 2000</td>
<td>0.025</td>
<td>-0.130</td>
</tr>
<tr>
<td></td>
<td>Goldberg et al 2001</td>
<td>0.000</td>
<td>-0.156</td>
</tr>
<tr>
<td></td>
<td>Holloway &amp; Carson 1999</td>
<td>0.160</td>
<td>-0.076</td>
</tr>
<tr>
<td></td>
<td>Gharebawi et al 2006</td>
<td>0.000</td>
<td>-0.079</td>
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<tr>
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<td>Karow et al 2008</td>
<td>-0.230</td>
<td>-0.463</td>
</tr>
<tr>
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<td>Staring et al 2009</td>
<td>-0.210</td>
<td>-0.379</td>
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<tr>
<td></td>
<td>Mohamed et al 2009</td>
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<tr>
<td></td>
<td>Random</td>
<td>-0.034</td>
<td>-0.091</td>
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</table>

Figure 1. Forest plot of studies included in the meta-analysis of the relationship between insight and quality of life
The insight measure that was used appeared to impact on the relationship between quality of life and insight, $Q(4) = 18.082, p = 0.001$. In the studies that utilised the SUMD, the results yielded a modest, low negative correlation between quality of life and insight, $r = -0.224 [-0.361, -0.078]$ (n = 2). The studies that used the Birchwood Insight Scale also yielded a low negative relationship between quality of life and insight, $r = -0.168 [-0.298, -0.032]$ (n = 3). The other studies, including the PANSS, the SAI and the ITAQ yielded no relationship between quality of life and insight (Figure 2).
Quality of Life by Insight Measure

<table>
<thead>
<tr>
<th>Model</th>
<th>Group by Insight measure</th>
<th>Study name</th>
<th>Correlation</th>
<th>Lower limit</th>
<th>Upper limit</th>
<th>Z-Value</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td></td>
<td>Chanteau et al. 2003</td>
<td>0.023</td>
<td>-0.035</td>
<td>0.014</td>
<td>0.014</td>
<td>0.025</td>
</tr>
<tr>
<td>100</td>
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<td>Cutler et al. 2002</td>
<td>0.014</td>
<td>-0.009</td>
<td>0.018</td>
<td>0.004</td>
<td>0.026</td>
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<td>Chanteau et al. 2003</td>
<td>0.038</td>
<td>-0.035</td>
<td>0.019</td>
<td>0.019</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>Fast</td>
<td>Kissin et al. 2006</td>
<td>0.010</td>
<td>-0.035</td>
<td>0.030</td>
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<td>0.035</td>
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<tr>
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<td>Fast</td>
<td>Kissin et al. 2006</td>
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<td>0.016</td>
<td>0.026</td>
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<tr>
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<td>-0.027</td>
<td>0.001</td>
<td>0.001</td>
<td>0.019</td>
</tr>
<tr>
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<td>Fast</td>
<td>Kissin et al. 2006</td>
<td>0.039</td>
<td>-0.025</td>
<td>0.016</td>
<td>0.016</td>
<td>0.042</td>
</tr>
<tr>
<td></td>
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<td>Smith et al. 2000</td>
<td>0.035</td>
<td>-0.015</td>
<td>0.015</td>
<td>0.015</td>
<td>0.026</td>
</tr>
<tr>
<td>Fast</td>
<td>Fast</td>
<td>Kissin et al. 2006</td>
<td>0.030</td>
<td>-0.039</td>
<td>0.038</td>
<td>0.038</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>Fast</td>
<td>Smith et al. 2000</td>
<td>0.017</td>
<td>-0.012</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.017</td>
</tr>
<tr>
<td>Fast</td>
<td>Fast</td>
<td>Kissin et al. 2006</td>
<td>0.025</td>
<td>-0.004</td>
<td>0.018</td>
<td>0.018</td>
<td>0.026</td>
</tr>
<tr>
<td></td>
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<td>Smith et al. 2000</td>
<td>0.010</td>
<td>-0.035</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.019</td>
</tr>
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<td>Fast</td>
<td>Kissin et al. 2006</td>
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<td>-0.035</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.016</td>
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<td>-0.008</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.034</td>
</tr>
</tbody>
</table>

Figure 2. Forest plot demonstrating the relationship between quality of life and insight as moderated by the variable of insight measure.
The variable of year of publication of the study was also analysed to determine its effect on the relationship between quality of life and insight, and it was found that the more recent the publication, the more negative the relationship between insight and quality of life, $B = -.013$, $se = .006$, $p = .022$ (see Figure 3). This result however may be skewed by the type of insight measure used and should be interpreted with caution.

Figure 3. Scatterplot demonstrating the relationship between quality of life and insight as moderated by year of publication

The percentage of males in each study was found to also have a slight effect on the relationship between quality of life and insight, such that the higher the percentage of males in a study, the more negative the relationship between quality of life and insight, $B = -.006$, $se = .003$, $p = .04$. However this effect is very small and approaching non-significance. This can be seen in Figure 4.
The variable of mean age of participants in the study appeared to affect the relationship between quality of life and insight. The regression coefficient $B = 0.01$, $se = .009$, $p = .04$, indicates that the older the mean age of the participant, the more the relationship between quality of life and insight diminishes. This can be seen in Figure 5.
Figure 5. Scatterplot of the relationship between quality of life and insight as moderated by the variable of mean age of participants

The variables of inpatient/outpatient and whether the insight measure used was subjective or objective were analysed and found not to be moderators (see Appendices A and B). Given that all the studies in the quality of life meta-analysis were of a cross-sectional nature this was not analysed. The quality of life measure used was also not analysed due to the proliferation of differing measures; there was only one measure that was used in two different studies. As most of the studies used subjective measures this was also not analysed.
**Functioning**

