

# Insight and neurocognition in first-episode psychosis

*Effects of insight and baseline IQ on remission at 1 - year follow - up*

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# Abstract

**Candidates:** Tale Moldestad and Linn Christine Sirichitr

**Title:** Insight and neurocognition in first-episode psychosis. Effects of insight and baseline IQ on remission at 1 - year follow - up.

**Supervisor:** Associate Professor Anne-Kari Torgalsbøen

**Background:** Lack of insight is a prevalent feature of patients with psychosis. The present study has focused on IQ and insight as potential predictors for remission in a group of first-episode psychosis patients. Poor insight is clinically relevant as it is associated with psychosocial dysfunction, poorer treatment adherence and an increased number of rehospitalizations. Previous studies have found general intelligence represented by IQ to be a sensitive and reliable cognitive predictor of later social and clinical outcome in the early stages of schizophrenia. In this study we have investigated to what degree insight in a group of first – episode psychosis patients changes from baseline to 1 – year follow – up. In addition, we have explored the relationship between insight, baseline IQ and remission.

**Methods:** This study is a part of a larger, longitudinal research project at the Department of Psychology. 24 adults above 18 years diagnosed with a first episode of psychosis were assessed on insight using the G12 item of the Structured Clinical Interview for the Positive and Negative Syndrome Scale (SCI – PANSS). Intellectual functioning was measured using the Norwegian version of the Wechsler Abbreviated Scale of Intelligence (WASI). Remission was assessed using the criteria defined by the Remission in Schizophrenia Working Group. For the statistical analyses we used data collected at baseline, 6 and 12 months.

**Results:** The results from our study show a statistically significant increase in insight after one year. A small, non – significant correlation was found between degree of insight and IQ. At 1 – year follow – up, 21 of a total of 24 patients were in remission. IQ is found to be moderately correlated with remission at 6 months and at 1 year. This correlation also failed to attain statistical significance. Results indicate small, non – significant correlations between insight and remission measured at the different time points.

**Conclusions:** Support was found for the main hypothesis that insight is improved and maintained throughout the first year after a first episode of psychosis for our group of patients. Regarding remission as an outcome variable, results concerning the contribution of insight and IQ were inconclusive.

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# Introduction

Towards the end of the 19th century, Emil Kraepelin used the term “dementia praecox”, to cover the existing diagnostic categories of hebephrenia, catatonia and paranoid psychosis into a single disease entity (Kraepelin, 1896). The term implied a degenerative, dementia - like disease that affected young adults, and most of the patients he described experienced deterioration of cognitive abilities such as attention, problem – solving, learning and memory. The diagnostic formulation was modified by Eugen Bleuler in 1908, who questioned the importance of deterioration when he outlined his review of the prognosis (Bleuler, 1908). He renamed the concept of “dementia praecox” the *group of schizophrenias* to describe what he considered to be a unifying disease characteristic. Bleuler (1908) considered symptoms like hallucinations and delusions to be secondary to the clinical picture of the disease, and suggested that failure in cognitive functioning was the core feature.

During the century following Kraepelin’s initial formulation, a number of sets of criteria have been proposed for diagnosing the condition. It is now recognized that schizophrenia is a disorder in which individuals experience a constellation of symptoms, including perceptual misinterpretation, cognitive impairment and emotional dysfunction (Mintz, Dobson & Romney, 2003). These symptoms are commonly divided into a positive and negative symptom - scale, which represents two distinct, yet overlapping clusters. The positive symptoms consist of hallucinations, delusions, bizarre or disorganized behavior, and the negative symptoms include affective blunting, anhedonia, apathy, impoverished cognition and impairments in attention (Combs & Mueser, 2007). In addition, many studies have found depressive symptoms to be common in schizophrenia (Arango & Amador, 2011). The patients grouped under the schizophrenia spectrum vary widely in their clinical presentation, course and response to treatment, regardless of the diagnostic system being used. One key feature of the disease is that many patients do not have awareness into the nature of the disorder, its symptoms, its social consequences and the need for treatment. This is usually referred to as *lack of insight* (Parellada et al, 2011).

In the beginning of the 20<sup>th</sup> century, authors started to recognize the importance of subjective experience and recognizing one’s illness for diagnosis and treatment (Arango & Amador, 2011), as lack of insight is frequently deficient among patients with psychosis (Amador &

David, 2004). With the recognition of the barrier to accepting and staying in treatment caused by poor insight, there has been an increase in the study of this field, as well as with its relationships with prognosis, compliance, neuropsychological impairment and clinical symptoms in schizophrenia (Arango & Amador, 2011).

### **The study of insight in schizophrenia**

In everyday usage, insight is defined as the capacity to discern the true nature of a situation (Mintz, Addington & Addington, 2004). Different professional definitions of the concept have evolved over the years, with the current definition recognizing the multidimensionality of the term. Thus, the broadened concept and operational definition includes: (1) awareness of mental disorder, (2) understanding the social consequences of the disorder, (3) awareness of the need for treatment, (4) awareness of specific signs and symptoms of disorder and (5) the attribution of symptoms to the disorder (Amador & Gorman, 1998).

The Diagnostic and Statistical Manual of Mental Disorders (DSM IV) addresses the issue of insight in schizophrenia by stating that poor insight is a manifestation of the illness rather than a coping strategy (American Psychiatric Association, 2000), and one of the major findings in the research literature is that about 50% to 80% of persons with schizophrenia do not know they have an illness. This unawareness typically does not improve with education, time or treatment (Arango & Amador, 2011; Mintz et al., 2004). Intact insight is found to be associated with better treatment adherence (Kemp & David, 1996), and so investigating the factors that contribute to deficits of insight has opened up as an important line of research. Severity of psychotic symptoms, severity of cognitive deficits, brain volume and relationship with co – morbid depression are all correlations that have been investigated (McEvoy et. al, 2006). With the recognition of insight as one of the key discriminating features of schizophrenia, there has been an explosion of new research on this problem, leaving a range of psychometric tools available that have demonstrated reliability and validity.

Some authors argue that what we are seeing is usually not denial, but can be seen as a cognitive deficit if the lack of insight persists over time (Arango and Amador, 2011). However, there is no general agreement on the clinical meaning and biological substrate of lack of insight (Parellada et al, 2011). In the literature, two theories have been dominating. The neurocognitive theory suggests that poor insight is the consequence of underlying

cerebral pathology. The second considers lack of insight as a psychological defense in order to preserve or maintain a positive outlook (Startup, 1996). Some researchers have also looked at lack of insight as a kind of neurological mechanism similar to anosognosia (Amador & David, 1998), or as a combination of the above (Mintz et al., 2003). None of the theories have been conclusive, however, and the results are also mixed among the potential correlates that have been studied (Thompson, McGorry & Harrigan, 2001). A 1 – year follow – up study of insight in early psychosis found that insight improved significantly over 12 months, and was negatively correlated with both positive and negative symptoms, and positively correlated with depressive symptoms at admission. No associations with cognition were found (Mintz et al, 2004). The researchers also observed that good insight was related to an increased number of suicide attempts prior to the first admission, and increased levels of depression at the initial assessment. They argue that this implies that first – episode subjects who are aware of their disorder before and at the start of treatment are at greater risk of depression and suicide attempts, and supports the theory that self-awareness deficits in psychosis may result from a form of psychological defense (McGorry & McConville, 1999).

### **Insight in first – episode psychosis**

In recent years, investigators have begun to study insight in patients experiencing a first episode of psychosis (FEP). Fennig et. al. (1996) found that fewer patients experiencing a first episode of psychosis of schizophrenia had full insight than patients experiencing first episodes of bipolar or other psychoses.

The study of insight in first - episode patients has some crucial advantages. Clinical and neuropsychological correlates to insight in first – episode psychosis are somewhat different than those reported for established schizophrenia. First, insight is not a static condition and may be influenced by neurobiological, clinical, therapeutic and social circumstances (Parellada et al., 2011). Furthermore, insight tends to be better in a risk mental state for psychosis rather than during the first episode, it tends to improve after the first episode, and patients with first – episode psychosis are less aware of having a mental illness than multiple - episode patients. Second, the population constitutes a heterogeneous group because it includes different psychosis categories, and the boundaries between them are not all agreed upon (Parellada et al., 2011). In addition, studies of first – episode patients allows for examination of the association between insight, symptomatology, and neurocognition without

the potential confounds of illness chronicity (Keshavan, Rabinowitz, DeSmedt, Harvey & Schooler, 2004).

One major study of insight in first – episode patients is the above mentioned by Parellada and colleagues (2011). They studied insight over the first two years of early - onset first – episode psychosis and its correlations with clinical, socio – demographic, cognitive and structural brain variables. Their results indicated that baseline insight into having a mental disorder, duration of untreated psychosis (DUP) and baseline intelligence quotient (IQ) became the most consistent variables explaining different aspects of insight at 2 years in patients who ended up with a diagnosis of schizophrenia.

