POOR INSIGHT IN OBSESSIVE-COMPULSIVE DISORDER: EXAMINING THE ROLE OF COGNITIVE, METACOGNITIVE, AND NEUROPSYCHOLOGICAL VARIABLES

by

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A dissertation

presented to Ryerson University

in partial fulfillment of the

requirements for the degree of

Doctor of Philosophy

in the Program of

Psychology

Toronto, Ontario, Canada, 2014

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Abstract

Poor Insight in Obsessive-Compulsive Disorder: Examining the Role of Cognitive, Metacognitive, and Neuropsychological Variables

Doctor of Philosophy, 2014

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The purpose of this study was to examine the cognitive and neuropsychological constructs that are conceptually related to poor insight in obsessive-compulsive disorder (OCD). The relationship between dimensions of insight (*Brown Assessment of Beliefs Scale*; BABS) and cognitive (magical thinking, paranoia/suspiciousness), metacognitive (metacognition, decentering, cognitive flexibility), and neuropsychological indices of cognitive flexibility were examined. Participants with OCD ($N = 80$) referred for treatment at an outpatient anxiety disorders clinic completed a clinical interview, a brief battery of neuropsychological measures, and a computer-administered questionnaire package assessing the variables of interest. Lower metacognition (i.e., Beck Cognitive Insight Scale [BCIS], composite score) was significantly associated with poorer insight (BABS total; $\rho = -.38$), and Metacognitions Questionnaire-30 cognitive self-consciousness subscale was negatively correlated with insight regarding a psychiatric source for one's symptoms ($\rho = -.24$). Stroop interference was the only neuropsychological variable associated with BABS total score ($\rho = -.23$), but was not a unique predictor of insight in a regression with BCIS composite scores predicting insight. Nearly all of the variance in insight was accounted for by BCIS composite scores ($R = .43$, $R^2 = .18$), indicating that metacognition, but not cognitive flexibility, contributes most strongly to clinical

insight. Finally, insight decreased when OCD symptoms were activated for both the good and poor insight groups, $F(1,78) = 119.29$, $p < .001$, partial $\eta^2 = .61$, and did not significantly vary as a function of insight group status, $F(1, 78) = 3.24$, $p = .08$, partial $\eta^2 = .04$. Implications, limitations, and directions for future research are discussed.

Acknowledgements

I would first like to express my sincere appreciation and thanks to my advisor, Dr. Martin Antony, for his ongoing support throughout my graduate training. You have been a tremendous mentor in all aspects of my professional training, and I am fortunate to have had the opportunity to benefit from your wisdom, experience, and guidance. Thank you for always being available, supporting my decisions, encouraging me to pursue relevant and important experiences, providing me with countless opportunities for professional growth and development, and for your willingness to move mountains to make this all possible. Many thanks.

Thank you to Dr. Naomi Koerner, who has taught me the importance of clarity, precision, and relevance in all aspects of my research. You have been a wonderful mentor to me from the very early days of my graduate training. I would also like to thank my examination committee, Dr. Todd Girard, Dr. Colleen Derkatch, and Dr. Eric Storch for taking time out of their busy schedules to provide insightful feedback and participate in my defense.

I would like to extend a sincere thank you to Drs. Randi McCabe and Karen Rowa, as well as the clinical and research teams at the Anxiety Treatment and Research Centre at St. Joseph's Healthcare, Hamilton, for supporting the development, recruitment, and data collection for this project. I have been truly fortunate to work with such a skilled team of researchers and clinicians.

Finally, to my family, friends, classmates, and colleagues, words cannot express my gratitude for your continued love, support, and encouragement throughout this process. I have so much for which to be thankful.

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Poor Insight in Obsessive-Compulsive Disorder: Examining the Role of Cognitive, Metacognitive, and Neuropsychological Variables

Obsessive-compulsive disorder (OCD) is characterized by the presence of recurrent intrusive thoughts, impulses, or images and/or repetitive mental acts or behaviours that are associated with intense distress, anxiety, or psychosocial impairment (American Psychiatric Association, 2013). Recent epidemiological studies estimate that 1.2% of the population experience symptoms that meet diagnostic criteria for OCD in a 12-month period, and the lifetime prevalence rate is approximately 2.3% (Ruscio, Stein, Chiu, & Kessler, 2010). Of those individuals seeking treatment for OCD, 15 to 30% have poor insight regarding nature and severity of their symptoms (Alonso et al., 2008; Catapano et al., 2010; Foa & Kozak, 1995). While studies have documented the clinical and demographic features associated with low insight in OCD, little is known about the related cognitive and neuropsychological variables. Therefore, the purpose of this study is to explore cognitive, metacognitive, and neuropsychological constructs that are conceptually related to impaired insight in OCD.

Prevalence and Course of OCD

Although estimates of the prevalence of OCD vary depending on the diagnostic instruments and criteria used, the World Health Organization (WHO) reported that OCD affects approximately 2-3% of the population worldwide and ranks among the top 20 leading causes of disability in the world (WHO, 2001). Canadian studies indicate that 3% of the Canadian population will be diagnosed with OCD at some time in their lives (Bland, Orn, & Newman, 1988). Although it is the least common of the anxiety disorders (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012), it tends to be the most severe in terms of impairment and disability (Kessler, Chiu, Demler, & Walters, 2005). This impairment leads to considerable

financial and personal costs. For example, Moritz (2008) reported that the direct (e.g., treatment, use of health care resources, hospitalization) and indirect (e.g., worker productivity, job loss, early retirement) economic costs of OCD have been estimated at $8.4 and $40 billion, respectively, in the United States.

The personal costs of the disorder are equally significant. Individuals with OCD often experience reduced physical functioning, lower emotional and social functioning, increased use of health care services, financial strain, and lower overall quality of life (Koran, 2000; Moritz et al., 2005). Eisen and colleagues (2006) found that 34% of individuals with OCD in their sample were unable to work, and 5% were unable to perform any activities of daily living, because of their psychological difficulties. In addition, OCD significantly interferes with one's relationship and family functioning, particularly when other psychiatric comorbidities are present (Huppert, Simpson, Nissenson, Liebowitz, & Foa, 2009). Some studies suggest that the quality of life of individuals with OCD is comparable to or lower than that of people with other chronic and disabling conditions, such as schizophrenia, heroin dependence, and severe depression (Bobes et al., 2001).

These costs do not appear to be distributed equally among men and women. Among adults, OCD tends to be diagnosed more frequently in women than in men (Kessler et al., 2012), though men tend to be diagnosed earlier, report greater severity of symptoms, and experience a more chronic course than do women (Fontenelle, Marques, & Versiani, 2002; Lochner & Stein, 2003). The mean age of onset for OCD is 18.49 years (Pinto, Mancebo, Eisen, Pagano, & Rasmussen, 2006); however, men are more likely to experience symptoms at a younger age (17.1 years) compared to women (20.5 years) (Lochner et al., 2004). In addition, patterns of comorbidity are significantly affected by sex, with women reporting more comorbid depression,

eating disorders, and panic attacks, and men experiencing more social anxiety, substance-related disorders, and hypomanic episodes (Lochner & Stein, 2003). Some researchers have suggested that these sex-related differences in the age of onset, course, and comorbidity point to subtypes of OCD mediated by genetic and biological factors (Labad et al., 2008; Lochner et al., 2004); however, this hypothesis requires further empirical support.