The characteristics of studies included in the meta-analysis of insight and functioning are listed in Table 2. A modest positive relationship was found between insight and functioning ($r = 0.211$, 95% CI 0.148 to 0.272, $z = 6.50, p < 0.001$). This analysis included 24 studies with a total population of 3932 individuals. To assess whether sampling bias would be large enough to render the mean effect size non-significant, a fail-safe $n$ was computed (Rosenthal, 1991). The fail-safe $n$ determines the number of studies needed to reduce the mean effect size to a negligible effect. For this meta-analysis, the fail-safe $n$ was 786. It is unlikely that such a large number of unpublished studies with null effects exist. Figure 6 shows a forest plot of the studies and their corresponding weighted effect sizes. There appeared to be no gross outlier studies, however there was heterogeneity found between the studies $I^2 = 65.11$ ($Q (23) = 65.9, p < 0.001$. The estimate of Tau is 0.116. This again falls into a moderate range of between studies variance and hence the data were analysed for moderator variables.
Table 2

Characteristics of studies included in the insight and functioning meta-analysis

<table>
<thead>
<tr>
<th>Study</th>
<th>Diagnosis</th>
<th>Insight scale</th>
<th>Functioning measure</th>
<th>N</th>
<th>Age</th>
<th>Subjective / objective functioning measure</th>
<th>Cross-sectional / longitudinal</th>
<th>Inpatient / outpatient</th>
<th>% males</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mohamed et al. 2009</td>
<td>Schizophrenia</td>
<td>ITAQ</td>
<td>Heinrich’s QOLS</td>
<td>1432</td>
<td>40.5</td>
<td>Obj</td>
<td>C</td>
<td>I &amp; O</td>
<td>74%</td>
<td>0.20</td>
</tr>
<tr>
<td>Stefanopoulou et al. 2009</td>
<td>Schizophrenia</td>
<td>ITAQ</td>
<td>GAF</td>
<td>36</td>
<td>34.88</td>
<td>Obj</td>
<td>C</td>
<td>I</td>
<td>69.4%</td>
<td>0.41</td>
</tr>
<tr>
<td>Rocca et al. 2010</td>
<td>Schizophrenia</td>
<td>SUMD</td>
<td>Heinrich’s QOLS</td>
<td>83</td>
<td>42.6</td>
<td>Obj</td>
<td>C</td>
<td>O</td>
<td>58%</td>
<td>0.445</td>
</tr>
<tr>
<td>Crumlish et al. 2007</td>
<td>Schizophrenia / schizoaffective disorder / schizophreniform disorder</td>
<td>SAI</td>
<td>GAF</td>
<td>60</td>
<td>33.7</td>
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<td>C</td>
<td>O</td>
<td>55%</td>
<td>0.47</td>
</tr>
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<td>Gharabawi et al. 2007</td>
<td>Schizophrenia / schizoaffective disorder</td>
<td>PANSS</td>
<td>PSP Scale CS Level of Functioning</td>
<td>323</td>
<td>41</td>
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<td>C</td>
<td>O</td>
<td>62%</td>
<td>0.24</td>
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<tr>
<td>Drake et al. 2007</td>
<td>Non-affective psychosis</td>
<td>Birchwood IS</td>
<td>SFS</td>
<td>158</td>
<td>n/a</td>
<td>Obj</td>
<td>L</td>
<td>I</td>
<td>68%</td>
<td>0.00</td>
</tr>
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<td>Saeedi et al. 2006</td>
<td>Schizophrenia spectrum</td>
<td>PANSS</td>
<td>Heinrich’s QOLS</td>
<td>278</td>
<td>24.4</td>
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<td>C</td>
<td>O</td>
<td>67.6%</td>
<td>0.33</td>
</tr>
<tr>
<td>Puschner et al. 2006</td>
<td>Schizophrenia</td>
<td>SAI</td>
<td>GAF</td>
<td>409</td>
<td>41.5</td>
<td>Obj</td>
<td>C</td>
<td>O</td>
<td>59.9%</td>
<td>0.32</td>
</tr>
<tr>
<td>Hofer et al. 2006</td>
<td>Schizophrenia / schizoaffective disorder</td>
<td>ITAQ</td>
<td>GAF</td>
<td>60</td>
<td>37.6</td>
<td>Obj</td>
<td>C</td>
<td>O</td>
<td>71%</td>
<td>0.00</td>
</tr>
<tr>
<td>Mutsatsa et al. 2006</td>
<td>Schizophrenia / schizophreniform disorder</td>
<td>SAI</td>
<td>SFS</td>
<td>94</td>
<td>26</td>
<td>Subj</td>
<td>C</td>
<td>O</td>
<td>76.5%</td>
<td>-0.035</td>
</tr>
<tr>
<td>Simon et al. 2004</td>
<td>Schizophrenia</td>
<td>SUMD</td>
<td>GAF LSP SBS DEX</td>
<td>38</td>
<td>24</td>
<td>Obj</td>
<td>C</td>
<td>I</td>
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<tr>
<td>Yen et al. 2002</td>
<td>Schizophrenia</td>
<td>SAI-E</td>
<td>Community Life Scale</td>
<td>74</td>
<td>32.9</td>
<td>Obj</td>
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<td>Condition</td>
<td>Measure</td>
<td>Scale 1</td>
<td>Scale 2</td>
<td>Type</td>
<td>Measure 1</td>
<td>Measure 2</td>
<td>QOL %</td>
<td>QOL p</td>
<td></td>
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<tr>
<td>Lysaker et al. 2002</td>
<td>Schizophrenia/schizoaffective</td>
<td>SUMD</td>
<td>WBI</td>
<td>121</td>
<td>na</td>
<td>Obj</td>
<td>L</td>
<td>O</td>
<td>81.8%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>disorder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.23</td>
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</tr>
<tr>
<td>Laroi et al. 2000</td>
<td>Schizophrenia</td>
<td>SUMD</td>
<td>GAF</td>
<td>21</td>
<td>36</td>
<td>Obj</td>
<td>C</td>
<td>I&amp;O</td>
<td>52.3%</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>0.46</td>
<td></td>
</tr>
<tr>
<td>Holloway &amp; Carson</td>
<td>Schizophrenia/schizoaffective</td>
<td>SAI</td>
<td>SBS</td>
<td>70</td>
<td>34</td>
<td>Obj</td>
<td>C</td>
<td>O</td>
<td>65.7%</td>
<td></td>
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<td>1999</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>0.28</td>
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</tr>
<tr>
<td>Smith et al. 1999</td>
<td>Schizophrenia/schizoaffective</td>
<td>SUMD</td>
<td>SBS</td>
<td>46</td>
<td>39</td>
<td>Obj</td>
<td>C</td>
<td>O</td>
<td>63%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>disorder</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>0.198</td>
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</tr>
<tr>
<td>Lysaker et al. 1998</td>
<td>Schizophrenia/schizoaffective</td>
<td>SUMD</td>
<td>Heinrich’s QOLS</td>
<td>101</td>
<td>na</td>
<td>Obj</td>
<td>C</td>
<td>O</td>
<td>95%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>disorder</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Browne et al. 1998</td>
<td>Schizophrenia</td>
<td>Birchwood IS</td>
<td>Heinrich’s QOLS</td>
<td>44</td>
<td>34.6</td>
<td>Obj</td>
<td>C</td>
<td>O</td>
<td>52.2%</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>Schwartz 1998</td>
<td>Schizophrenia</td>
<td>SUMD</td>
<td>GAF</td>
<td>66</td>
<td>42</td>
<td>Obj</td>
<td>C</td>
<td>O</td>
<td>62.1%</td>
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<td></td>
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<tr>
<td>Schwartz et al. 1997</td>
<td>Schizophrenia</td>
<td>SUMD</td>
<td>GAF</td>
<td>23</td>
<td>40.1</td>
<td>Obj</td>
<td>C</td>
<td>I</td>
<td>60.8%</td>
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<td></td>
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</tr>
<tr>
<td>Dickerson et al. 1997</td>
<td>Schizophrenia/schizoaffective</td>
<td>PANSS</td>
<td>SFS</td>
<td>87</td>
<td>39.4</td>
<td>Subj</td>
<td>C</td>
<td>O</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>disorder</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>-0.062</td>
<td></td>
</tr>
<tr>
<td>Amador et al. 1994</td>
<td>Schizophrenia/schizoaffective</td>
<td>SUMD</td>
<td>GAS</td>
<td>221</td>
<td>34.4</td>
<td>Obj</td>
<td>C</td>
<td>I&amp;O</td>
<td>66%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>disorder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.256</td>
<td></td>
</tr>
<tr>
<td>Cuesta &amp; Peralta 1994</td>
<td>Schizophrenia</td>
<td>AMDP</td>
<td>GAF</td>
<td>40</td>
<td>27.7</td>
<td>Obj</td>
<td>C</td>
<td>I</td>
<td>77.5%</td>
<td></td>
</tr>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Lysaker et al. 1994</td>
<td>Schizophrenia/schizoaffective</td>
<td>PANSS</td>
<td>Work Personality Profile</td>
<td>47</td>
<td>40</td>
<td>Obj</td>
<td>L</td>
<td>O</td>
<td>95.2%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>disorder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
- Heinrich's QOLS = Heinrich's Quality of Life Scale
- GAF = Global Assessment of Functioning
- CS Level of Functioning = Carpenter-Strauss Level of Functioning
- SFS = Social Functioning Scale
- SBS = Social Behaviour Schedule
- DEX = Dysexecutive Questionnaire
- WBI = Work Behaviour Inventory
- FSRF = Functional Skills Rating Form
- LSP = Life Skills Profile
- PSP Scale = Personal and Social Performance Scale
Figure 6. Forest plot of studies included in the meta-analysis of the relationship between insight and functioning.
The variable of the subjectivity of the functioning measure utilised was found to impact on the relationship between functioning and insight ($Q(1) = 12.6, p < 0.001$), such that the studies that used subjective functioning measures yielded no relationship, $r = -.03, [-0.17, 0.116]$ (n = 3) between insight and functioning and the studies that used objective measures of functioning yielded a modest positive relationship, $r = 0.25, [0.19, 0.31]$, (n = 21), as can be seen in Figure 7.