Results from a study by Mintz, Addington and Addington (2004) indicated a small negative relationship between insight and global, positive and negative symptoms. There was also a small positive relationship between insight and depressive symptoms. Other findings, such as the study of total brain, gray and white matter volumes in relation to insight show contradictory results (Gilleen, Greenwood & David, 2011). Most studies found insight to be improved over the course of the studies (McEvoy et al 2006). Taken together, these findings argue in favor of insight being partially dependent of the mental status of the patient but also having some trait value (Mintz et al, 2003).

### **Impaired neurocognition in psychotic disorders**

Neurocognition is among the individual traits thought to have an association with insight. Cognitive impairments are one of three major groups of symptoms to be found in the clinical picture of schizophrenia, along with positive and negative symptoms (Carlsson, Nyman, Ganse & Cullberg, 2006; Combs & Mueser, 2007; Bleuler, 1908; Kraepelin, 1896; van Winkel et al., 2006). Despite the noteworthy heterogeneity among individuals with schizophrenia, up to 80% of patients have cognitive impairments, and typically perform 0.8-1.5 SDs below the level of healthy controls on several cognitive domains. Neurocognitive dysfunction is strongly associated with functional disability (Mesholam-Gately, Giuliano, Goff, Faraone & Seidman, 2009), which makes neurocognition a variable of clinical interest. The cognitive impairment is of such a pronounced character that it has been proposed to be part of the diagnostic criteria for schizophrenia in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-V), and International Classification of Diseases,

eleventh revision (ICD-11) (Bora, Yücel & Pantelis, 2009). Now considered a core feature of the illness (Mesholam-Gately et al., 2009; Sponheim et al., 2010), cognitive impairments refer mainly to difficulties in working, verbal and visual memory, reduced executive functioning (e.g. abstract reasoning, planning, organizing), reduced speed of information processing and attention (Combs & Mueser, 2007; Sitskoorn, Aleman, Ebisch, Appels & Kahn, 2004; Sundet, 2011). This also seems to be the case in first episode psychosis patients (Carlsson et al., 2006).

The cognitive deficits are apparent at the first episode and roughly are equal to those observed in so-called chronic cases (Mesholam-Gately et al., 2009). It appears as if the impairment by nature is relatively stable over time, therefore some propose that it does not reflect a progressive deterioration, but rather an innate or early-acquired neurocognitive developmental disorder that serves as a risk factor which may lead to psychosis if the individual is exposed to a substantial amount of environmental stress (Sundet, 2011). This becomes evident through research focusing on the cognitive performances of non-affected relatives of patients with schizophrenia. A meta-analysis by Sitskoorn et al. (2004) concludes that the cognitive deficits found in patients with schizophrenia are also found in their non-affected relatives. A more recent study also noted more severe cognitive deficits in first-degree relatives compared to second-degree relatives primarily in domains involving psychomotor speed, memory, attention, reasoning, and social cognition (Keshavan et al., 2010). This study also noted reduced general intelligence. Thus, the cognitive impairments of schizophrenia are found in medicated as well as unmedicated, first-episode, remitted and high-risk individuals and are characterized by stability over time (Combs & Mueser, 2007; Keshavan et al., 2010; Mesholam-Gately et al., 2009). As mentioned above, the clinical relevance of studying cognitive impairments in schizophrenia stems from its considered contribution to treatment outcome and the observed social impairments of the disorder (Bora et al., 2009).

Social cognition is today considered to be a key determinant of the observed functional disability of schizophrenia patients (Green & Horan, 2010), which in turn has important implications for the development, course and outcome of the illness (Couture, Penn & Roberts, 2006). Impairments in social cognition in patients with schizophrenia are thought to provide a unique contribution to the impaired functioning, beyond that of the (nonsocial) neurocognition mentioned above. As with the global neurocognitive impairments described

above, impairment in social functioning is evident premorbid in those who later develop schizophrenia, and have also often been found in non-affected first-degree relatives of individuals with schizophrenia (Couture et al., 2006).

### **IQ in schizophrenia**

According to several meta-analyses, the most pronounced cognitive deficits in schizophrenia patients are evident in verbal learning, digit symbol coding, and general IQ (Bora et al., 2009). Over the last decades, IQ has been the most studied index in the pre-psychosis phase (Mesholam-Gately et al., 2009). Research has found that even years before the onset of any psychotic symptoms, schizophrenia patients demonstrate mean IQ scores approximately one-half of a standard deviation below healthy control individuals (Woodberry, Giuliano & Seidman, 2008). The research literature has several studies focusing on IQ as a risk factor or a predictor for the development of psychosis.

According to van Winkel et al. (2006) several longitudinal studies have shown that intellectual decline is present long before disease onset, and that this intellectual impairment may increase even more closer to disease onset. Mesholam-Gately et al. (2009) point to findings that show a larger IQ impairment in first episode patients compared to a premorbid measure, followed by deficit stability through later phases of illness measured at group level. Hence, the course after disease onset is much debated. In their meta-analysis, Woodberry et al. (2008) list three longitudinal studies that report a significant decline in IQ from premorbid to post-onset testing in schizophrenia patients, relative to a comparison group. These findings suggest deterioration between the premorbid phase and first episode. In their 10 years follow-up, van Winkel et al. (2006) also uncovered an IQ deterioration preceding the first hospitalization, and found no evidence for a deterioration of IQ after the first episode. Even in the low IQ group they found a stable course of IQ over the course of the illness (van Winkel et al., 2006).

Longitudinal studies indicate that a lower IQ score is associated with increased risk of schizophrenia, severe depression and non-affective psychoses (Zammit et al., 2004). A recent meta-analysis characterizes the risk of schizophrenia across the range of premorbid IQ, and also uncovers strong associations between premorbid IQ and risk for developing schizophrenia (Khandaker, Barnett, White & Jones, 2011). Risk for schizophrenia was not

restricted to the lower end of the intelligence spectrum. A linear relationship was observed, with the risk for schizophrenia increasing by 3,7% for every 1-point decrease in premorbid IQ. They also found that greater premorbid decrease in IQ was associated with earlier age of illness onset. No evidence of an increasing deficit during the premorbid period towards illness onset was discovered through the study. Based on their findings, they make the suggestion that higher IQ may serve as a protective factor in schizophrenia, hence making lower IQ a marker of increased risk of developing schizophrenia (Khandaker et al., 2011). Zammit et al. (2004) conclude that premorbid IQ is likely to be a risk factor for psychotic illnesses in general rather than for schizophrenia in particular, and that higher IQ score could be said to protect against psychotic illness.

In the study of van Winkel et al. (2006), low IQ in patients with schizophrenia was associated with structural brain abnormalities, cognitive impairments and negative symptoms. They found an improvement of cognition only in the high IQ group, suggesting that patients with higher premorbid IQ are likely to demonstrate higher levels of neuroplasticity than the patients with lower levels of premorbid IQ. The low IQ group shows no deterioration in cognition prior to or after the first psychotic episode, indicating a stable lower neurocognitive function overall. Furthermore, cognitive impairment is usually associated with poorer outcome (van Winkel et al., 2006). Many researchers stress the importance of identifying predictors of both illness and outcome at illness onset. One reason for this lies in the potential to shape early interventions (Leeson, Barnes, Hutton, Ron & Joyce, 2008). What is known about IQ as a prognostic variable for later outcome in schizophrenia and other forms of psychosis?

### **IQ as predictor of outcome**

Studies of established schizophrenia have consistently found that cognitive function predicts clinical and social outcome between 6 months and 15 years later (Leeson et al., 2008).

Studies of first-episode patients have also found premorbid IQ and IQ at first episode to be significant predictors of outcome in schizophrenia (Carlsson et al., 2006; van Winkel et al., 2007). Cognitive impairments noted at first hospitalization, including IQ measured by WAIS-R, have been found to significantly predict the functional outcome, superior in respect to diagnosis and ratings of symptoms and DUP (Carlsson et al., 2006).

Most studies in this research area have investigated the impact of specific domains of cognition, such as executive function, memory and attention. In their four-year study of first episode psychosis Leeson et al. (2008) tested the possibility that IQ as an index of general intelligence may serve as a more reliable and sensitive predictor of outcome in first-episode schizophrenia, than measures of specific abilities such as memory and executive functioning. Others make the notion that the use of estimated premorbid IQ serves as a more reliable predictor for later functional outcome than IQ at the first episode. This may be due to the heterogeneity in course of IQ, in other words, individual differences in intellectual deterioration in the period from premorbid level to time preceding the first hospitalization (van Winkel et al., 2007).

In sum IQ seems to be a stable trait, which impacts both clinical and social outcome in schizophrenia patients. It consistently serves as a sensitive and reliable cognitive predictor of later social and clinical outcome in the early stage of schizophrenia. How do these reported findings relate to insight in patients suffering from a psychotic disorder such as schizophrenia?

### **Neurocognition and insight in psychosis**

As mentioned earlier, it has been debated whether the reduced insight found in schizophrenia and psychosis in general is a sociocultural response, or a reflection of the well-known neurocognitive deficit characterizing a large number of the patients. There has been an increasing interest in research investigating the association between neurocognition and insight starting early in the 1930's, but the empirical testing of this potential causal relationship has only occurred over the past two decades (Aleman, Agrawal, Morgan & David, 2006). It has been proposed that impaired functioning of the prefrontal cortex (involved in mental flexibility, abstract reasoning, concept formation and self-reflection) may cause impaired insight. In this research the findings prove to be inconsistent, with some studies reporting significant associations between impaired insight and executive functioning, memory or attention, whereas other studies have not been able to produce the same significant associations (Aleman et al., 2006; Simon, De Hert, Wampers, Peuskens & van Winkel, 2009). Quee et al. (2010) points to a meta-analysis of such studies, which found that neurocognition had only a modest predictive value when it comes to insight.