OCD affects individuals across the lifespan. As reported above, onset of the disorder tends to be in early adulthood; however, symptom onset has been reported in children and in older adults (Eisen, Yip, Mancebo, Pinto, & Rasmussen, 2010). Although studies of the long-term course of OCD are rare, some studies suggest that symptoms tend to wax and wane but rarely fully remit. For example, Skoog and Skoog (1999) followed 144 patients with OCD for a mean of 47 years. They found that only 20% of patients achieved full remission and an additional 28% reported partial remission. Almost 50% of the sample had symptoms that persisted for over 30 years. Similarly, Steketee, Frost, and Cohen (1999) reported that only 20% of OCD patients attained full remission, and 50% attained partial remission of symptoms over the course of a 5-year follow-up after treatment. Although few consistent predictors of course have been found, earlier diagnosis tends to be related to a more chronic and unremitting disorder (Eisen et al., 2010). Left untreated, OCD can be a longstanding and disabling condition.

With treatment, however, the prognosis can be quite good. Several meta-analyses have documented large effect sizes for cognitive, behavioural, and medication treatments of OCD (e.g., Eddy, Dutra, Bradley, & Westen, 2004; Hofmann & Smits, 2008; Rosa-Alcázar et al., 2008). For individuals with OCD, there are several efficacious treatments options, including exposure and response prevention, cognitive therapy, pharmacotherapy, and combined approaches. Cognitive and behavioural approaches tend to be the most effective, with no

conclusive advantage for either cognitive or behavioural interventions alone (Deacon & Abramowitz, 2004; Eddy et al., 2004) or for augmenting psychotherapy with medication, at least for adults (Foa, Franklin, & Moser, 2002). Eddy et al. (2004) conducted a comprehensive meta-analysis which revealed that a mean of two-thirds of individuals who complete psychotherapy trials report significant symptom improvement (i.e., at least 25-50% improvement in symptom severity measures). Overall, 38% were classified as recovered following treatment, defined as no longer meeting diagnostic criteria for OCD.

Despite these successes, it is apparent that many patients are classified as partial responders or nonresponders following treatment. While there are few consistent predictors of treatment outcome, pretreatment symptom severity and presence/absence of comorbid depression (Abramowitz & Foa, 2000; Steketee, Chambless, & Tran, 2001), as well as level of insight into one's symptoms (Foa, Abramowitz, Franklin, & Kozak, 1999; Himle, Van Etten, Janeck, & Fischer, 2006; Ravi Kishore et al., 2004), have been identified as significant moderators of treatment success.

OCD Symptomatology

Obsessions are defined as recurrent intrusive thoughts, urges, or images that are experienced, at some time during the course of the disorder, as distressing or inappropriate (American Psychiatric Association, 2013). Although 90% of the population reports intrusive thoughts, these thoughts rarely occur with the frequency, distress, or intensity seen in OCD (Belloch, Morillo, Lucero, Cabedo, & Carrió, 2004). Thus, although the content of OCD-related thoughts and behaviours is similar to those of a nonclinical population, they become clinically significant when they cause significant distress or impairment.

There is considerable heterogeneity in the symptom presentation and clinical

characteristics of individuals with OCD (Lochner & Stein, 2003). Patients may present with a range of obsessions or compulsions that vary in theme from person to person. For example, frequently reported obsessions centre around themes of aggression, contamination, symmetry, and, less frequently, sexual, somatic, and moral or religious themes (Pinto, Mancebo, Eisen, Pagano, & Rasmussen, 2006). Compulsions are repetitive or ritualized behaviours or mental acts that are often performed in response to obsessions and are intended to reduce distress or prevent some feared outcome from occurring (American Psychiatric Association, 2013). Common compulsions include repeated checking, cleaning, repetition and counting, and ordering or arranging (Pinto et al., 2006). Most people, however, report having multiple obsessions and compulsions (Fontenelle, Mendlowicz, Marques, & Versiani, 2004), creating myriad possible symptom presentations.

In order to better understand the heterogeneity of symptoms and features of OCD, attempts have been made to classify OCD into subtypes based on symptom theme, underlying motivation for obsessive and compulsive behaviours, psychobiology, age of onset, or comorbidity (e.g., Leckman et al., 2000; Lochner & Stein, 2006; McKay et al., 2004; Rasmussen & Eisen, 1992). Of the various methods of categorizing OCD, the most common and empirically supported methods to date are based on symptom presentation (Mataix-Cols, do Rosario-Campos, & Leckman, 2005; McKay et al., 2004). Most studies indicate that the latent structure of OCD is comprised of four or five symptom clusters, the most common of which include: (a) obsessions and checking (e.g., aggressive, sexual, religious, and somatic obsessions and checking compulsions); (b) symmetry and ordering (e.g., symmetry and exactness obsessions, repeating, counting, and arranging compulsions); (c) cleanliness and washing (e.g., contamination obsessions and cleaning/washing compulsions); and (d) hoarding (Leckman et al.,

1997; Summerfeldt, Richter, Antony, & Swinson, 1999). However, hoarding appears to be the only subtype that has consistently been associated with unique clinical, demographic, and neuropsychological features across studies (Grisham, Brown, Liverant, & Campbell-Sills, 2005), which prompted the creation of a new diagnostic category for hoarding disorder in the Diagnostic and Statistical Manual, 5th edition (DSM-5) (Mataix-Cols et al., 2010). Therefore, although heterogeneity is evident in OCD, it remains a unitary disorder within current diagnostic systems, with the exception of hoarding.

Previously, DSM-IV-TR criteria (American Psychiatric Association, 2000) required that an individual with OCD recognize that his or her symptoms are excessive or unreasonable at some point during the course of the disorder. That is, the individual was required to have insight into the excessive or unreasonable nature of his or her thoughts or behaviours. This criterion was intended to differentiate OCD from delusional disorders in which poor insight is a defining feature. However, the DSM-IV OCD field trial (Foa & Kozak, 1995) drew attention to the range of insight that people with OCD have regarding their symptoms. Acknowledging this, the DSM-IV (American Psychiatric Association, 1994) included an option to specify if the current episode is characterized by "poor insight," and added a delusional variant of OCD in the psychosis section (i.e., psychotic disorder not otherwise specified or delusional disorder, unspecified type). The DSM-IV field trial (Foa & Kozak, 1995) and subsequent inclusion of the insight specifier have been important in highlighting the frequency and significance of impaired insight in OCD. Studies indicate that 15 to 30% of OCD cases are associated with poor or absent insight (Alonso et al., 2008; Catapano et al., 2010; Foa & Kozak, 1995), and other estimates suggest that this may be as high as 40% (Aigner et al., 2005), depending on how insight is assessed. In addition, some authors have noted that insight tends to fluctuate throughout the course of the disorder,

with some periods being marked by fully intact insight and insight completely lacking at other times (Insel & Akiskal, 1986; Kozak & Foa, 1994; Lelliott, Noshirvani, Başoğlu, Marks, & Montiero, 1988). These studies indicate that impaired insight is much more common and variable than previously believed.