**Figure 7.** Forest plot demonstrating the relationship between functioning and insight as moderated by the variable of subjectivity of functioning measure.

The variable of the percentage of males in a study was analysed to determine whether it affected the relationship and it was found that for those studies with a higher percentage of males, the relationship between insight and functioning diminishes, $B = -.0061$, $se = .0019$, $p = .001$, as can be seen in Figure 8.
Figure 8. Scatterplot of the relationship between insight and functioning as moderated by the variable of percentage of males in each study.

The variable of functioning measure used yielded significant results when tested for its effect on the relationship between insight and functioning $Q(11) = 22.46, p = 0.02$, however given that many of the groups included only one study, the validity of this result is questionable and this result should be interpreted with caution (see Appendix C).

Other variables were also tested to determine their effect on the relationship between insight and functioning but were not found to be moderators, including insight measure, whether the insight measure was subjective or objective, whether the study was of a cross-sectional or longitudinal design, whether the study participants were inpatients or outpatients, the year of publication of the study and also the mean age of participants (see Appendices D to I).
Discussion

The results show a modest positive correlation between insight and functioning in individuals with schizophrenia, such that those individuals with higher levels of insight also have better functioning than individuals with poorer insight. There was no evidence of a relationship between insight and quality of life in individuals with schizophrenia.

**Moderators**

True variance in the moderate range was found in the meta-analysis on insight and quality of life. A search for moderators showed that the insight measure used accounted for some of the variance. In particular, the studies that used the SUMD and the Birchwood Insight Scale yielded a negative relationship between insight and quality of life, while the studies that used the PANSS, SAI and ITAQ showed no relationship between insight and quality of life. Given the small number of studies in this meta-analysis, and the research that demonstrates that insight measures generally correlate highly with one another, this result should be interpreted with caution.

The mean age of participants was also identified as a moderator, such that the older the mean age of participants in the study, the more the relationship between insight and quality of life diminished. It has been previously established that the longer a person has had the disorder, the poorer the quality of life (Bobes & Gonzalez, 1997). This could tentatively explain why age was found to moderate the relationship. It is possible to speculate that as an individual ages, any well-being that they possessed as a result of good insight may be lost, perhaps due to functional and cognitive decline typically associated with schizophrenia over time, and decline associated with ageing.
Heterogeneity was also present in the meta-analysis on insight and functioning. An analysis for moderators showed that the higher the percentage of males in a study, the more the relationship between insight and functioning diminished. This is a surprising finding, and an explanation for this effect is not readily apparent. The possibility of limited variance in the studies with lower percentages of males was explored, but was found to not be the cause as variance between the studies was fairly even. Another moderator that could account for variation in effect sizes in this analysis is whether the functioning measure was subjective or objective. Those studies that used the subjective version of the Social Functioning Scale, which was the only subjective functioning measure used in the articles in the analysis, were found to yield no relationship between insight and functioning. In contrast, those studies that used an objective functioning measure yielded a positive relationship between insight and functioning. Research has shown that when individuals with schizophrenia are asked to complete subjective quality of life measures, they often report high levels of satisfaction despite a background of impoverished conditions, which can appear incongruous and may be a result of a lack of insight (Doyle et al., 1999). The same may be occurring with subjective functioning measures, as some individuals maybe over-estimating their level of functioning. The relationship between insight and functioning may disappear when subjective measures are used for this reason.