In another meta-analysis by Aleman et al. (2006) they tested the hypothesis whether insight is related to general intelligence, e.g. IQ-score, or more specifically to prefrontal cognitive dysfunction, e.g. measured by the Wisconsin Card Sorting Test (WCST). They report a small statistically significant relationship between general cognitive functioning and insight, although the relationship between WCST-scores and insight was significantly stronger. These associations were slightly stronger in the schizophrenia group, than in patients with psychosis in general. As Aleman et al. (2006) state in their discussion of the associations, the findings support the neuropsychological hypothesis to impaired insight in schizophrenia and psychosis in general. On the other hand, Simon et al. (2009) did not find any other associations between insight and cognitive functioning than a subtle one (though significant) using the WCST, concluding that their findings suggest that other factors than cognition have greater impact on insight in patients with schizophrenia. Hence, the findings on the association between neurocognition and insight are somewhat inconsistent.

Whereas previous studies have assessed the relationship between insight and neurocognition, the relationship with social cognition is more rarely studied (Penn, Sanna & Roberts, 2008), although it has received more attention throughout the past decade. The findings are inconsistent. Some studies have reported relationships between social cognition and insight in psychosis, whereas others have not (Quee et al., 2010). Quee et al. (2010) also point out that most of the research on social cognition and insight has focused on whether there is a relationship or not, leaving the question of social cognitions contribution to explaining insight in psychosis an unanswered one. Research indicates only a modest association between neurocognition and social cognition, and there is general consensus that they are two related, but different constructs (Couture et al., 2006). Nevertheless, Quee et al. (2010) point out the importance of taking into account that the two are partially overlapping concepts, when investigating factors associated with insight.

## **Outcome in schizophrenia**

From the earlier dominating view of schizophrenia as a degenerative disease, to the recognition of neurocognitive contributions and the emergence of better psychological and psychopharmacological treatment procedures, it is clear that the outlook for individuals with schizophrenia have changed over the last decade. This has come partially due to changes in diagnostic criteria, but also as a consequence of findings from long – term follow up studies

which demonstrate better outcomes than previously thought possible (Harding & Zahniser, 1994; Harrow, Grossman, Jobe & Herbener, 2005; Torgalsbøen & Rund, 2010; Warner, 1994).

It was Kraepelin who first introduced the concept of recovery to the field of schizophrenia – research. With a definition of recovery defined as returning to a premorbid state with no signs of the illness, he found that 12,6 % of the patients diagnosed as having a dementia praecox achieved recovery (Kraepelin, 1896). Most of these patients relapsed within 1 or several years, however, suggesting a definite cure to be rare. Bleuler on the other hand, pointed to the heterogeneous nature of the disorder, and found that 60% of the patients he followed showed mild deterioration after their first episode of psychosis (Bleuler, 1908).

It has been suggested that the differences in prognosis might be related to the heterogeneity of the schizophrenia – spectrum disorders. That is, the type of schizophrenia with good prognosis seems to have different etiology than the schizophrenia that is referred to as a neurodevelopmental disorder (Murray, 1994). The latter is the disorder where alterations in brain structure and cognitive dysfunction are pronounced, symptoms that to a certain degree reflects Kraepelin’s initial description of the disease. Schizophrenia with good prognosis, on the other hand, is found to be heterogeneous in its form, unstable in course, the positive symptoms are dominant, and the etiology has much in common with that of affective psychosis (Murray et al. 1992). Other factors found to be related to good prognosis are good premorbid functioning, late onset, a traumatic incident as causative factor, good initial response to neuroleptics, continuous use of medication and good neurocognitive functioning (Frangou & Murray, 1996).

### **Defining outcome in schizophrenia**

Many individuals with schizophrenia raise the question as to whether or not they will recover from their illness, and several studies have pointed out the challenges research face when measuring outcome from mental illnesses (Emsley, Chiliza, Asmal & Lehloeny, 2011). Answering this question, however, has been complicated by the lack of consensus on the definition of the remission - state. The Remission in Schizophrenia Working Group was set together in April 2003 to develop a consensus definition of remission as applied to schizophrenia, based on their proven clinical and predictive validity (Andreasen et al., 2005).

The need for such a definition has come to pass because of last century's new expectations around the long - term course schizophrenia, including new progress on psychosocial and pharmacological therapies for psychotic disorders, new variable definitions of treatment outcome, and evidence that traditional predictions of generally poor outcome may have been overstated (Færden, Nesvåg & Marder, 2008). The consensus – based criteria are based on distinct thresholds for reaching and maintaining improvement, and represents an innovative approach for standardizing outcome measures. This symptom - based assessment is considered to provide the necessary objectivity, consistency and independence to enable clinicians and researchers to define remission after a first episode and subsequent psychotic episodes, as well as throughout periods of chronic, non – acute illness. The working group defined remission as a state of mild or less on core symptoms that are maintained for a minimum of 6 months. Furthermore, the group stated that remission is a necessary but not sufficient step toward recovery and that recovery is a more demanding term than remission (Andreasen et al. 2005).

Harding (1994) claims that using the terms outcome and end-state in schizophrenia might yield people to conclude regarding the potential for recovery. Thus, for a definition of recovery, it is important to keep in mind that recovery is not synonymous with cure, although these concepts are frequently being used (Torgalsbøen & Rund, 2010). Furthermore, an important consideration when formulating a concept of recovery from schizophrenia relates to the differences that researchers, clinicians and consumers of mental health services have in defining the term. Researchers often define recovery as an extended period of remission from psychotic symptoms. Clinicians, on the other hand, will focus on the improvements in global functioning when defining the term. Jacobson and Greenley (2001) argue that recovery is distinguished from cure by its endpoint, which is not necessarily a return to “normal” health and prior functioning, and also by its emphasis on the individual's active participation in self – help activities. In this view recovery is more of a matter of retaining a meaningful life within the limitations the disorder presents, which represents a shift from viewing the concept of recovery synonymous with cure, to a term describing relatively good outcome (Jacobsen & Greenley, 2001). In 2002, Liberman and colleagues proposed an operational definition of recovery in schizophrenia, based on several international studies (Liberman et al., 2002). The definition requires assessments of outcomes of symptomatology, vocational functioning, independent living, and social relationships, and argues for a moderate level of symptoms and

recovery for functioning. The key issue with such definitions is to promote replicable research on the subject with reliable outcome measures (Torgalsbøen & Rund, 2010).

Thus, in addition to being an outcome term, today recovery also refers to the regaining of a role in society and living well with a chronic illness despite a certain level of symptoms (Jacobson & Greenley, 2001; Torgalsbøen, 2005).

### **Insight as a predictor of outcome**

Since the emergence of more effective treatment strategies of schizophrenia from the 1960 's and onwards, attempts have been made to identify predictors of treatment outcome. The potential benefits for clinical practice are considerable, as early identification of people who respond poorly to treatment would allow for timely adjustments and modifications of treatment programs. Because identification of such predictors would target factors of risk and resilience, they might provide a better understanding of the underlying pathophysiology of the schizophrenia - spectrum disorders (Emsley, Chiliza & Schoeman, 2008). There are several reasons for the assumed connection between lack of insight and poor outcome. Most important is the assumption that insight might cause noncompliance with treatment because patients are not likely to comply with being treated for a problem that they do not believe to be either present, or psychiatric in cause (Lincoln, Lüllman & Rief, 2007). Subsequently, early research on the clinical relevance of poor insight in schizophrenia has associated it both with poor compliance and poor outcome (Shad, Keshavan & Tamminga et al, 2007).

In a study by Drake et al. (2007), the effect of insight on outcome was investigated in a sample of first – episode patients. Poor insight was found to significantly predict relapse and rehospitalizations at 18 – months follow – up, with poor recognition of symptoms being the aspect of poor insight best related to poor outcome. In a meta - analysis by Perkins, Boteva & Lieberman (2005), no link between poor insight, poor treatment adherence and poor outcome was found, indicating that the results from studies with insight as an outcome – predictor are inconsistent.

## **Purpose of the present study**

To sum up, many studies that have assessed insight in patients with psychosis report a relationship between poor insight and diagnosis of schizophrenia, more severe psychotic psychopathology, lower cognitive functioning, lower gray matter volumes and poor outcome (Parellada et al., 2011).

The concept of insight is clinically relevant because poor insight is associated with psychosocial dysfunction and poorer treatment adherence, as well as an increase in the number of rehospitalizations (Amador & David, 2004). Thus, investigating which factors are specifically related to poor insight is of crucial importance for understanding which factors might contribute to better prognosis, and for further development of treatment strategies.