Given the variability of insight in OCD, recommendations were made to refine how insight is operationalized, measured, and specified in the DSM-5 (American Psychiatric Association, 2013). Leckman and colleagues (2010) highlighted some problems with the conceptualization of insight in the DSM-IV. First, the DSM-IV criterion did not provide a clear definition of what is meant by "excessive" or "unreasonable." Although the diagnostic criteria required that the individual recognize that his or her symptoms are excessive or unreasonable at some time during the course of the disorder, they provided no means of interpreting the irrationality of one's obsessions or compulsions. For example, this could refer to the intensity, accuracy, or rationality of beliefs or actions. In addition, if the client's beliefs were not in agreement with the clinician's, there was a risk of misdiagnosing schizophrenia or another psychotic disorder when a diagnosis of OCD with poor insight was more appropriate. Because OCD beliefs can be held with delusional intensity despite the clear absence of a psychotic disorder, the DSM-5 adopted the group's recommendation to remove the insight criterion altogether and eliminate the delusional variant in the psychosis section to prevent misdiagnosis and double coding. This appears to be consistent with how delusional OCD beliefs are characterized clinically when it is apparent that OCD with poor insight is the primary presenting complaint (Foa & Kozak, 1995).

In addition, the range of options for the insight specifier have been expanded in DSM-5 to allow for greater specificity (e.g., good or fair insight, poor insight, and delusional beliefs) in

diagnosis. A broader range of insight options is more consistent with the variability of clinical presentations in OCD, where insight is rarely present or absent, but rather falls along a continuum from good to poor to absent. For example, Catapano et al. (2010) reported that the pretreatment insight scores, measured with the *Brown Assessment of Beliefs Scale* (BABS; Eisen et al., 1998), of 106 OCD outpatients ranged from 1 to 21 out of a possible 24 (higher scores representing greater degree of delusionality) (Catapano et al., 2010). In fact, the DSM-IV field trial found that only 13% of participants were certain that the feared outcome would *not* occur if they did not act on their compulsions (Foa & Kozak, 1995), indicating that fully intact insight is the exception in OCD.

Expanding the range of insight specifiers in DSM-5 is also consistent with recommendations made for other Axis I disorders. Body dysmorphic disorder (BDD) is characterized by a high degree of delusional beliefs, with most studies indicating that nearly 40% of individuals with BDD report beliefs of a delusional intensity (Eisen, Phillips, Coles, & Rasmussen, 2004). Other studies suggest that this may be closer to 50% to 60% of BDD cases (Mancuso, Knoesen, & Castle, 2010; Phillips, Menard, Pagano, Fay, & Stout, 2006). However, comparisons of the delusional and nondelusional variants of BDD have failed to identify consistent differences between these groups in terms of clinical or demographic features, quality of life variables, functional impairment, or treatment response, leading researchers to conclude that they are indeed different forms of the same disorder (for a review, see Phillips et al., 2004). Thus, DSM-5 adopted changes in the diagnostic criteria of BDD, including removal of the delusional variant of BDD from the psychosis section and including insight specifiers similar to those for OCD to better characterize the range of insight seen in BDD (Phillips et al., 2010).

Inclusion of insight specifiers in the diagnostic system highlights the significance of poor

insight as a feature of OCD and other psychological disorders. Changes in the DSM-5 indicate that the degree of insight will figure more prominently in the diagnostic criteria as an insight specifier is now assigned for all cases of OCD. As such, researchers and clinicians will benefit from a more nuanced understanding of the correlates and associated cognitive and neuropsychological features of insight in OCD and other disorders.

Defining Insight in OCD

Insight, as described by the DSM-IV-TR, refers to the extent of an individual's recognition of the nature and severity of his or her symptoms. Historically, insight had been conceptualized as either present or absent (Marková & Berrios, 1992). This interpretation was integrated into the diagnostic criteria with DSM-IV, requiring that insight be present at some point during the course of the disorder in order to be diagnosed with OCD rather than a psychotic disorder. Further, the poor insight specifier in DSM-IV implied that insight was either intact or absent at a given point in time. However, as the studies above indicate, insight is a continuous construct that ranges from excellent to absent or, as Insel and Akiskal (1986) suggest, true obsessions at one pole to delusional beliefs at the other.

This evidence has led some to propose other concepts in order to better describe the range of insight in OCD. For example, Foa and Kozak (1995) refer to *fixity of beliefs* to describe the strength of conviction in one's obsessional beliefs. They developed the *Fixity of Beliefs Scale*, a semistructured interview that contains items measuring the patient's confidence that the feared consequence would happen, recognition that one's beliefs differ from conventional beliefs, the patient's understanding of the source of these beliefs, flexibility of beliefs, and bizarreness of beliefs (Foa & Kozak, 1995). Psychometric evaluation showed that the scale lacked internal consistency, indicating that the items were not measuring the same construct. Thus, they selected

the single item assessing confidence in one's belief as a measure of strength of obsessive-compulsive beliefs, or fixity of beliefs, to represent insight in OCD. In a small study of short-term exposure and response prevention for OCD, this item predicted treatment outcome, with those patients who reported higher fixity of beliefs showing less symptom change following treatment (Foa, Abramowitz, Franklin, & Kozak, 1999). Thus, while the scale did not sufficiently capture insight as intended, a significant effect of fixity of belief on treatment outcome was observed. The authors hypothesized that poor insight interferes with treatment outcome perhaps because these participants found it difficult to incorporate information conflicting with their rigid and fixed beliefs.

The term *overvalued ideas* (OVI) has been used interchangeably with fixity of beliefs to describe obsessional beliefs that are strongly held but with less than delusional intensity (American Psychiatric Association, 1994; Kozak & Foa, 1994; Neziroglu & Stevens, 2002; Veale, 2002). Marková, Jaafari, and Berrios (2009) suggest that overvalued ideas occupy the space along the continuum of OCD beliefs between obsessions proper and delusions. Thus, the strength with which the obsessive beliefs are held is inherent in the definition of OVIs. At the delusional end of the continuum, patients with no insight are convinced of the reasonableness of their beliefs despite evidence to the contrary. Individuals with fully intact insight readily acknowledge the senselessness and excessiveness of their obsessions and compulsions. In contrast, people with OVIs are relatively certain that the feared consequences of not performing their compulsions are likely to occur but can acknowledge alternative interpretations.