It is important to note that implications derived from moderator analyses can only be confirmed once they have been tested on individuals. Moderators must be understood as explaining variation among studies (Eack & Newhill, 2007), not individuals, as the unit of analysis in a meta-analysis is aggregated results, and not individuals. It should also be noted that the moderators found in the quality of life
meta-analysis in particular should be treated with caution due to the small number of articles in the analysis.

**Insight and Functioning**

The meta-analysis of insight and functioning yielded a mean correlation of 0.21, indicating that 4% of the variance in functioning is accounted for by insight. This is a significant, positive, albeit modest, correlation, but the importance of this relationship is questionable when considered from a clinical perspective.

Given that the majority of these studies used cross-sectional data (20 out of 24 studies), what this correlation actually demonstrates is a relationship between insight and functioning when measured at the same time. This correlation therefore shows that when insight is good, functioning is also good, and when insight is impeded, functioning is also. However it may not be that straightforward. Associations found at one point do not necessarily mean that these associations are stable. It could also mean that the association is particular to one phase of the disorder and not to others (Lysaker et al., 1998).

One factor that may be largely responsible for mediating this relationship is the potential overlap in content of symptomatology (Startup et al., 2010). Most insight measures have some measure of symptomatology, as do some functioning measures, in particular the GAF and SBS, both of which have a symptom focus. The GAF is divided into ten ranges of functioning, and the description for each decile has two components; symptom severity and the level of functioning. The GAF rating is decided by either the symptom severity or the level of functioning falling within a particular range (American Psychiatric Association, 2000). The SBS also has a substantial symptom focus, with many of its 21 items being actual symptoms as well as social behaviours, including items such as ‘acting out bizarre ideas’, ‘poor self-
care’, ‘underactivity’, ‘little spontaneous communication’, ‘suicidal ideas or behaviour’, and ‘odd or inappropriate conversation’ (Wykes & Sturt, 1986). Opportunities for cross-over via symptomatology between insight and functioning are evident, in particular in the instance of the measure of an individual’s ability to relabel symptoms as hallucinations and delusions. This component of insight is included in the SUMD, the SAI and the Birchwood Insight Scale. The ability to relabel symptoms could naturally correlate with functioning measures that contain symptomatology components, particularly those with a symptom severity component such as the GAF and the SBS; when an individual’s symptoms are severe their ability to relabel symptoms is greatly compromised. This could produce a correlation between insight and functioning that is mediated by symptoms. Another example of potential cross-over that was noted by Startup et al. (2010) is between the SAPS (Andreasen, 1984) and the SBS, as well as the SANS (Andreasen, 1989) and the SBS. The disorganisation subscale of the SAPS has much in common with items from the SBS, such as ‘destructive behaviour’, incoherence of speech’, ‘odd or inappropriate behaviour’ and ‘socially unacceptable habits’. The SANS, which focuses more on the negative symptoms of schizophrenia has much in common with items from the SBS such as ‘little spontaneous communication’, ‘poor self-care’ and ‘underactivity’.

It may be that the relationship between insight and functioning can be better explained by the measures of insight correlating with the symptomatology that is a component of the functioning measures. Other authors, such as Lysaker et al. (2004) for example, have acknowledged the importance of controlling for symptomatology when determining the relationship between insight and functioning.

Despite this, the correlation between the insight and functioning is rather modest. One possible explanation for the small correlation is that individuals with
schizophrenia are a heterogeneous population; some individuals with little or no insight may be placed on depot medication. These people adhere to their medication, often against their will. Adherence to medication will often correlate with functioning, simply because people improve on medication, without necessarily improving their insight. Good insight is not a requirement for these people to have good functioning. The small effects of insight on functioning might also be explained by the association between good insight and depression found by Mintz et al. (2003), as depression can potentially disrupt social functioning.

This meta-analysis of insight and functioning suffered from a paucity of longitudinal data, with only 4 of the 24 studies included being prospective studies. Two of these studies, both by Lysaker and his colleagues, although prospective, had very short times (3 and 7 weeks) between baseline and follow-up measures, and therefore cannot really be said to be longitudinal data. This was compounded by the fact that two important longitudinal studies, Startup et al. (2010), and Mohamed et al. (2009), were excluded due to an inability to transpose the data to Pearsons’ correlations. Mohamed et al. (2009) did provide cross-sectional data for measures of insight and functioning at baseline and this correlation was included in the meta-analysis.

A closer inspection of these longitudinal studies shows that the findings remain somewhat inconsistent.

Yen et al. (2002) conducted a prospective study on 74 patients with schizophrenia to explore the predictive value of insight for suicide, violence, hospitalisation and social adjustment. Dependent variable measures were taken 12 months after baseline measures. The results showed that those patients with better insight had better social adjustment scores than those with poorer insight. This study
used the SAI as an insight measure. Of the three subscales of the SAI, the only one that correlated significantly with their measure of functioning was treatment compliance.

Mohamed et al. (2009), in an 18-month prospective study, showed that insight was related to total scores on their measure of social functioning (the HQOL), but only when the model included medication adherence as an independent variable as well, indicating that there was a substantial shared variation between the two independent variables of insight and medication adherence.

Drake et al. (2007) studied the effect of insight on time to relapse and readmission, and social function, on individuals who had recently experienced their first episode of non-affective psychosis. Time from baseline to final measure was 18 months. They discovered that baseline insight measures, using the Birchwood Insight Scale, and final measures of the Social Functioning Scale did not correlate significantly.