Regarding the association between neurocognition and insight, the findings are somewhat inconsistent. Aleman et al. (2006) uncovered a small statistically significant relationship between general cognitive functioning and insight. Quee et al. (2010) have found that neurocognition only had a modest predictive value when it comes to insight, suggesting that other factors than cognition might have greater impact on insight in patients with schizophrenia (Simon et al., 2009). On the other hand, general intelligence represented by IQ seems to be a stable trait, which impacts both clinical and social outcome in schizophrenia patients. It consistently serves as a sensitive and reliable cognitive predictor of later social and clinical outcome in the early stage of schizophrenia (Leeson et al., 2008).

Several studies have pointed out poor insight to be a phenomenon that might predict remission and outcome (Arango & Amador, 2011; Schwartz, 1998). Research has paradoxically linked awareness of illness to both better functional outcomes and lesser hope and self - esteem (Lysaker, Roe & Yanos, 2007). Consensus based criteria for remission has been proposed, but the association of this definition with broader functional outcome has not yet been established in first – episode patients. Thus, due to the significance of diagnosis and treatment of schizophrenia, a critical look at the relationship between insight and outcome is warranted.

In this study our main aim is to explore to what degree insight in a group of first – episode patients changes from baseline to 1-year follow- up. In addition, we hope to discover patterns of insight change. Specifically the study is targeted at identifying variables that might be related to insight improvement, by exploring the relationship between insight, baseline IQ and remission in a group of first episode patients.

### **Hypotheses:**

- 1) Based on previous findings we expect baseline IQ to be positively correlated with degree of insight at six – months follow – up and one - year follow-up.
- 2) We expect to find a positive correlation between IQ and degree of remission after six months and one year.
- 3) Degree of insight is expected to be positively correlated with remission after six – months and 1-year follow-up.
- 4) We expect to find an increased degree of insight after six months and one year compared to insight measures at baseline.

Evidence supports the important role of illness state and individual characteristics for insight. Insight has, however, shown a pattern of apparently contradictory associations with outcome. By exploring each of the variable’s unique contribution to insight, we’re hoping to see how they might explain the degree of remission after one year. This will give us a basis for discussing the possible implications for treatment of this group of patients.

## **Methods**

Our study is a part of a larger research project at the Department of Psychology, University of Oslo, with Anne-Kari Torgalsbøen as the principal investigator. This is a prospective, longitudinal study, which investigates the stability and rate of full recovery in a group of patients with schizophrenia over a 10 – year course. How and when remission and full recovery occurs, and possible predictors such as neurocognition and resilience are studied. A feedback comprising the results of the neuropsychological testing and the resilience scales are given to the patient's therapist from baseline assessments. Written informed consent is obtained, and the study has been approved by the Regional Committee for Medical Research Ethics (REK).

Over a period of four years (2007 – 2011), 28 recent onset patients were referred to the study. Neurocognitive function is assessed at baseline, at 6 months, and thereafter once a year for a planned period of 10 years. The Norwegian version of the MATRICS Consensus Cognitive Battery (MCCB) (Nuechterlein & Green, 2006) is used to assess neurocognitive function. The MCCB consists of 10 tests that assess seven cognitive domains: Speed of processing, attention/vigilance, working memory (nonverbal/verbal), verbal learning, visual learning, reasoning, problem solving and social cognition. General intellectual function is assessed using the Norwegian version of the Wechsler Abbreviated Scale of Intelligence (WASI) (Bosnes, 2009). In our study we use data from baseline assessments, from the 6 months and 1 - year follow up.

### **Subjects**

The participants have been recruited from psychosis - sections in Vestre Viken Health – Care Unit and Lovisenberg hospital. The possible participants were referred to the study by their therapists within five months after starting treatment. The candidates were first – episode psychosis patients with a diagnosis within the schizophrenia – spectrum according to the diagnostic criteria in DSM – IV (APA, 2000), and were required to be minimum 18 years old. Exclusion – criteria were affective disorders, IQ below 70 and head trauma. The control group consists of healthy controls that are matched pairwise with the patient-group on important demographic variables such as gender, age and education. The mean age at baseline was 21.08 years, ranging from 18 to 27 years with a standard deviation of 2.58. At

baseline the distribution of participants were: paranoid schizophrenia 25%, schizo – affective disorder 25%, schizophrenia 20.8%, disorganized schizophrenia 8.3%, schizophreniform disorder 12.5%, schizophrenia, residual type 8.3%. The distribution of highest completed level of education at baseline was: secondary school 37.5%, upper secondary 33.3%, started higher education 25% and master’s degree 4.2%.

## **Clinical assessments**

### *Insight*

As mentioned above, the participants in the patient-group were admitted to the project shortly after their first hospitalization. At the time of admission they signed an informed consent form, and a clinical interview was performed. Subsequently they were assessed for the presence or absence of illness symptoms, level of neurocognitive function and resilience. The degree of symptoms was measured with the Structured Clinical Interview for the Positive and Negative Syndrome Scale (SCI-PANSS), a comprehensive assessment of the symptoms of schizophrenia. PANSS is widely used in clinical settings as well as research settings, and is regarded as a reliable measure of symptom assessment (Emsley, Rabinowitz & Torremans, 2003). The scale consists of 30 items divided into three subscales: the positive subscale, the negative subscale and the general psychopathology subscale. As poor insight is considered a core symptom of schizophrenia (Carroll et al., 1998; Gharabawi, Lasser, Bossie, Zhu & Amador, 2006), one item of particular interest in this thesis is G12 “impaired insight and judgement”. The G12 rating considers multiple components consisting of awareness of the disorder, recognition of positive and/or negative symptoms, and awareness of the need for treatment (Gharabawi et al., 2006). This item is rated from 1 (corresponds to “no impairment”) to 7 (corresponds to “severe impairment”). A score greater than, or equal to 4 on the G12 on the PANSS, was used to define lack of insight. This cut - off score is consistent with previous studies that measured insight using the PANSS (Lysaker et al., 1999; Mintz et al., 2004). PANSS is administrated at baseline, after six months, and then subsequently once a year over a 10-year period. In this thesis we will apply data from the patient group at baseline, 6 months and from the 1 year follow-up.

### *The criteria for remission*

The definition for remission as suggested by the Remission in Schizophrenia Working Group will be used as a marker in the course, as it is the result of a consensus definition with reasonable clinical and predictive validity (Andreasen et al., 2005). The criteria for remission in schizophrenia are based on an evaluation of the following 8 groups of symptoms as presented in the PANSS: P1 (delusions), G9 (unusual thought content), P3 (hallucinatory behaviour), P2 (conceptual disorganization), G5 (mannerisms and posturing), N1 (blunted affect), N4 (social and emotional withdrawal) and N6 (lack of spontaneity). The cut - off score in these items are set to 3 or less, indicating that the score must be mild or absent. A 1 – 7 range for each item is used, with a duration of 6 months as a minimum threshold.

## **Neuropsychological assessments**

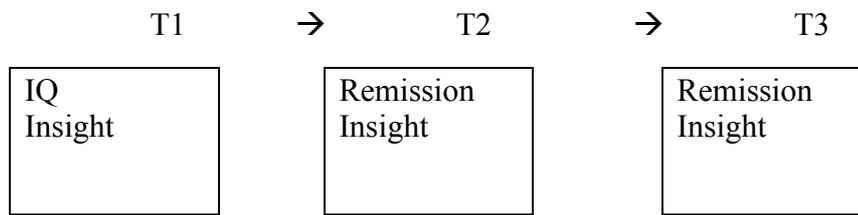
### *Intellectual assessment*

The IQ-scores used in the analyses of our study were assessed in both patient and control group at baseline using the Norwegian research version of the Wechsler Abbreviated Scale of Intelligence. This version was developed in 2001, and has been commercially available in Norway since 2007 (Bosnes, 2009). The scoring of the Norwegian version of the WASI is based on American norms, as Norwegian norms have yet to be established for both WASI and WAIS-III. First introduced in 1999, the WASI is an individually administered intelligence test (WASI) consisting of four subtests: Vocabulary, Block Design, Similarities and Matrix Reasoning (Wechsler, 1999). These four subtests assess various aspects of intelligence, respectively fluid and crystallized intelligence, as well as verbal knowledge and nonverbal reasoning. Together the four subtests are used to develop a Full Scale IQ. Total IQ, Verbal IQ and Functional IQ in the WASI all have a mean standard score of 100, with a standard deviation of 15 (Stano, 2004). One study on 50 patients who completed both tests showed only a 0.7 IQ points difference in total performance on the WASI and the WAIS-III, indicating that the Norwegian version of the four subtests abbreviated scale is a safe procedure to estimate general intellectual level (Bosnes, 2009).

## **Design**

In our study we use data from baseline (T1) assessments, six – months assessments (T2), and one – year follow – up (T3). Due to the nature of the statistical analysis, we only included the

subjects who completed assessments at all three times. Consequently, out of the total of 28 patients, we have excluded four from our analysis, leaving us with a total sample of 24.



*Figure 1.* Design of the study

### *Insight*

The PANSS G12 was used as an observer – rated measure of insight. The scores range from 1 to 7, with a score of 1 indicating that the symptom is absent. The insight scale is inverted; hence, higher scores on the G12 item indicate poorer insight. Insight was measured at baseline, after six months and after one – year, as illustrated in figure 1.