Similarly, Neziroglu, McKay, Yaryura-Tobias, Stevens, and Todaro (1999) used the term overvalued ideas to describe the pathological quality of thought that exists along the continuum between rational thought processes and delusions. They conceptualize OVIs as being inversely

related to insight; that is, insight gets poorer as overvalued ideas are perceived as more realistic. They created a structured interview (the *Overvalued Ideas Scale*) to assess OVIs specific to OCD, rather than delusional beliefs more generally. The scale consists of 11 items assessing qualities of OVIs, including bizarreness, belief accuracy, fixidity, reasonableness, pervasiveness, explanation for discrepancy from conventional beliefs, stability of beliefs, and attempts to resist the beliefs (Neziroglu et al., 1999). The scale demonstrated adequate internal consistency, stability, and interrater reliability (Neziroglu et al., 1999) but inconsistent predictive validity (Neziroglu, Stevens, McKay, & Yaryura-Tobias, 2001). This finding may be related to problems with the scale itself, methodological limitations of the validation study, or problems with the authors' conceptualization of OVIs in OCD; however, subsequent studies have used this measure and the associated definition and found it to be compatible with other measures of insight (Shimshoni, Reuven, Dar, & Hermesh, 2011).

Some authors have noted that OVIs also contain an affective component that may be associated with one's values (Kozak & Foa, 1994; Neziroglu & Stevens, 2002; Veale, 2002). Kozak and Foa (1994) noted that people with OVIs are highly bothered by the obsession or the behavioural response to the obsession, whereas delusions are rarely associated with a negative affective response. Thus, they believe that the OVIs precede a negative emotional response. In contrast, Neziroglu and Stevens (2002) contend that the underlying affect drives the OVIs. In support of this hypothesis, they cite the development and validation study of the *Overvalued Ideas Scale* (OVIS; Neziroglu, McKay, Yaryura-Tobias, Stevens, & Todaro, 1999), in which psychometric evaluations found that the OVIS was highly correlated with measures of depression and anxiety. Similarly, Veale (2002) argued that idealized personal values are of central importance to OVIs rather than the strength of conviction of one's beliefs, and the OVI is

articulated when an individual has an emotional reaction to threatened personal values. For example, an individual who holds idealized values of order and precision reports anxiety when things are not "just right." Therefore, Veale believes that cognitive behaviour therapy will be more effective if it targets the latent personal value rather than the manifest belief. Neziroglu and Stevens (2002) also propose that OVIs are fixed and only amenable to change if directly challenged, which will subsequently reduce distress. Although the affective element of insight has been discussed in the literature, there has been no research to indicate the causal or temporal relationship between affect and insight.

It is important to note that overvalued ideation is not necessarily synonymous with insight in OCD, and some authors have attempted to separate the constructs (Brakoulias & Starcevic, 2011). Whereas most definitions of overvalued ideation refer to the strength of belief, insight traditionally refers to awareness of the inaccuracy of one's beliefs. The logical connection is that one holds a belief more strongly when he or she believes it to be accurate. There is considerable overlap among the definitions and some research indicates that there is a high correlation among measures of insight and overvalued ideas (Shimshoni, Reuven, Dar,& Hermesh, 2011). Thus, although there are conceptual differences between OVIs and insight, they are often used synonymously in the OCD literature.

Other dimensions of insight have been extensively examined with regard to the psychotic disorders. For example, Amador and Strauss (1993) described two main dimensions of insight in psychosis: awareness of illness and attribution of illness. While definitions of insight have varied in complexity over time, the most widely accepted definition has expanded to include understanding of the social consequences of the disorder, awareness of the need for treatment, and awareness of specific signs or symptoms of a disorder (Amador & Gorman, 1998). Each of

these dimensions appears to be independent but related to symptom severity (Mintz, Dobson, & Romney, 2003). Within OCD, similar dimensions of insight have been suggested but do not seem to be entirely independent. Eisen et al. (1998) created the BABS to measure the characteristics of delusional beliefs in a broad range of psychological disorders. The semistructured interview contains items assessing the dimensions that are thought to underlie delusional beliefs, including strength of conviction, perception of others' views of beliefs, explanation of differing views, fixity of beliefs, efforts to disprove beliefs, and insight (i.e., awareness of a psychiatric source of one's symptoms). The BABS has demonstrated excellent psychometric properties, including sensitivity to change, interrater and test-retest reliability, and convergent validity with other insight measures (Eisen et al., 1998). Psychometric evaluation showed that there was a high correlation among the dimensions, and a factor analysis indicated that all items loaded on a single factor, suggesting that the multiple dimensions assessed are related to a single insight dimension. Since its publication, the BABS has become the most widely used assessment of insight in OCD and other nonpsychotic disorders.

The preceding definitions reflect "clinical insight," which has been defined as the extent to which individuals have insight into the nature and severity of their symptoms (Beck, Baruch, Balter, Steer, & Warman, 2004). As described earlier, clinical insight is thought to be manifested by the rigidity with which individuals hold on to their beliefs. It is focused on the specific aspects of the disorder rather than on a broader understanding of the symptoms and their consequences (Marková, Jaafari, & Berrios, 2009). This can be differentiated from "cognitive insight," which is a term that has been used to describe the *capacity* of individuals to assess their thought processes (Beck et al., 2004). Thus, cognitive insight can be described as the ability to distance oneself from cognitive distortions, reflect on them, and acknowledge alternative viewpoints

(Beck et al., 2004). Cognitive insight is thought to be a metacognitive variable that determines the degree of clinical insight and, ultimately, the development of delusional beliefs.

Support for this distinction between cognitive and clinical insight comes primarily from the literature in schizophrenia and other psychotic disorders. Individuals with psychotic disorders show impaired capacity for metacognition and difficulty in modifying distortions in thinking when provided with corrective feedback (for a review, see Beck & Warman, 2004). Compared to individuals with nonpsychotic disorders (e.g., depression, anxiety), people with psychosis report impaired ability to be objective about delusional experiences and cognitive distortions, reduced capacity to alter their perspective, unresponsiveness to corrective feedback, and overconfidence in delusional beliefs (Beck & Warman, 2004). Beck and colleagues created the *Beck Cognitive Insight Scale* (BCIS; Beck, Baruch, Balter, Steer, & Warman, 2004) to measure these aspects of cognitive insight. The 15-item self-report questionnaire comprises two subscales measuring self-reflectiveness (e.g., objectivity, openness to feedback) and self-certainty (e.g., certainty about judgments, resistance to feedback). The scale has demonstrated acceptable psychometric properties and has been shown in several studies to be related to modification of delusional thinking in psychosis (Riggs, Grant, Perivoliotis, & Beck, 2012). The limited work that has examined the relationship between cognitive insight and anxiety has typically been conducted with patients with comorbid psychosis (Buchy, Bodnar, Malla, Joober, & Lepage, 2009; Colis, Steer, & Beck, 2006). The single study that compared cognitive and clinical insight in nonpsychotic OCD found nonsignificant correlations between the BCIS and other clinical insight measures, which the authors suggest could indicate that the measures assess separate but related constructs (Shimshoni et al., 2011). Specifically, the BCIS is intended to measure general thought patterns and the capacity for self-reflection whereas measures of clinical insight assess

insight in relation to specific beliefs. Alternatively, the null findings could be an artifact of measurement type, as the BCIS is a self-report measure compared to the interview-based clinical insight measures. It is apparent that more research needs to be done to understand the distinction between cognitive and clinical insight, if indeed this construct is relevant to problems other than psychotic disorders. Given the other similarities between delusions and poor insight in OCD, it is reasonable to conclude that cognitive insight is one aspect of the multidimensional nature of insight in OCD.