Similar findings were made by Startup et al. (2010) who used the ITAQ to assess insight and three measures of functioning, the SBS, the SFS and the GAF. Ninety patients with schizophrenia-spectrum disorders were assessed at the time of an acute psychotic episode, and then reassessed at 6, 12, and 24 months. Mixed model regression analyses provided no evidence that insight assessed at one time predicted social functioning at the subsequent follow-up. Also, an investigation of whether changes in insight were associated with changes in functioning showed that there was no significant contribution made by changes in insight that was independent of changes in symptoms.

This research also suggests that the aspect of insight that best predicts functioning may indeed be treatment compliance. This relationship has been
previously identified by other authors (Puschner et al., 2006). Yen et al. (2002) found that the treatment compliance subscale was the only subscale of the SAI that correlated significantly with functioning, and Mohamed et al. (2009) found that insight predicted functioning only when adherence to medication was included as an independent variable in the model. This suggests that other aspects of insight such as the ability to relabel symptoms, acceptance and awareness of a disorder, or awareness of the consequences of the disorder, may not play a vital role. Indeed, these aspects of insight have been previously associated with higher rates of depression (Mintz et al., 2003).

It may be that interventions to improve insight may make no contribution to changes in functioning that are independent of changes in symptoms. If so, the best approach to improving an individual’s functioning may not be to attempt to improve insight, but to try to improve functioning and prevent relapse, as suggested by Startup et al. (2010).

**Insight and quality of life**

As determined by this meta-analysis, it appears that there is no relationship between insight and quality of life. This is in spite of the fact that there is a positive, albeit small, relationship between insight and functioning, which is a major component of quality of life. This incongruity begs further inspection of what is actually being measured when the term ‘quality of life’ is used, and why, when these components of well-being, functioning and environmental or contextual factors are grouped together into the concept of quality of life, they do not correlate with insight.

Quality of life measures are generally composed of three components; a well-being or satisfaction component, which is usually subjective, a functional measurement, and some measure of contextual or environment factors. If it can be
assumed that good insight produces good functioning, the lack of relationship with insight must reside in the other two factors. The contextual factors are usually objective; where the person lives, how much money they have, what their living situation is, and so on. Unfortunately, insight cannot influence, let alone predict, contextual factors, as there are so many other variables that influence an individual’s life. This leaves the well-being or satisfaction component, which is subjective. Subjective measures of well-being or satisfaction have long been a contentious issue for many reasons when administered to individuals with schizophrenia. Measures that are subjective in nature, in particular when measuring well-being, are often seen as unreliable even in non-psychiatric populations, particularly as they can fluctuate over time.

**Issues with subjective measures**

Research on quality of life is dominated by assessments of subjective well-being, the patients’ subjective view of their functioning and their satisfaction with different life domains. However, for patients with schizophrenia, the patients’ view and subsequent reporting may be distorted (Katschnig, 1997). This can occur because of symptoms such as delusions and hallucinations, or through other idiosyncratic beliefs. It could also occur due to an unconscious or conscious process of the individual over-estimating their competence for tasks, or their life situation, in an effort to retain their self-esteem.

An individual’s mood also plays an important role in their perception of their well-being (Katschnig, 1997). It is well documented that people, regardless of whether they have a psychiatric disorder or not, use their momentary affective state as information in making judgements of how happy or satisfied they are with their lives. The depressed patient may well see their well-being, social functioning and living
conditions as worse than they appear to the independent observer, whereas the manic patient may rate their subjective well-being as very good, and their social functioning and living conditions as unduly favourable. Studies have shown that patient mood can account for up to 40% of the variance in quality of life outcomes (Becker & Diamond, in Katschnig et al., 1997).

It has also been suggested that some individuals with schizophrenia may, through either a conscious or unconscious process, over-estimate their competence for certain tasks or their life situation, and subsequently their quality of life, in an effort to retain their self-esteem. This is part of the sealing-over style (McGlashan et al., 1975) that has been identified as a strategy amongst some individuals with schizophrenia. Individuals who employ this sealing-over style use denial as a strategy to cope with their diagnosis and the detrimental effect the disorder has on their life. It is believed that these individuals who utilise denial as a prominent defence mechanism usually experience poorer insight than others with schizophrenia who ‘integrate’ their experience. Karow et al. (2007) suggested that the underlying mechanism for this may be related to insight: that schizophrenia patients with greater insight may be more accurate reporters of their quality of life, while schizophrenia patients with poorer insight may over-rate their quality of life.

Some researchers have addressed directly the question of the validity of using subjective measures on individuals with schizophrenia. Research conducted by Karow et al. (2007) explored whether patients with high levels of both self and expert-rated insight report lower subjective quality of life compared to patients with poor insight. They found that the subjects with higher levels of self and expert-rated insight reported poorer quality of life in all of the subscales of the MSQoL. Yet, these individuals were more strongly integrated into social networks, indicating that their
functioning was indeed better than the individuals with poor insight, despite their subjective quality of life being lower.

Doyle et al. (1999) found that patients with poor insight were less likely to report accurately. Patients with schizophrenia were grouped into high or low insight, and then correlations between objective and subjective quality of life measures were computed. They discovered significant correlations between objective and subjective quality of life ratings for the good insight group, but these correlations were not significant for the patients with low insight, who tended to rate their quality of life as higher.

Other research has demonstrated similar findings, in particular that reported by Hasson-Ohayon et al. (2006). In their study on insight and quality of life, good insight was associated with poorer emotional well-being, less economic satisfaction, and lower vocational status. This research suggests that there may be two mechanisms at work here; not only may individuals with poorer insight report unduly favourably on quality of life domains, but those individuals with good insight may well be experiencing the full brunt of coming to terms with having a serious mental disorder and be fully aware of the restrictions they now have. This could decrease their quality of life, and this is evinced in the low reporting of their subjective well-being or satisfaction.