### *IQ*

Intellectual function is measured with WASI, as is a continuous variable. IQ was measured at baseline, and compared to measures of insight and remission at the different points of time.

### *Remission*

Since a premise for participation in the study was classification of a recent first – episode psychosis, remission was measured only at the six months follow – up and at the one – year follow – up. Remission has been chosen as the outcome – variable, with the consensus – based criteria for remission as a theoretical foundation. Accordingly, remission was defined by using an absolute threshold of severity of the diagnostic symptoms of schizophrenia, rather than improvements from baseline. The shift in characterizing improvement through means of threshold criteria permits direct comparisons across groups (Andreasen et al., 2005). Thus, our dependent variable is categorical, dividing our sample into either in remission – group, or not in remission – group. Despite that many challenges have been pointed out regarding the use of statistical analysis with dichotomous variables (MacCallum, Zhang, Preacher & Rucker, 2002), it can be argued that it is of clinical relevance to our sample of patients.

## Statistical analyses

The statistical analyses were conducted by using the computer program Predictive Analytics SoftWare Statistic 18 for Windows (PASW). Descriptive analyses were performed to map the distribution of data on different variables and checking for outliers. The relationship between insight, IQ and remission was assessed by using the Pearson's product – moment correlational analysis. The strength of the relationship between our variables is interpreted by using guidelines suggested by Cohen (1988), as shown in the table below.

Table 1

### *Guidelines for interpreting the Pearson's product moment coefficient*

small	$r = .10 \text{ to } .29 \text{ or } -.10 \text{ to } -.29$
medium	$r = .30 \text{ to } .49 \text{ or } -.30 \text{ to } -.49$
large	$r = .50 \text{ to } 1.0 \text{ or } -.50 \text{ to } -1.0$

From the correlations we have calculated the amount of shared variance ( $r^2$ ). This value represents the proportion of variance in the outcome variable that is explained, or shared, by the independent variable. To investigate whether there are significant differences in the mean scores on the insight variable across time, one – way ANOVA was used. To determine where these differences are, Tukey HSD multiple comparison post – hoc tests were conducted. Post - hoc tests are designed to help protect against the likelihood of a Type I – error (Pallant, 2005). As our outcome variable is categorical, logistic regression would have been the preferred statistical technique to test the predictive power of insight and IQ on remission. However, this method requires that the sample consist of a minimum of 10 to 15 cases per variable (Babyak, 2004), a criteria not fulfilled in our data.

### *Statistical power*

The aim of this explorative study is to uncover tendencies in a small patient group. Since small samples provide less statistical power, the risk of incorrectly accepting the null hypothesis increases (Cohen, 1988). Due to the fact that this study is a part of a larger, ongoing longitudinal research project where subjects are interviewed and assessed at different

time points, it was not possible to acquire more participants for our thesis. The findings will therefore only indicate potential tendencies, rather than significant relationships. One way to compensate for a small group size is to adjust the alpha – level, e.g. by setting the cut – off level to .10 or .15, as opposed to the traditional .05 level (Cohen, 1990). However, adjusting the alpha - level in our data proved not to constitute any difference to the statistical significance. Effect – sizes were determined by interpreting the strength of the amount of shared variance ( $r^2$ ). The guidelines for interpreting the  $r^2$  value are: .20 and below is considered a small effect, values around .50 equals a moderate effect, values of .80 or above equals a large effect (Cohen, 1988).

### *Normality and outliers*

Statistical analyses were applied to assess the normality of the variables. The normal Q-Q plot shows a reasonably straight line with no clustering of points, with most collecting around the zero – line, as illustrated in figure 2. This suggests a normal distribution of IQ – scores. Kolmogorov – Smirnov – test of normality also indicates a normality of the distribution of IQ - scores, as the Sig value is .200. Insight and remission are variables not expected to be normally distributed.

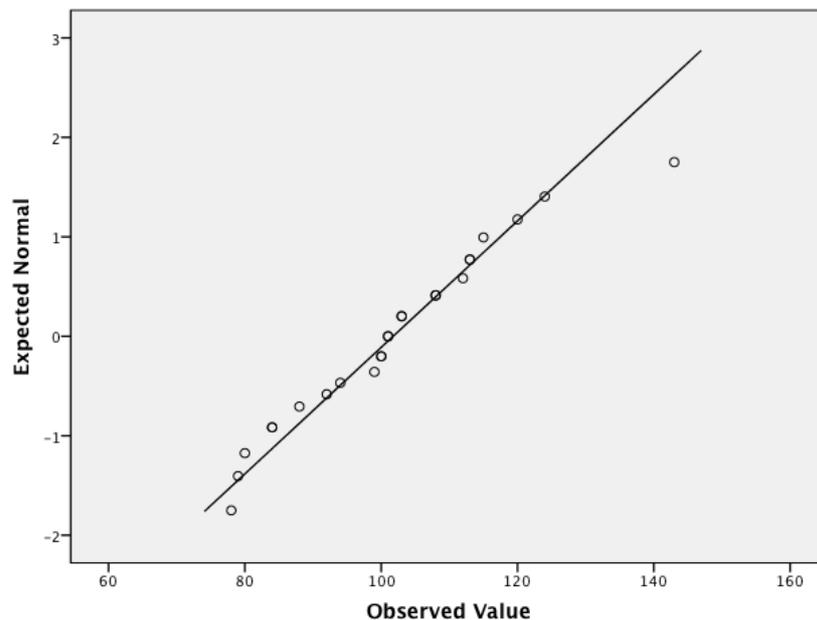


Figure 2. Normal Q-Q Plot of WASI: IQ

Many statistical techniques are sensitive to outliers. As our dataset on IQ – scores contain two scores that deviate somewhat from the mean, we did an outlier analysis on the IQ – measure to check how much of a problem these outlying cases are likely to be. When comparing the original mean and the new, trimmed mean as illustrated in table 2, we see that the more extreme scores have insignificant influence on the mean. We therefore retain these cases in the data file.

Table 2

*Outlier analysis of the IQ measure*

		Statistic	Std. Error
Mean		101.75	3.21018
95 % Confidence interval for mean	Lower bound	95.11	
	Upper bound	108.39	
5 % Trimmed mean		100.94	
Median		101.00	

# Results

## Descriptives

The range of IQ scores has a difference of 65 points. However, as table 3 shows, these outlying scores do not influence the mean score. By convention, the mean in the standardization sample is set to an IQ score of 100, and the standard deviation is set to 15 IQ points (Wechsler. 1999). When comparing our distributional data with these standards, our sample provides us with satisfactory data for the statistical analyses we have selected.

Table 3

*Distributional data for IQ scores (N=24) measured at T1*

	Minimum	Maximum	Mean	Std. deviation
IQ - score	78	143	101.75	15.73

Table 4 shows the number of patients distributed on score 1 to 4 on the G12 of the PANSS from baseline to one – year follow – up (T1 – T3). As the insight values are inverted, however, this implies that there has been an increase in mean insight – level from inclusion until one – year testing. At baseline 83,3% demonstrated good insight (n = 20), while 16,7% exhibited impaired insight (n = 4). At six - months and at one - year follow-up, 100% demonstrated good insight (n = 24), hence, none of the individuals showed lack of insight.

Table 4

*Distribution of patients (N=24) on the PANSS G12 insight scale at baseline, after six months and after one year (T1, T2, T3)*

Time	Score 1	Score 2	Score 3	Score 4	Mean score	St.deviation
T1	9	5	6	4	2.21	1.14
T2	15	7	2		1.46	.66
T3	15	6	3		1.50	.72

As figure 3 illustrates, the mean insight score decreases from baseline to six months follow up, and slightly increases from six - months follow – up to one – year follow up.

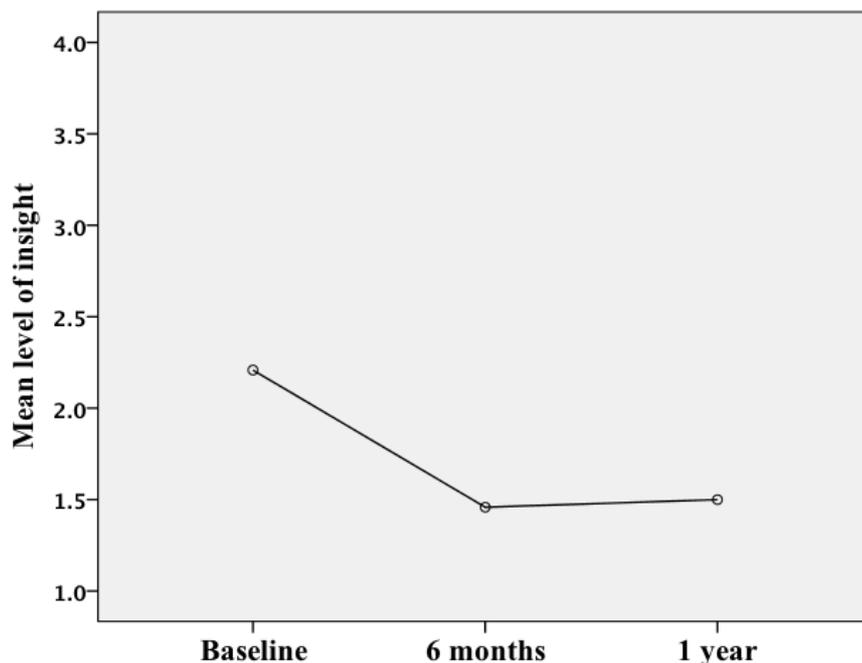


Figure 3. Change in mean insight level over 12 months

The number of patients in the remission – group increases from six – months follow – up to one – year follow – up, as demonstrated in table 5. At one –year follow-up only three individuals are not in remission.