In summary, insight in OCD is considered to be a multidimensional, continuous construct. The aspect of insight that is integrated into the diagnostic criteria for OCD refers to clinical insight; that is, the extent of an individual's recognition of the nature and severity of his or her symptoms. Although the concepts are not interchangeable, clinical insight overlaps considerably with overvalued ideation, which refers to beliefs that are strongly held but with less than delusional intensity. Cognitive insight is another dimension of interest in OCD as it has been hypothesized to relate to the capacity to modify cognitive distortions, but to date has been understudied in OCD and other nonpsychotic disorders. Attempts to study the correlates and consequences of poor insight in OCD have been limited by confusion in the various definitions and measures available.

The Phenomenology of Insight in OCD

Impaired insight in OCD is much more common than previously believed. Estimates vary but tend to range from 15 to 30% of people with OCD have poor insight into the nature and severity of their symptoms (Alonso et al., 2008; Catapano, Sperandeo, Perris, Lanzaro, & Maj, 2001; De Berardis et al., 2005, Foa & Kozak, 1995; Marazziti et al., 2002; Ravi Kishore et al., 2004). Several studies have attempted to identify the unique clinical and demographic features of

this subset of OCD patients. Across studies, demographic variables are generally unrelated to insight in OCD (Bellino, Patria, Ziero, & Bogetto, 2005; Catapano et al., 2010; Türksoy, Tükel, Özdemir, & Karali, 2002). Clinical variables, on the other hand, have yielded mixed results and a few consistent predictors of poor insight have been identified.

Although the clinical picture is mixed, poor insight in OCD tends to be associated with greater symptom severity (Catapano et al., 2001, 2010; De Berardis et al., 2008; Eisen et al., 2001; Jacob et al., 2014; Jakubovski et al., 2011; Matsunaga et al., 2002; Ravi Kishore et al., 2004; Türksoy et al., 2002). In fact, Türksoy et al. (2002) found that symptom severity, as measured by the total score on the *Yale Brown Obsessive Compulsive Scale* (Y-BOCS; Goodman et al., 1989), was the single best predictor of insight when considered together with clinical variables and other measures of mood and anxiety.

Across studies, however, the largest proportion of variance in insight scores accounted for by symptom severity was only 17% (Türksoy et al., 2002), indicating that insight is not simply a reflection of OCD severity. In addition, some studies have not found a relationship between symptom severity and poor insight in OCD (Aigner et al., 2005; Eisen et al., 2004; Foa, Abramowitz, Franklin, & Kozak, 1999; Marazziti et al., 2002), contrary to what would be expected if poor insight were simply an indication or symptom of severe psychopathology. Aigner et al. (2005) found that individuals with good and poor insight reported similar severity of OCD symptoms. However, their study dichotomized patients as having good or poor insight based on clinical impression, without the use of a validated measure of insight. Marazziti et al. (2002) included only participants with OCD and comorbid disorders; therefore, the failure to find an association between insight and OCD severity may be an artifact of the sample characteristics. Interestingly, Elvish, Simpson, and Ball (2010) reported that the severity of anxiety as measured

with the anxiety subscale of the *Depression Anxiety Stress Scales* (DASS; Lovibond & Lovibond, 1995), but not OCD severity in particular, predicted poor insight. This is one of the few studies that isolated OCD severity from anxiety more generally, suggesting that it may be the physical arousal and fear associated with obsessions and compulsions that contributes to impaired insight, rather than OCD severity specifically.

To explain these conflicting findings, some have examined the relationship between insight and OCD symptom subtypes. The assumption is that insight may be related to the severity of particular OCD presentations, rather than global OCD severity. Recently, Jacob and colleagues (2014) found that individuals with poor insight, as assessed by Y-BOCS item 11 scores, exerted less effort to resist or control their obsessions and compulsions compared to those with good insight, which the authors hypothesized may reinforce OCD symptoms. In terms of overt symptom domains, Ravi Kishore et al. (2004) found that individuals reporting primarily hoarding compulsions or miscellaneous obsessions (e.g., superstitious beliefs) had higher scores on the BABS, reflecting poorer insight. However, the correlation between BABS scores and total Y-BOCS severity was stronger than for any other symptom subtype independently. Other possible symptom dimensions that may be related to insight include total Y-BOCS compulsions scores (Bellino et al., 2005), mental neutralizing (Jacob et al., 2014), somatic and hoarding obsessions (De Berardis et al., 2005), ordering compulsions (Elvish, Simpson, & Ball, 2010), and hoarding type (Jakubovski et al., 2011); however, these correlations tend to be weaker than those found for overall severity. Additionally, other studies have found no relationship between symptom subtype and insight (Catapano et al., 2010). Given the inconsistency in the symptom domains found to be associated with insight, and the preponderance of studies finding overall severity to be a stronger predictor of insight, it does not appear that subtyping OCD by symptom

presentation adds to our understanding of clinical features associated with poor insight.

Insight is also more likely to be impaired when comorbidity is present (Elvish, Simpson, & Ball, 2010; Matsunaga et al., 2002; Ravi Kishore et al., 2004). For example, Matsunaga et al. (2002) found that individuals with OCD and co-occurring schizophrenia were more likely to have poor insight than those with OCD alone. Similarly, several studies have found a relationship between poor insight and schizotypal personality disorder (Alonso et al., 2008; Catapano et al., 2010). These correlations are not unexpected given the similarities between delusions and poor insight in OCD, and may reflect a delusional response style rather than poor insight related to the symptoms themselves.

Some studies have found that the number of comorbidities, rather than any particular type of comorbid disorder, is associated with low insight (Elvish, Simpson, & Ball, 2010; Ravi Kishore et al., 2004). Thus, while comorbidity is more common among individuals with low insight compared to those with intact insight, the patterns of comorbidity vary across studies, and the relationship between insight and comorbidity may be better accounted for by the number of comorbidities, rather than any particular type of co-occurring disorder.