From these studies (Doyle et al., 1999; Hasson-Ohayon et al., 2006), a picture begins to emerge of a trend of individuals with schizophrenia with good insight who unfortunately report lower levels of quality of life, in particular the subjective component of well-being or satisfaction, than those individuals with poor insight. These individuals also demonstrate higher levels of functioning. One explanation for this phenomenon is that good insight generally leads to better compliance (Karow et
al., 2008), which in turn leads to better functioning, whilst concurrently endowing the individual with an awareness of their limitations and restrictions due to their disorder, such that they rate their subjective satisfaction and their environmental conditions as poor. Staring et al. (2009) observed this trend in a study that examined the premise that improving insight is an important goal in the treatment of schizophrenia. They hypothesised that service engagement, and medication compliance are high in patients with good insight, and that good insight is related to negative outcome only when it is accompanied by stigmatising belief. This hypothesis was indeed supported, leading them to conclude that good insight is associated with low quality of life, depressed mood, and negative self-esteem mainly when accompanied by stigmatising beliefs.

However, not all research has found these discrepancies between expert-rated and self-rated quality of life. Lehman et al. (1993) demonstrated convergent validity between patients and clinicians in their perception of quality of life, and Skantze et al. (1992) showed that individuals with schizophrenia were able to accurately report their social deficits.

It is important to remember that quality of life is a person’s own subjective evaluation of his or her life situation, and thus can only be defined by a subjective index (Bobes & Gonzalez, 1997, in Katschnig et al., 1997). The ultimate goal of medical intervention is to improve the well-being of the patient, and as an evaluation of outcome, quality of life captures this more comprehensively than traditional outcome measures, such as symptomatology and hospital recidivism rates (Doyle et al., 1999). Subjective measures can inform health professionals and other caregivers about the actual experience of the individual, and therefore assist the process of improving outcomes for that individual. Interventions and assistance can be targeted
at the aspects of the individual’s life that are meaningful to them, rather than other’s ideas of what areas of their life require improvement being imposed upon them.

**Problems with quality of life measures**

Another issue that further complicates the determination of the relationship between insight and quality of life is the lack of standardisation of quality of life measures. This problem may stem from the lack of agreement or standardisation of a concept of quality of life. The definition and measurement of quality of life in the context of schizophrenia is complex, and disagreements about the definition still abound (Becker & Diamond, 1997).

Most quality of life definitions consider the three domains of subjective well-being, functional status, and environmental conditions. This latter domain can also include physical health and economic status. Most quality of life measures generally include one or more of these aspects, however there is little or no discussion in the literature about a standard rule of which aspects are essential for validly measuring quality of life. As well as no consensus on which aspects should be included, there is also no agreement on the weighting or scoring of these aspects, which has been done arbitrarily (Becker & Diamond, 1997). Indeed, theoretical work is still required to determine a unified concept of quality of life for individuals with schizophrenia.

Despite the lack of agreement on a definition of quality of life, many instruments and measures have been developed, particularly for individuals with schizophrenia. Indeed, in this meta-analysis alone, only one measure was used in two studies, Lehman’s Quality of Life Interview; the other eleven studies used completely different instruments. Other researchers, such as Eack and Newhill (2007) have observed the same phenomenon, that of a proliferation of quality of life measures, few of which are consistently used throughout the literature. Without data to demonstrate
that any of these measures correlate, it is very difficult to say that the same concept of quality of life was measured by these instruments. Becker and Diamond (1997) also believe that this lack of conceptual clarity and the absence of standardisation has exacerbated the problem of developing instruments, and, in particular, has prevented generalisation between studies.

**The validity of quality of life as a single measure**

Another criticism of quality of life measures when used in patients with schizophrenia is that the three domains are so different that reducing them to a single global measure renders the concept meaningless. In other words, the concept struggles with face validity. For example, an individual who functions well may not necessarily live in adequate housing, or have a decent standard of living. By contrast, an individual with poor functioning may have financial support from family to provide them with decent housing and other opportunities. Keeping in mind these examples, if an individual with good insight scores highly in the functioning domain, poorly in the environmental domain and obtains a slightly lower than average score for subjective satisfaction, the quality of life measure will show an overall average score. This results in important information about different aspects of their quality of life being lost.

Barry (in Katschnig et al., 1997) believes that the majority of studies that have utilised quality of life scales on psychiatric populations show that the objective components of quality of life, such as demographic characteristics and environmental conditions, show only a modest relationship, if any, to measures of life satisfaction. The relationship between objective and subjective indicators appears to be weak.

Indeed, an inspection of the studies included in this quality of life meta-analysis in which the correlations between the subscales of the quality of life
measures and insight were actually reported, shows that the subscales vary greatly in their correlations with insight. As this meta-analysis has found, it is typically the functioning component of the quality of life measure that correlates with insight, such that those individuals with good insight function better than those with poor insight. However, good insight also appears to correlate negatively with the subjective emotional or well-being component of quality of life.

Hasson-Ohayon et al. (2006) examined the relationship between insight and quality of life using the Human Services Scale as a quality of life measure and the SUMD to measure insight. These researchers reported on the correlations of the subscales of these measures, which enabled a closer view of the relationship between insight and quality of life. They found that good general insight, as well as good insight into one’s symptoms, was related to reduced emotional well-being, as well as lower vocational status and less economic satisfaction. Interestingly, insight into the need for taking medication alone was positively correlated with higher emotional well-being. This opposed the trend of good insight being related to poor emotional well-being. One explanation for this may be that some individuals with schizophrenia acknowledge that medication assists them, or are able to identify their symptoms, yet they still do not accept that they have a mental disorder.

Karow et al. (2008) studied the relationship between self- and expert-rated insight and quality of life using the Insight Scale, the SUMD, the PANSS and the MSQoL. Although the authors reported the unpaired t-tests between these three insight scales and 8 subscales of the MSQoL there were no analyses of the significance of correlations between the separate subscales of the MSQoL and the insight measures. However, the authors did conclude that better insight is associated with better social functioning and decreased subjective quality of life.
Gharabawi et al. (2007) explored the role of insight as a mediator of functioning and quality of life in a trial of patients with schizophrenia who were receiving risperidone. The study demonstrated a significant correlation between insight and the psychosocial subscale of the Schizophrenia Quality of Life Scale (SQLS), while there was no relationship between insight and the subscales of energy/motivation and symptoms/side effects. The authors concluded that their findings suggested that insight and functioning are positively linked, as evinced by the psychosocial subscale of the SQLS, but there was no relationship with overall quality of life.