Table 5

Number of subjects in remission at six – months (T1) and one – year follow – up (T3).

Time	Remission	Frequency
T2	In remission	16
	Not in remission	8
T3	In remission	21
	Not in remission	3

## The relationship between IQ, insight and remission

As illustrated in table 6, the correlation analysis indicates a small, positive correlation between baseline IQ scores and insight measured at the three different times, as the values on the insight scale are inverted (1 equals that the symptom of lack of insight is absent). IQ-score are also moderately correlated with remission at six months and at one year. The results also show small correlations between insight and remission measured at the different time points. The correlation between remission at six months follow – up and remission at one year follow – up indicate a small, positive relationship. However, none of these correlations are statistically significant. The correlation analysis reveals one statistically significant result, namely the correlation between insight measured at six months and insight measured at one year.

Table 6

*Correlations between measures of insight, IQ and remission*

Measure	Insight at baseline	Insight at 6 months	Insight at 1-year follow-up	Remission at 6 months	Remission at 1-year follow-up
IQ – score	-.22	-.26	-.26	.35	-.34
Insight at baseline		.39	.24	-.19	.18
Insight at 6 months			.50*	-.05	.27
Insight at 1-year follow-up				-.13	.09
Remission at 6 months					.27

*Note. \*p<.01, \*\*p<.001*

As presented in table 7, the amount of shared variance between baseline IQ and insight ranges from 5% to 7%. According to Cohen (1988), this is a very small effect.

Table 7

*Amount of shared variance between baseline IQ and insight at T1, T2 and T3*

Measures	r	r <sup>2</sup>
IQ- remission T2	.35	.12
IQ- remission T3	-.34	.12

Table 8 demonstrates the amount of shared variance between baseline IQ and remission after six months and one year. At both points of time, the amount of shared variance is 12%, suggesting a small effect.

Table 8

*Amount of shared variance between baseline IQ and remission at T1 and T2*

Measures	r	r <sup>2</sup>
IQ- insight T1	-.22	.05
IQ- insight T2	-.26	.07
IQ- insight T3	-.26	.07

As table 9 shows, the amount of shared variance between insight and remission at the different points of time ranges from 0 to 7%, once again, indicating very small effects.

Table 9

*Amount of shared variance between insight and remission between T1, T2 and time T3.*

Measures	r	r <sup>2</sup>
Insight T1-remission T2	-.19	.04
Insight T1-remission T3	.18	.03
Insight T2-remission T2	-.05	.00
Insight T2-remission T3	.27	.07
Insight T3-remission T2	-.13	.02
Insight T3-remission T3	.09	.01

### **Change in insight measures from baseline to one – year follow – up**

The one - way between – groups ANOVA was conducted to determine change in insight over time. The results as presented in table 10 indicate that there is a statistically significant difference among the mean scores on the insight variable for the three time measures.

Table 10

*Oneway ANOVA dependent variable: insight*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.528	2	4.264	5.667	.005
Within Groups	51.917	69	.752		
Total	60.444	71			

Having achieved a statistically significant difference, we can now look at the results from the post hoc test in table 11. The statistical significance of the differences between each pair of time points is provided in table 11. The post – hoc test reveals that the difference in the insight – measures between T1 and T2 and between T1 and T3 is statistically significant ( $p =$

< .05). That is, the insight scores differ significantly between baseline and six – months follow – up, and between baseline and one – year follow – up.

Table 11

*Post hoc test of the differences between each pair of time points.*

(a) Time	(b) Time	Mean Difference (a-b)	Std. Error	Sig.
1	2	.75000*	.25040	.011
2	3	-.04167	.25040	.985
1	3	.70833*	.25040	.017

By calculating the eta squared, we found the effect size for the ANOVA results in Cohen’s (1988) terms to be considered a large effect size, as shown in table 12.

Table 12

*Calculation of the effect size from the ANOVA results*

$$.141 \text{ (Eta squared)} = \frac{8.538 \text{ (Sum of squares between-groups)}}{60.444 \text{ (Total sum of squares)}}$$

## Discussion

### The relationship between IQ and insight

The assumed relationship between insight scores and IQ scores in our study were examined by using Pearson's correlations. The results from the analysis indicate a small positive correlation between IQ and insight at the different points in time (respectively  $r = -.22$ ,  $r = -.26$ , and  $r = -.26$ ). This suggests that in our sample, there is a small tendency that patients with a higher IQ score at baseline were more likely to demonstrate an increased level of insight after six months, and one year after admission to the study. Although this is a finding that supports our hypothesis that baseline IQ is positively correlated with degree of insight at six-months follow-up and at the one-year follow-up, it is not statistically significant. Thus, the positive relationship indicated may be coincidental. Several factors may underlie the insufficient statistical significance, with the sample size being one of the more prominent. This matter will be brought up in a subsequent segment in the discussion. When dealing with correlations of these sizes, which in addition are not statistically significant, one should be cautious about drawing any conclusions.

The explained variance of baseline IQ in insight levels at baseline is  $r^2 = .05$ . Hence, roughly 5 % of the variation in insight measures is explained by differences in IQ. After six months the amount of shared variance is approximately 7%, and at the one-year follow-up the amount is also 7%. According to Cohen (1988), this is a rather small effect, suggesting that other factors than IQ contributes to the variation in insight levels in our group of patients with first-episode psychosis. The notion of other important influences on insight levels provides a temporary explanation for why some individuals with psychosis with high cognitive functioning can display poor insight into own illness, and the contrary for some individuals with low cognitive functioning.

Whereas others have successfully used measures of premorbid IQ in their study (David, Buchanan, Reed & Almeida, 1992; David, van Os, Harvey, Foerster & Fahy, 1995), it can be debated whether our analysis on insight and IQ were performed on data collected too early in the course of the patients with first-episode psychosis. According to Leeson and associates (2008) IQ consistently serves as a sensitive and reliable cognitive predictor of later social and

clinical outcome even in the early stage of schizophrenia. Parellada et al. (2011) also illustrate that baseline IQ is a consistent predictor of several domains of long-term insight.

As previously mentioned, the relationship between cognition and insight has produced inconsistent results (Aleman et al., 2006; Cooke et al., 2007; David et al., 1992; Kemp & David, 1996; Simon et al., 2009; Quee et al. 2010). This inconsistency could stem from many factors. Kemp and David (1996) list three possible reasons for this inconsistency: 1) insight is not a unitary concept, 2) that studies vary in sample composition, choice of measurements, and 3) that the psychological factors underlying insight may not be static but vary along with other psychopathological parameters.

Can we assume that there is a linear relationship between IQ and insight? Despite lack of statistical significance, our finding seems to indicate a trend that is consistent with some previous reports of baseline IQ as one of the more robust variables in explaining different aspects of insight in follow-up studies (Arango & Amador, 2011; Parellada et al., 2011). There seems to be a consensus in research that neurocognitive impairment and insight in psychosis are associated variables, however the nature of their relationship has yet to be determined.

As Kemp and David (1996) note, the lack of any striking results regarding the relationship between insight and cognitive impairment argues against a simple hypothesis of lack of insight as a neuropsychological deficit. Our findings seem to support the view that the relationship between neurocognition and insight may be complex, and may consist of an interaction between cognitive abilities and other factors. Cooke et al. (2007) propose that one such interaction might occur between cognitive ability and the way a person copes with psychosis. They suggest that poor insight, especially in those with high intellectual functioning, may be adaptive and serve as protection against a drop in their self-esteem.

### **The relationship between IQ and remission**

Baseline IQ-scores were moderately correlated with remission after six months and at the one-year follow-up. The correlation with remission is positive at the six-month follow-up, but at the one-year follow up, the correlation coefficient is negative. Both of these correlations failed to attain statistical significance. When taken into account that the correlations change

direction between the six- month follow-up and the one-year follow-up, and fail to attain statistical significance, this strongly suggests that the results have occurred by chance. The results of our analysis on IQ and remission therefore offer little support to our hypothesis that there is a positive correlation between the two variables at the different time points.

The amount of shared variance for the correlation between baseline IQ and remission at six months is  $r^2 = .12$ , converted into percentage this tells us that baseline IQ explains 12% of the variance in remission after six months. The amount of shared variance between baseline IQ and remission at the one-year follow-up is  $r^2 = .12$ . Converted into percent this tells us that baseline IQ explains 12% of the variance in remission at the one-year follow-up. Thus, approximately 12% of the variance in remission scores is related to individual differences in IQ-scores. According to Cohen (1988) this is rather small effect.