Depression is also typically elevated among individuals with poor insight in OCD (Alonso et al., 2008; Eisen et al., 2006; Catapano et al., 2001, 2010; Ravi Kishore et al., 2004; Türksoy et al., 2002). In fact, both Türksoy et al. (2002) and Ravi Kishore et al. (2004) found that major depressive disorder was the only Axis I disorder more frequently reported by OCD patients with low insight compared to those with good insight. This relationship also appears to be consistent across disorders. A recent meta-analysis (Mintz, Dobson, & Romney, 2003) found a modest negative correlation between insight and depression in schizophrenia. Specifically, the authors found that, among patients with schizophrenia, those with poor insight experience lower

depression severity, which the authors suggest may indicate that poor insight is a protective factor for depression. Thus, it appears that depressive symptomatology may be a feature of insight more generally, though the direction of this relationship remains to be tested. Given that depressive symptoms are highly associated with OCD severity (Carter, Pollock, Suvak, & Pauls, 2004; Tükel, Meteris, Koyuncu, Tecer, & Yazici, 2006) and, as reviewed earlier, OCD symptom severity is associated with poor insight, more research is needed to understand the relationship between these variables. Unfortunately, depressive symptoms are not routinely assessed or controlled for in studies of insight in OCD, which may in part account for some of the inconsistent results across studies.

Other clinical features that have been reported to be associated with poor insight in OCD include earlier age of onset of OCD (Catapano, 2010; Ravi Kishore et al., 2004), longer illness duration (Bellino et al., 2005; Ravi Kishore et al., 2004), family history of OCD or schizophrenia spectrum disorders (Bellino et al., 2005; Catapano et al., 2010), and lower overall quality of life and functional impairment (Eisen et al., 2006; Matsunaga et al., 2002). However, Storch et al. (2013) found that insight was the only variable among a variety of clinical factors (e.g., anxiety sensitivity, depressive symptom severity, interference due to OCD symptoms) that was not associated with functional impairment. Similarly, Eisen et al. (2006) found that the relationship between insight and quality of life became nonsignificant after controlling for depression and OCD severity, suggesting that insight is not a unique or robust predictor of social impairment and overall quality of life.

These relationships, however, are not stable across studies and some report few, if any, clinical features associated with insight (e.g., Marazitti et al., 2002). These studies often use single item measures, like the Y-BOCS item 11 (which measures “insight into obsessions and

compulsions) and item 1 (i.e., confidence that the harmful consequence will happen) from the *Fixity of Beliefs Questionnaire* (Foa & Kozak, 1995), to measure insight, which would be expected have lower reliability and validity than psychometrically sound multi-item measures, like the BABS or OVIS. Indeed, more consistent relationships between insight and clinical features of OCD tend to be reported in studies utilizing these multi-item measures (e.g., Catapano et al., 2010; Eisen et al., 2001; Ravi Kishore et al., 2004). In addition, dichotomizing patients into low and high insight groups reduces the sensitivity of continuous measures. This may explain the failure of studies, like Marazitti et al.'s (2002) study, to detect relationships among commonly associated variables.

In summary, the clinical picture of poor insight in OCD is highly variable across studies. Some, but not all, of this variability in study findings can likely be accounted for by the use of different instruments to measure insight. For example, some studies use single item measures, such as the fixity of beliefs confidence item and item 11 on the Y-BOCS, which have lower reliability and validity than multi-item measures, such as the BABS or Overvalued Ideation Scale (OVIS). Alternatively, the variability may be related to study methodology, including dichotomizing the sample into high and low insight groups based on differing operational definitions. Although this creates a challenge in identifying consistent clinical features associated with poor insight in OCD, overall OCD symptom severity and depression symptom severity have been found to be reasonably stable predictors of poor insight. Some have argued that there may be an "atypical" subtype of OCD characterized by poor insight, and associated with more severe depression and OCD symptoms (Solyom, 1985). However, the majority of empirical evidence does not support this hypothesis. Rather, insight is not stable throughout the course of the disorder and appears to fluctuate independently of OCD severity and comorbid mood symptoms,

which suggests that poor insight is not simply a characteristic of a severe or atypical OCD subtype.

Prognostic Value of Insight

Of the studies that have examined the relationship between degree of insight and treatment outcome in OCD, the results have been inconsistent, but generally suggest that impaired insight is a poor prognostic factor in the treatment of OCD. Insight is most commonly assessed in psychopharmacological treatment studies, though the few studies that have included insight measures indicate that insight also impacts the efficacy of behavioural treatments for OCD.

In one of the earliest studies of OCD-related beliefs, Lelliott, Noshirvani, Başoğlu, Marks, and Montiero (1988) found that the one-third of OCD patients in their sample that perceived their obsessive thoughts to be rational did not respond differently to clomipramine plus exposure therapy compared to their counterparts with low fixity of beliefs. Similarly, Eisen et al. (2001) reported that degree of insight at baseline was not predictive of response to sertraline. Patients with poor insight at baseline were just as likely to improve and to a similar degree as patients with good insight. In a large scale chart review at an outpatient treatment clinic, Ghaemi, Boiman, and Goodwin (2000) examined insight, as measured by the *Scale to Assess Unawareness of Mental Disorder* (SUMD; Amador et al., 1993) an interview measure of insight widely used in schizophrenia, in a range of Axis I disorders (bipolar disorder I and II, major depressive disorder, anxiety disorders, and schizoaffective disorder). Across disorders, baseline insight scores did not predict outcome following pharmacotherapy. Although the studies noted above did not find a differential effect of insight on treatment outcome, in all studies, change in insight predicted change in symptoms, such that greater change in insight correlated with better

improvement in symptom severity.

In contrast to the few studies noted above, several studies have documented a strong relationship between pharmacotherapy outcome and insight. For example, Ravi Kishore, Samar, Janardhan Reddy, Chandrasekhar, and Thennarasu (2004) reported that treatment nonresponders had higher baseline BABS scores compared to treatment responders, and pretreatment insight scores accounted for 67% of the variance in treatment outcome. However, the authors did not control for baseline symptom severity or comorbidity, both of which have been shown to greatly affect response to treatment. Other studies have documented similar results in support of this finding. After a brief 12-week trial with SRIs, Alonso et al. (2008) found that pretreatment BABS scores correlated with changes in Y-BOCS scores, with a tendency toward smaller symptom change following treatment for the low insight group. Following a longer course of treatment with SRIs, Catapano and colleagues (2001, 2010) reported a significant effect of insight on treatment outcome at posttreatment and 3-year follow-up. Following the 24-week trial, 52% of the good insight group were classified as treatment "responders" compared to 0% of the low insight group. The poor insight group did report a modest but significant improvement in severity of total Y-BOCS scores but none of the participants with low insight evidenced enough symptom improvement to be considered a treatment responder, defined as a minimum 35% improvement in Y-BOCS total scores. In fact, Erzegovesi et al. (2001) reported that poor insight was the most significant predictor of poor response to SRIs in their study.

Unlike the pharmacotherapy studies reported earlier, the results of behavioural studies are less contradictory and tend to show a negative effect of poor insight on treatment outcome. Following the DSM-IV field trial in which poor insight in OCD was found to be more common than previously believed, Foa, Abramowitz, Franklin, and Kozak (1999) examined the degree to

which insight influenced the efficacy of exposure and response prevention (EX/RP). They reported that the patients with more strongly fixed beliefs had poorer treatment outcome and experienced a significantly smaller reduction in Y-BOCS total scores than the low fixity group. Although they noted a substantial improvement in Y-BOCS scores in the high fixity group, they were unable to determine if the improvement was statistically significant because of small sample size (n = 5). The authors hypothesized that symptom change may be mediated by a reduction in strength of beliefs, so those with more fixed and rigid beliefs would not benefit to the same extent as those with fully intact insight and more flexible beliefs. There were several limitations of this study, including a small sample size, a single item measure of insight without established psychometric properties, and dichotomizing insight into low and high fixity groups; however, these limitations are common among many of the treatment studies in this area.