It appears that when the components are looked at separately, good insight predicts better functioning, but possibly poor subjective emotional well-being. Given that these domains, along with the objective environmental domain, make up the concept of quality of life, it does not make sense to combine these three domains together to obtain a single measure when two domains, functioning and satisfaction or emotional well-being, have the potential to cancel each other out, therefore giving the appearance of there being no relationship between insight and quality of life. This is particularly true in the instance of individuals with good insight.

This complexity has been noted by other authors such as Becker and Diamond (1997), who state that, “global assessments of quality of life will not be useful until the complex relationship between the subjective and objective dimensions of quality of life are understood” (p125).

**Limitations**

The ‘file-drawer’ bias is one limitation that is regularly identified in meta-analytic investigations (Rosenthal & DiMatteo, 2000). This term refers to an upward bias of the mean effect due to the unpublished studies with a null effect being left
unpublished. Ideally, every piece of data on the subject would be collected, however significant results of research are published more commonly than non-significant results. This results in many non-significant results being relegated to the ‘file-drawer’. It is safe to say however that the meta-analysis on insight and functioning was not limited by this bias, as the fail-safe N test showed that 786 studies with non-significant results would be required to be in unpublished existence to reduce the correlation of 0.21 to non-significance.

Some studies reported that no correlation between insight and functioning or quality of life was found, but did not provide the statistical information in the results. It was decided to include these studies despite the lack of data in order to include as many studies as possible. These studies were given an effect size of zero, which is a conservative approach (Aleman et al., 2006), as this may obscure the existence of small effects. However, Rosenthal and DiMatteo (2000) stress the importance of ‘staying close to the data’, and this appeared to be the most reasonable approach to take. It was observed that in those studies that concluded that no relationship existed, and also reported the statistical information, the correlation was indeed close to zero.

Another concern about meta-analyses in general is that the studies included in a meta-analysis are too dissimilar to be able to combine and draw conclusions about a population from. This criticism is known as ‘mixing apples and oranges’ (Borenstein et al., 2009). However studies brought together in a meta-analysis will invariably differ in their characteristics, and it is up to the researcher to decide on the appropriateness of combining results. The main issues of dissimilarity in this investigation have been previously discussed, in particular the differences between quality of life measures. On the whole, the studies were very similar, with the majority being cross-sectional in nature. The samples of each study were also very
similar; most were individuals with a diagnosis of schizophrenia or schizoaffective disorder, most were outpatients, and most had a chronic disorder.

Conclusion

The results of these meta-analyses show that there is a small, moderate positive correlation between insight and functioning, however it is unclear to what extent this is mediated by symptoms. It is also unclear whether or not insight can indeed predict functioning, due to a paucity of longitudinal data.

Despite functioning being a major component of quality of life, the meta-analysis on insight and quality of life showed no relationship between these variables. This could be for a number of reasons. There is no research that demonstrates that the many different quality of life measures used in research on individuals with schizophrenia correlate with each other. Also, the usefulness of a single global measure typically derived from three or more subscales with no proven correlation with each other call into question the validity of such quality of life measures.

Theoretical work is required to find a consensus on a comprehensive definition of quality of life for individuals with schizophrenia. From this, a standardised measure of quality of life could be designed specifically for use in this psychiatric population in order to further the research in this area. In particular, to further our understanding of quality of life as a treatment outcome, and our understanding of the causal sequence in schizophrenia.

Methodological improvements could also be made in this area of research. The problem of an exclusively subjective approach to data collection could be rectified by obtaining assessments by third parties, namely a family member or friend, and a professional. Also, shifting the focus from purely cross-sectional research to
more longitudinal data would yield important information on the predictive importance of insight in quality of life and functioning.

The positive correlation between insight and functioning shows that improving insight may be something to aim for. However interventions may be more effective if they focus on relapse prevention and functioning itself, rather than improving functioning via insight. Research has shown that there can be costs as well as benefits to improving insight. It is also important to remember that the goal of clinical interventions is not only to improve an individual’s life from a health professional’s point of view, but to improve their life in a way that has meaning to that individual. Improving insight in a clinical setting needs to be handled thoughtfully with full awareness of all these aspects, and assessed in an ongoing fashion, mindful of the individual’s level of perceived stigma, their feelings of hopelessness, self-perception and self-esteem.

It may be that improving an individual’s compliance with medication and treatment, without necessarily improving their understanding of the consequences of their disorder, or accepting their disorder, or even being able to re-label symptoms, is the way to improve functioning and quality of life, without the disadvantages of ensuing depression that appears to accompany good insight.
References


*Introduction to Meta-Analysis*. Wiley & Sons, UK.


*Comprehensive Meta-analysis Version 2*. Biostat, Englewood, NJ.


Lysaker, P.H., Bell, M.D., Bryson, G.J., & Kaplan, E. (1998). Insight and interpersonal function in schizophrenia. *Journal of Nervous and Mental Disease, 186* (7), 432-436.


*Lysaker, P.H., Bryson, G.J., & Bell, M.D. (2002). Insight and work performance in schizophrenia. Journal of Nervous and Mental Disease, 190 (3), 142-146.*


and neurocognition on social adjustment in schizophrenia and schizoaffective disorder. *Journal of Nervous and Mental Disease, 187*(2), 102-108.


schizophrenia and other chronic mental disease. *Journal of Nervous and Mental Disease, 186*, 44-50.
Appendix A

The relationship between insight and quality of life as moderated by the variable of inpatient/outpatient.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Effect size and 95% interval</th>
<th>Test of null (2-Tail)</th>
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<th>Tau-squared</th>
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<td>Q-value</td>
</tr>
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<td></td>
<td></td>
</tr>
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<td>0.950</td>
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<tr>
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<td>3,000</td>
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<tr>
<td>Overall</td>
<td>13 0.055 0.068 0.003</td>
<td>2.123</td>
<td>0.034</td>
<td>24.029</td>
</tr>
</tbody>
</table>

Mixed effects analysis

|            |                             | Z-value | P-value | Q-value | df (df) | P-value | I-squared | Tau Squared | Standard Error | Variance | Tau |
| Fixed effect analysis |
| 1,000      | 2 0.063 0.240 0.119       | 0.693 | 0.495 |       |           |          |          |          |          |          |     |
| 2,000      | 9 -0.026 -0.107 0.051     | -0.037 | 0.465 |       |           |          |          |          |          |          |     |
| 3,000      | 2 0.045 0.177 0.089       | 0.696 | 0.512 |       |           |          |          |          |          |          |     |
| Overall    | 13 0.036 0.100 0.028     | -1.113 | 0.265 |       |           |          |          |          |          |          |     |
Appendix B

The relationship between insight and quality of life as moderated by the variable of subjectivity or objectivity of insight measure.