As previously mentioned, the clinical relevance of studying neurocognitive measures such as IQ in patients with psychosis arises from an assumed contribution to treatment outcome, and the observed social impairments of the disorder (Bora et al., 2009). What is said about the predictive value of IQ in remission?

In the research literature, the value of IQ as a predictor of outcome is not clear (Emsley, Chiliza & Schoeman, 2008). Good neurocognitive functioning is often associated with the “good prognosis” group of patients with schizophrenia (Frangou & Murray, 1996). This group in general demonstrates higher rates of remission. It is however not a uniform finding. Emsley et al. (2008) offer an explanation for this controversy by noting the existence of individual differences in the rate of cognitive decline before the first hospitalization. Studies of first-episode psychosis patients have found IQ measured at the time of the first episode to be significant predictors of outcome in schizophrenia (Carlsson et al., 2006; van Winkel et al., 2007). Van Winkel et al. (2007) indicate that an estimate of premorbid IQ may serve as a more reliable predictor for later outcome than IQ measured at the time of the first psychotic episode. They found functional outcome to be associated with premorbid IQ-levels but not with IQ assessed at the time of the first hospitalization when following a group of first episode patients over a course of 10 years. In our measurement of intellectual functioning, we did not assess for premorbid functioning, which might be considered a limitation in our study. Another 2-year follow-up study however, found that the predictive value of cognitive performance assessed at baseline with regard to clinical outcome was statistically significant,

and that cognitive performance strongly predicted work performance (Holthausen et al., 2007).

The literature demonstrates inconsistent findings when it comes to IQ as a predictor of outcome and remission in psychosis, and our results do not provide more clarification on the matter.

### **The relationship between insight and remission**

The data from our statistical analysis regarding the relationship between insight and remission reveals no statistically significant results, and only weak correlations, ranging from  $r = -.05$  –  $r = .27$ . The correlations between insight at all three time points and remission at six months indicate that there is a small, positive relationship, meaning that there is a slight tendency for the rates of remission to increase with improved insight scores. The correlations between insight and remission at one – year follow – up indicate that as rates of remission increases, degree of insight decreases – though not above the level of impairment. However, the strength of the correlations is weak, and failed to achieve statistical significance. Hence, there is a risk that the results are coincidental. In addition, the analysis of variance showed that at the highest, only 7% of the change in remission is likely to have been caused by changes in insight. The results therefore offer little support to the hypothesis that degree of insight is positively correlated with remission after six months, and at the 1-year follow up.

Descriptive statistics show that at one year follow up, only 3 subjects are not in remission, and all subjects have good insight. This indicates that at least for these three patients, insight is less likely to have been a causal factor in determining the state of remission after one year. Nevertheless, 3 is a too small number to be comparable with the in – remission – group, as will be discussed later in the paper. The correlational analysis will not provide us with information concerning causation of the relationship, but given the high number of patients in remission, it is worth noting that in our sample all subjects demonstrate relatively high levels of insight from baseline onwards, and that 83, 3%, all with increased or maintained levels of insight, are in a state of remission after one year.

Hence, although the results only reveal weak tendencies towards a positive relationship between insight and outcome after one year, our study reveals intriguing results regarding the

degree of remission for our sample of first – episode patients. Already after six months, 16 of the 24 subjects have been classified as in remission. Studies investigating remission in larger first – episode cohorts based on the criteria proposed by the Remission in Schizophrenia Working Group have found mixed results, with rates of remission ranging from 17 to 88 % (Emsley et al. 2007; Emsley et al., 2011). This is in line with results from long – term follow – up studies that have demonstrated better outcomes than indicated by earlier studies (Harding & Zahniser, 1994; Harrow et al., 2005; Torgalsbøen & Rund, 2010; Warner, 1994).

The poor long – term course of schizophrenia has been characterized by reduced social and occupational functioning, loss of independent living, impaired quality of life, substance abuse and increased risk of suicidal and violent behavior. Evidence from previous studies has proved unclear, but many clinicians believe that poor insight is partially responsible for the negative functional and symptomatic prognosis (Lincoln, Lüllman & Rief, 2007).

Even though the topic of lack of insight has been increasingly present in the literature on schizophrenia in the last couple of years, questions still remain concerning the prognostic value of degree of insight. In an early study by Heinrichs, Cohen and Carpenter (1985), it was reported that early insight predicts better resolution of relapse on an outpatient basis without the need for rehospitalization in patients with schizophrenia. This is in line with views that consider increasing insight as an early intervention strategy as an important step towards facilitating successful treatment (Emsley, Chiliza & Schoeman, 2008; Shad et al., 2007; Schwartz, 1998).

Accordingly, more recent research suggests that good insight in patients correlates with superior adjustment after being hospitalized and discharged, as well as drug response – and compliance in aftercare (Arango & Amador, 2011).

However, it is important to note that studies exploring the impact of insight on outcome have focused on different components. In a meta – analysis among 13 cross – sectional studies, 8 studies found degree of insight at baseline to be associated with functioning, whereas 5 studies did not find any associations (Lincoln et al., 2007). Similarly, in a meta – analysis Perkins and colleagues (2005) reported no associations between poor insight and poor outcome. In a review by Emsley et al. (2007), however, factors found to predict remission were better premorbid adjustment, shorter duration of untreated psychosis, lower baseline levels of symptoms and better insight. In the same review, insight, together with early

treatment response and DUP, is underlined as a particularly important predictor of long – term outcome.

One possible explanation for the inconsistent results regarding insight as a predictor of outcome, and thus, the nonsignificant results from the present study, is that the long – term relationship between insight and functional outcome might be mediated by symptom severity. A study by Lincoln et al (2007) showed that higher baseline insight is associated with less symptoms and fewer rehospitalizations at follow – up and this might explain better functioning.

Recently, studies have begun to investigate the influence of severity of psychotic symptoms on insight of patients with a first – episode psychosis to determine which aspects of psychopathology are associated with longitudinal course. Results are inconsistent, but in one large study by Saaedi, Addington & Addington (2007), patients with good insight showed fewer positive and negative symptoms at each assessment, and higher depression at baseline. The first finding is consistent with theories of insight deteriorating with psychotic symptom increase (Amador & David, 1998), and the latter with the defense theory of insight (McGorry & McConville, 1999; Startup, 1996). In another study by Mintz et al (2004), the main finding was that patients who showed persistent good insight or whose insight improved over 12 months had greater improvement on positive symptoms compared to patients where poor insight was maintained.

In our study, the psychopathological correlates of insight have not been identified, but they are expected to be absent or small in the remissive state. So, the findings mentioned above are worth noting because they indicate that the clinical state of patients might be correlated with patterns of insight change.

### **Improvements of insight from baseline to one – year follow up**

Data from our analysis discover an increase in insight measured with the PANSS G12 item from baseline to six months, and from baseline to one – year follow- up. This confirms our main hypothesis expecting increased levels of insight from a first – episode psychosis and after one – year. The one – way ANOVA indicates that the change in insight scores is

statistically significant between T1 and T2, and between T1 and T3, meaning that the mean score at T2 and T3 is distinct from the mean score at T1.

In addition to having obtained a statistically significant result, a large effect size was found ( $\eta = .14$ ), despite the fact that the actual difference in the mean insight scores between the time points was very small.

In our sample, descriptive statistics reveal that the average insight – scores on the PANSS G12 item is below 3 (mean: 2,21) at T1. This demonstrates a relatively high degree of insight at baseline for our sample, with only 4 subjects above the cut – off score ( $>3$ ) of impaired insight at baseline. Put differently, the study indicates that 83,3 % of our first – episode patients demonstrated good insight at the initial assessment, with no scores above cut - off at six – months and 1 – year assessment. From T1 to T2, there is a slight decrease in insight – scores, but not above level of impairment. This implies that one subject has been rated one score higher (and thus, as having lower level of insight) compared to T2. The change in insight from T2 to T3 proved not to be statistically significant with the ANOVA.

Poor insight is a cardinal feature of schizophrenia – spectrum disorders, and is one of the most frequently observed symptoms of acute schizophrenia (Crumlish et al, 2005). It is now recognized that the concept of having insight into having a mental disorder is not “all or nothing”, a notion that is reflected in the 1 - 7 scoring system of the G 12 item of the PANSS. The relatively modest fluctuations in change of insight in our sample can be seen as a reflection of the low sample – size and its distribution on the insight scale. However, although our sample demonstrated relatively good levels of insight at baseline, it is important to keep in mind that maintenance of insight into having a mental disorder might be just as important as the improvements itself.

Moreover, it can be argued that the change in insight from baseline, however small, is clinically relevant for our sample of patients, and thus is a meaningful starting point for discussing the significance of the insight – measure for this patient – group. The findings contrast with earlier first – episode studies that reported less than half of their samples demonstrated good insight (Fennig et al, 1996), and studies suggesting that first – episode patients are less aware of having a mental illness than multiple – episode patients (Parellada et al, 2011; Thompson et al, 2001). Most studies, however, have found insight to improve

over the course of time (Crumlish et al., 2005; McEvoy et al, 2006). As addressed in the introduction, various theories have been proposed to account for poor insight in schizophrenia, and the matter is still being investigated and debated (Arango & Amador, 2011).