Other psychological treatment studies with more rigorous methodology have reported similar results. For example, Himle, Van Etten, Janeck, and Fischer (2006) found that baseline insight predicted Y-BOCS scores following group EX/RP, even after controlling for pretreatment symptom severity, depression, and other demographic variables. Similarly, in a study to establish the predictive validity of the OVIS, Neziroglu, Stevens, McKay, and Yaryura-Tobias (2001) reported that pretreatment OVIS scores were significantly related to treatment outcome. However, their results were mixed, as overvalued ideation predicted variance in treatment outcome for compulsions, but not obsessions. The authors pointed to psychometric limitations of the Y-BOCS in assessing obsessions to account for these differences, but conceded that the OVIS was only predictive of change in compulsions following EX/RP.

With few exceptions, most studies have shown that insight improves with treatment regardless of treatment modality (Alonso et al., 2008; Eisen et al., 2001; Foa, Abramowitz,

Franklin, & Kozak, 1999; Himle et al., 2006; Lelliott et al., 1988; Matsunaga et al., 2002; Ravi Kishore et al., 2004). In addition, among studies that failed to find an effect of baseline insight on treatment outcome, many report that *change* in insight is related to improvement in symptom severity (Alonso et al., 2008; Eisen et al., 2001; Ghaemi, Boiman, & Goodwin, 2000). These results suggest that patients with poorer insight can still benefit from treatment but may experience a less favourable outcome than patients with better insight.

It is unclear from the available evidence whether changes in insight precede or follow symptom change. It may be that insight is a mediator between symptom severity and treatment outcome, or even a moderator of treatment outcome. However, it is apparent that OCD is more treatment resistant when insight is impaired. For these individuals, additional treatment strategies may be indicated to enhance treatment outcomes. For example, pretreatment motivational enhancement has been shown to improve insight in schizophrenia (Rüsch & Corrigan, 2002; Sousa, 2008). Psychoeducation and psychoanalytic therapy tend to be minimally effective in improving insight in schizophrenia, though psychotropic medications have demonstrated some efficacy (Henry & Ghaemi, 2004), as also indicated by the above studies. Some preliminary investigations have suggested that cognitive rehabilitation strategies (Delahunty, Morice, & Frost, 1993) may be effective in modifying cognitive flexibility in schizophrenia, though their relationship with insight and treatment outcome has yet to be determined. In addition, if there are other cognitive variables found to be related to insight that have known intervention strategies, these may be useful in improving insight before or throughout treatment in order to enhance outcomes. While these hypotheses have generated some preliminary support in the psychotic disorders literature, they await testing with an OCD population.

Models of Insight in OCD

Neuropsychological models. There is some evidence that impaired insight in OCD is associated with neuroanatomical and neuropsychological dysfunction. Structural and functional neuroimaging studies have documented brain abnormalities in OCD compared to nonpsychiatric controls pointing to dysfunction in the cortico-striatal-thalamic circuit, most consistently in the orbitofrontal cortex and basal ganglia (Britton & Rauch, 2009; Huey et al., 2008). The orbitofrontal cortex of the brain is involved in a number of functions, but those specifically thought to be relevant to OCD include attention and awareness, executive functioning, and regulation and maintenance of cognitive set (Lezak, Howieson, Bigler, & Tranel, 2012). Behaviourally, dysregulation of the prefrontal cortex is associated with disinhibition, impulsivity, and perseveration (Stuss, 1983). The basal ganglia consists of a number of structures in the subcortical region of the brain thought to be responsible for voluntary movement and cognitive impairments, such as attentional allocation, memory and learning, and conceptual thinking (Lezak et al., 2012). In addition, the basal ganglia appears to be involved in enhancing the efficiency of higher order cognitive processes and in regulating reward-directed behaviour (Ring & Serra-Mestres, 2002). Thus, evidence suggests that the characteristic symptoms and cognitive deficits seen in OCD may be associated with abnormalities of these regions (Kwon et al., 2003); however, researchers have been unable to determine exactly how these neuroanatomical structures relate to cognitive functioning and symptom expression (Huey et al., 2008). It is presumed that such dysfunction would be detected by tests that are sensitive to executive functioning (Henry, 2006).

Neuropsychological studies provide some evidence as to the role of neuroanatomical dysfunctions in cognitive functioning and symptom expression in OCD. The neuropsychological aspects of OCD have been extensively studied but have revealed inconsistent findings. While

several neuropsychological deficits have been noted, to date, research has been unable to provide a distinct cognitive profile for individuals with OCD. Given that OCD has been associated with dysfunction in the prefrontal cortex, and the prefrontal cortex is thought to be the neural region primarily responsible for executive functioning, it is expected that individuals with OCD will demonstrate deficits on tests of executive functioning. This has been the conclusion of several researchers (e.g., Greisberg & McKay, 2003; Kuelz, Hohagen, & Voderholzer, 2004); however, the specific aspects of executive functioning that have been found to be impaired vary across studies. For example, Tallis (1997) concluded that executive functioning deficits in OCD are specific to impairment in set-shifting. In contrast, Greisberg and McKay (2003) argue that difficulty with organizational strategies account for the specific executive functioning deficits seen in OCD. However, a few studies have argued that there is not enough evidence to conclude that individuals with OCD demonstrate reliable executive functioning deficits compared to controls (Simpson et al., 2006). These discrepancies may be explained by the use of different neuropsychological tests that assess different aspects of executive functioning, or that some tests are more sensitive to the specific cognitive deficits associated with OCD. Alternatively, it may be that these tests are sensitive to differences related to the sample, such as symptom presentation or comorbidities.

Cognitive flexibility is one aspect of executive functioning that has been specifically implicated in OCD, and seems to encompass the conclusions of both Greisberg and McKay (2003) and Tallis (1997) reported above. Cognitive flexibility refers to the ability of an individual to initiate and modify a course of thought or behaviour according to novel information. It comprises perceptual, cognitive, and response dimensions (Lezak et al., 2012). Perceptually, cognitive inflexibility manifests as defective scanning and inability to change

perceptual set easily. Conceptual (cognitive) inflexibility appears as a concrete or rigid approach to understanding and problem solving, and difficulties in "learning to learn" in response to feedback. Cognitive inflexibility can appear behaviourally as obsessiveness or behavioural inflexibility, including perseverative, stereotyped, or nonadaptive behaviour. Deficits in executive functioning, and cognitive flexibility in particular, can greatly impact an individual's day-to-day functioning, including difficulties with self-regulation and adaptation to the environment.