<table>
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<th>Groups</th>
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<th>Tau squared</th>
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<td>Upper limit</td>
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<td>0.651</td>
<td>0.005</td>
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<td>Total between</td>
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<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>13</td>
<td>0.035</td>
<td>0.669</td>
<td>0.003</td>
</tr>
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</table>

Mixed effects analysis

|        | Number of Studies | Point estimate | Lower limit | Upper limit | Z-value | P-value | Q-value | df (Q) | P-value | I-squared | Tau Squared | Standard Error | Variance | Tau |
|        | 1.000 | 2 | -0.162 | -0.303 | -0.003 | 2.003 | 0.023 |
| 2.000 | 10 | -0.016 | -0.673 | 0.040 | 0.553 | 0.573 |
| Total between | 3.047 | 1 | 0.001 |
| Overall | 13 | 0.034 | 0.687 | 0.000 | 1.206 | 0.216 |
Appendix C

The relationship between insight and functioning as moderated by the variable of functioning measure.

<table>
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<th>Groups</th>
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<td>P-value</td>
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<td>0.000 0.000 0.000 0.000</td>
</tr>
<tr>
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</tr>
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99
Appendix D

The relationship between insight and functioning as moderated by the variable of insight measure.

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Mixed effects analysis

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Appendix E

The relationship between insight and functioning as moderated by the variable of subjectivity or objectivity of insight measure.

<table>
<thead>
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<th>Groups</th>
<th>Effect size and 95% interval</th>
<th>Test of null (Q-Tau)</th>
<th>Heterogeneity</th>
<th>Tau-squared</th>
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<td>Lower limit</td>
<td>Upper limit</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>1.000</td>
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<td>0.010</td>
<td>0.109</td>
<td>0.149</td>
</tr>
<tr>
<td>2.000</td>
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<td>0.199</td>
<td>0.260</td>
</tr>
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<td>Total within</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total between</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>24</td>
<td>0.213</td>
<td>0.189</td>
<td>0.249</td>
</tr>
</tbody>
</table>

Mixed effects analysis | | | | | | | | | | | | | | |
| 1.000  | 2                            | 0.017                | 0.105         | 0.225       | 0.153    | 0.073   | 0.081   | 1     | 0.776   | 0.000     | 0.000       | 0.000       | 0.000       | 0.000 |
| 2.000  | 22                           | 0.229                | 0.167         | 0.288       | 7.073    | 0.000   | 3.960   | 1     | 0.053   | 0.000     | 0.000       | 0.000       | 0.000       | 0.000 |
| Total between | | | | | | | | | | | | | | |
| Overall | 24                           | 0.211                | 0.152         | 0.259       | 6.022    | 0.000   | 6.022   | 1     | 0.053   | 0.000     | 0.000       | 0.000       | 0.000       | 0.000 |
Appendix F

The relationship between insight and functioning as moderated by the variable of design of study, cross-sectional or longitudinal.

<table>
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<th>Test of null (Z-Tau)</th>
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<th>Tau-squared</th>
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<td>Upper limit</td>
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<tr>
<td>Fixed effect analysis</td>
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<td>0.191</td>
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<td>0.195</td>
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Mixed effects analysis

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<th>Heterogeneity</th>
<th>Tau-squared</th>
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Appendix G

The relationship between insight and functioning as moderated by the variable of inpatient/outpatient.

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<th>Lower limit</th>
<th>Upper limit</th>
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<th>P-value</th>
<th>Q-value</th>
<th>df (Q)</th>
<th>P-value</th>
<th>I²</th>
<th>Tau Squared</th>
<th>Standard Error</th>
<th>Variance</th>
<th>Tau</th>
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</tr>
<tr>
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<td>0.169</td>
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<td>10.145</td>
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<td>0.071</td>
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<tr>
<td>Overall</td>
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<td>0.188</td>
<td>0.249</td>
<td>13.035</td>
<td>0.000</td>
<td>65.916</td>
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</tbody>
</table>

Mixed effects analysis

| 1.000 | 15               | 0.105          | 0.014       | 0.272       | 4.700    | 0.000   | 9.099   | 6     | 0.000   | 0.162  | 0.000       | 0.000          | 0.000    | 0.000|
| 2.000 | 4                | 0.115          | 0.072       | 0.254       | 1.209    | 0.227   | 2.412   | 2     | 0.003   | 0.000  | 0.000       | 0.000          | 0.000    | 0.000|
| 3.000 | 3                | 0.253          | 0.086       | 0.405       | 2.947    | 0.003   | 5.951   | 3     | 0.000   | 0.000  | 0.000       | 0.000          | 0.000    | 0.000|
| Blank | 2                | 0.432          | 0.294       | 0.576       | 3.541    | 0.000   | 1.099   | 1     | 0.000   | 0.000  | 0.000       | 0.000          | 0.000    | 0.000|
| Total between | 0.0999 | 3 | 0.162 |
| Overall | 24               | 0.211          | 0.146       | 0.274       | 6.301    | 0.000   | 1.398   | 1     | 0.000   | 0.000  | 0.000       | 0.000          | 0.000    | 0.000|
Appendix H

The relationship between insight and functioning as moderated by the variable of year of publication.

<table>
<thead>
<tr>
<th>Groups</th>
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<th>Test of null (G-Tau)</th>
<th>Heterogeneity</th>
<th>Tau-squared</th>
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<td>Number Studies</td>
<td>Point estimate</td>
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<td>Upper limit</td>
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<td>Total between</td>
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<tr>
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<td>Overall</td>
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Appendix I

The relationship between insight and functioning as moderated by the variable of mean age.

Fixed effect regression

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</table>

| Tau-squared    | 0.01593        |

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