An interesting finding from some previous studies is that higher levels of insight is associated with less severe psychopathology (Mintz et al., 2004; Saaedi et al.,2007) These correlational studies do not imply causality, but can be seen as reflecting the complexity of the psychotic process. Thus, one may speculate that the psychotic process itself interfere with the individual's capacity to evaluate one's own condition realistically (Amador & David, 1998). Other studies have found level of psychotic symptoms not to be predictive of poor insight at 6 month follow-up (Fennig et al., 1996), but it is still possible that reduced insight is a reflection of psychotic symptom severity (Mintz et al., 2004). In our study the severity of psychotic symptoms were not investigated, but the possible connection also mentioned in the previous section is still worth stressing because it might be one of the reasons explaining the high level of preserved insight for our patient group.

Several possible explanations for the inconsistent findings emerge. The complexity of the insight phenomenon might reflect the possible existence of different types of insight impairments. Examples include a neurocognitive – based impairment, or a denial of reality that acts as a psychological defense mechanism designed to protect against general symptomology such as depression (Smith et al., 2004). A study by Gilleen, Greenwood & David (2011) demonstrated that awareness of functioning in each domain of insight was largely independent and was predicted by different factors. Accordingly, an interesting line of research has opened up, namely investigating fractionations across different dimensions of insight. This fractionation includes awareness of mental illness, treatment compliance and different aspects of cognitive functioning (Gilleen et al., 2011). Another question is whether one should address the awareness of different types of symptoms. The PANSS G12 item is based on an assessment of global symptom levels, but it is possible that awareness of positive symptoms such as hallucinations and delusions is fundamentally different from awareness of negative symptoms such as flat affect or curbing of interest (Smith et al., 2004).

In a study examining the evidence between the theories that dominate the literature on poor insight in psychosis, it is suggested that an integration of these is necessary for a fuller understanding of the complexity of insight (Cooke, Peters, Kuipers & Kumari, 2005).

## **Limitations of the present study**

One of the main limitations of this study is the low sample size. With small samples, it is difficult to detect statistically significant differences between groups (Pallant, 2005). In our study, we compared a group consisting of 3 patients not in remission, to a group of 21 in remission at one – year follow – up. This is not considered “fair play” when comparing means, and in addition rules out the statistical analysis most widely used when predicting outcomes. By using logistic regression we would have been able to test the predictive power of insight and intellectual functioning, and assess the relative contribution of each individual variable on remission.

Despite lack of statistically significant results regarding the relationships between insight, IQ and remission, there is evidence that indicates that a larger sample size would have yielded more statistically significant results. Similarly, the generalizability of our significant result regarding change in insight is limited by the small sample size. However, we have chosen to discuss the non – significant results as indications, with caution that the results have an increased probability of having occurred by chance. In addition, in our discussion of the results we have chosen to focus on the clinical relevance for our sample of patients.

The importance of statistical significance set aside, the strategy of using correlations does not provide us with any information on the direction of the proposed linear relationship between insight and IQ (Pallant, 2005). We can therefore only speculate about any underlying causation, and if any, what the direction of the relationship is.

Pallant (2005) suggest that one should be cautious when interpreting correlation coefficients, especially in studies with small samples. The significance of the Pearson’s  $r$  is strongly influenced by the size of the sample. A moderate correlation in a small sample may not reach statistical significance at the  $p < .05$  level, but very small correlations in a large sample might. In small samples like ours, it is therefore often suggested that statistical significance should be reported but ignored, and that the main focus should be directed at the amount of shared variance (Pallant, p.127, 2005).

There are limitations to the generalizability of this study’s sample. The mean level of insight is relatively high from baseline onwards, and with no scores above four, our sample might

not be representative for the population of patients with first-episode psychosis. The literature states that about 50% - 80% of patients with schizophrenia are not aware of their mental illness (Arango & Amador; Mintz et al., 2004). It is also worth noting that the underlying reason for the narrow distribution on the insight score might be due to a form of self – selection bias, in which the participants that agreed to take part in the study differ on some psychological characteristics from those who chose not to participate. We cannot rule out that one such characteristic might be good insight. It is always an issue for studies such as this that the patients who agree to participate are probably more compliant and insightful than those who refuse, as might be reflected in the high baseline levels of insight. Similarly, it is possible that patients with lack of insight might find participation in such a study irrelevant, since they do not consider themselves as being mentally ill and in need of treatment.

Some variables are likely to have a significant impact on rates of remission and insight as well as performance under neuropsychological assessments. In particular, it is probable that the use of psychopharmacological medications and effects of other types of treatment may moderate the relationships between the variables. In our study, we have not controlled for the effects of such variables.

One possible limitation of the study is the use of the PANSS G12 item as only measurement of insight, as this is a unidimensional measure. Thus, it cannot provide information regarding degree of insight along different dimensions. However, results from recent studies have demonstrated that the findings from studies using a unidimensional measure of insight such as the PANSS do not differ substantially from studies using a multidimensional approach (Mintz et al., 2003).

Finally, it is worth underlining that this study is a part of a larger research project, and the data are collected early in the research process. Thus, stronger tendencies and associations are likely to be more eminent in the later stages of the research, where multiple assessments and wider time frames are available for comparisons.

## **Clinical implications and future research**

The clinical implications of good insight are somewhat debated. While some clinicians maintain that having good insight is of crucial significance for treatment compliance (Arango & Amador, 2011) and increased quality of life, others emphasize the importance of the possible relationship between lack of insight and increased levels of depression and higher risk of suicide (Crumlish et al., 2005). Nevertheless, regarding which clinical substrates prove to be more eminent, previous studies reveal that classifying a patient's level of insight early in the course of the disease might be of crucial importance to understand more about the course and prognosis for these patients. This can in turn allow for an adequate treatment program to be put forth (Lincoln et al., 2007).

Few studies have investigated the role of insight in early psychosis. Attention to this issue is of great importance, as the risk for depression and suicide in the first year following an onset of psychosis is great, and lack of insight might further increase this risk (Schwartz, 1998).

On insight improvement, one interesting implication of our findings is that in a population of first – episode psychosis patients, insight might be maintained and improved for all of the subjects. Arango and Amador note in their review from 2011 that most studies of treatment adherence find that the best predictor of nonadherence and partial adherence is poor insight (Arango & Amador, 2011), demonstrating the clinical significance of studying the potential underlying causes of this condition.

One interesting finding from our study was the number of patients who transitioned from a state of non-remission at baseline, to a state of remission after six months and at the one-year follow-up. Multiple factors are likely to have contributed to this high remission rate. As previously noted, symptom ratings, side effects of medication, treatment attitudes are other factors likely to contribute to the variation in insight and compliance (Kemp & David, 1996), and thus, play a potentially important role in the research on remission.

The growing interest in research on insight has brought along a range of different measurements and terminology for this particular variable. With the availability of

psychometric tools with good reliability and validity (Arango & Amador, 2011), come the challenges of between-studies comparisons.

The complexity of insight – might also reflect the heterogeneity of the schizophrenia – spectrum disorders. An increased research focus on first-episode patients will provide a more detailed picture of their clinical feature, and allow comparison between patients who are at approximately the same stage of illness.

## Conclusions

The results from our study show a significant increase in insight after one year. Already after six months, none of the subjects demonstrate impaired insight. This is in line with most previous studies on first – episode psychosis, in which most have found insight to improve over the course of time. The majority of the subjects in our sample were also able to maintain the high levels on insight demonstrated at baseline. Thus, the results indicate that both improvement and maintenance in insight found in the initial stages of the disorder continue throughout the first year for our group of patients.

Even though a small correlation between degree of insight and intellectual function was found, this association proved not to be significant. This suggests that IQ has an insignificant contribution to the variation in insight levels in our group of patients with first-episode psychosis from baseline till one year. Hence, our findings seem to support the view that the relationship between IQ and insight is complex, and may likely consist of an interaction between cognitive abilities and other factors. A possible neuropsychological basis for poor insight in psychosis has been proposed, however, consistent supporting evidence for this is lacking. Other clinical factors and individual variables such as attitudes to treatment might be of greater importance to the development of insight, than cognitive abilities such as general intelligence.

The results for our subjects are encouraging because they suggest that insight may be maintained and improved in the majority of first – episode patients. In addition, 21 of a total of 24 patients are in remission. Multiple factors are likely to have contributed to this high remission rate, and including more variables might have provided us with more information. Regarding remission as an outcome variable in our study, results were inconclusive concerning the contribution of insight and IQ. The small sample size needs to be considered, but the results may indicate that other factors are potentially more significant in explaining the state of remission.

Our results indicate that insight is a multidimensional concept, perhaps consisting of different types of impairments. Thus, insight might have multiple predictors, and revealing the nature

of insight might lead to interventions that may improve adherence to treatment, and hence, patient outcome.

We still lack a full understanding of the factors involved in causing poor insight. More research is needed on first-episode psychosis patients to gain a detailed assessment of their clinical features, and to allow for a comparison of patients at approximately the same stage of illness. This will contribute to further clarification of the factors predicting the course and outcome in first-episode psychosis.

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