Cognitive flexibility has been extensively studied in OCD because of the overlap between the characteristic symptoms of OCD and the behavioural manifestations of cognitive flexibility. In fact, Chamberlain, Blackwell, Fineberg, Robbins, and Sahakian (2005) argue that repetitive, intrusive OCD-related cognitions can be thought of as failures to shift attention away from distressing mental activities toward more pleasant or adaptive cognitions. Thus, they believe that cognitive flexibility mediates the relationship between underlying neuropsychological deficits and compulsive behaviours. To test their hypothesis, Chamberlain and colleagues (2006) compared individuals with OCD, trichotillomania, and healthy controls on measures of cognitive flexibility and motor inhibition. Deficits in cognitive flexibility were specific to individuals with OCD whereas impairment of motor inhibition was observed in both OCD and trichotillomania. Several other studies have supported the hypothesized association between cognitive flexibility and OCD (Olley, Malhi, & Sachdev, 2007). For example, Watkins et al. (2005) reported that OCD patients demonstrated impaired set-shifting and reversal of response set compared to individuals with Tourette's syndrome and healthy controls. Bannon, Gonsalvez, Croft, and Boyce (2006) found that patients with OCD continued to exhibit impaired set-shifting ability as measured by the *Wisconsin Card Sorting Test*, even after symptom remission, suggesting that

cognitive inflexibility is a stable characteristic of OCD.

In a novel study to examine cognitive flexibility in OCD, Kwon et al. (2003) concurrently measured the functional activity of the brain in 14 patients with OCD and 14 healthy matched controls with neuroimaging (positron emission tomography) while undergoing neuropsychological testing of executive functioning. They found that cognitive flexibility, and set-shifting in particular, was significantly impaired in individuals with OCD, and the tests on which the subjects performed poorly were associated with a characteristic pattern of activation in the prefrontal cortex. A similar study using functional magnetic resonance imaging confirmed that individuals with OCD perform more poorly on tasks of set-shifting compared to healthy controls, and this performance corresponded with reduced activation in the frontal-striatal circuit (Gu et al., 2008). These studies indicate that the deficits in cognitive flexibility observed in OCD may be associated with underlying functional differences in brain anatomy.

Greisberg and McKay (2003) suggested that executive functioning deficits seen in OCD are related to the use of inappropriate organizational strategies, such as the rigid implementation of ineffective strategies. This type of cognitive inflexibility has been observed across studies (Cavedini, Zorzi, Piccinni, Cavallini, & Bellodi, 2010). For example, Bohne et al. (2005) found that people with OCD demonstrated impaired ability to learn from feedback, reflecting a rigid implementation of ineffective problem solving strategies, whereas other visuospatial abilities, memory, and general neuropsychological functioning were intact. Other studies have also demonstrated an impaired ability to learn from feedback, or difficulty in "learning to learn," in individuals with OCD utilizing various neurocognitive measures (Olley, Malhi, & Sachdev, 2007).

The *Wisconsin Card Sorting Test* (WCST; Heaton, 1981) is the most widely used

measure of executive functioning (Rabin, Barr, & Burton, 2005), and has been suggested to be of particular relevance in the assessment of the cognitive deficits in OCD. The key cognitive processes thought to underlie performance on the WCST are perseveration and set-shifting, indicators of cognitive flexibility (Lezak et al., 2012). However, despite the apparent congruence between the executive functions assessed by the WCST and those thought to be impaired in OCD, the research findings have not reliably found impairments on this measure. For example, Moritz et al. (2001) compared the neuropsychological profile of patients with OCD, unipolar depression, schizophrenia, and healthy control subjects. They found that patients with OCD demonstrated impaired performance on tests of cognitive flexibility, including the *Trail Making Tests* A and B and a verbal fluency test, but not on the WCST number of categories completed (measure of concept formation) or perseveration. Similarly, Abbruzzese et al. (1995, 1997) compared the performance of patients with OCD or schizophrenia on two different measures of set shifting, the WCST and the *Object Alternation Task*. Individuals with OCD performed more poorly only on the *Object Alternation Task* and scored within normal range on the WCST, whereas the patients with schizophrenia showed an inverted pattern of results. Several other studies have also noted inconsistencies with regard to executive functioning deficits assessed by the WCST (Kuelz, Hohagen, & Voderholzer, 2004; Tallis, 1997). In fact, a recent meta-analysis found that although individuals with OCD evidenced moderate deficits on the WCST, these were not significantly greater in magnitude than other tests of executive functioning or psychomotor speed (Henry, 2006). Thus, the author concluded that the WCST was not differentially sensitive to deficits in executive functioning in OCD.

Several studies have suggested possible explanations for these discrepancies on tests of executive functioning. Few studies measure or control for comorbid depression despite evidence

that the presence of depressive symptoms is associated with impaired performance on measures of executive functioning in OCD (Moritz et al., 2001). Another hypothesis, and one that was tested in the present study, is that poor insight may contribute to the variability in executive functioning seen across studies.

There is a much more established evidence base regarding the neurocognitive correlates of insight in psychotic disorders, though the few studies that have been done with OCD came to the similar conclusion that insight is related to executive functioning deficits. A recent meta-analysis of 35 studies ($N = 2354$) examining neurocognitive functioning in individuals with schizophrenia and other psychotic disorders found that prefrontal cognitive functioning was explicitly impaired in those with psychosis (Aleman, Agrawal, Morgan, & David, 2006). There was a large effect size for the relationship between insight and executive functioning deficits and a small but significant association between insight and general intellectual functioning. The association between insight and executive functioning was significantly greater than for memory or general intellectual ability. These results suggest that executive functioning deficits, and cognitive inflexibility in particular, may play a specific role in impaired insight, over and above intellectual ability or memory impairment.

Similar associations between neurocognitive performance and insight have also been observed in OCD. Kitis et al. (2007) examined the relationship between neuropsychological functioning and overvalued ideation in patients with OCD, schizophrenia, and healthy controls. They found that the schizophrenia group was significantly more impaired on tests of executive functioning compared to those with OCD; however, the small sample of OCD patients with poor insight ($n = 12$) showed performance comparable to the schizophrenia group. Patients with OCD with good insight (i.e., low OVIS scores) performed significantly better on all tests than the OCD

with high overvalued ideation group. Thus, they concluded that overvalued ideation was closely related to neurocognitive impairments in OCD. However, the study did not control for several factors known to be associated with overvalued ideation and executive functioning deficits, including symptom severity and comorbid depression. In addition, although overvalued ideation is known to be a continuous construct, insight was dichotomized and no information was provided as to the means of dividing the group. Similar findings were reported by Tumkaya et al. (2009), who found that a small sample of individuals with OCD with poor insight (n = 13) performed more poorly on measures of executive functioning compared to the OCD group with good insight. In addition, they noted that OCD with poor insight shares similar neurocognitive characteristics with schizophrenia and schizophrenia with comorbid OCD, suggesting that OCD with poor insight represents a subgroup with distinct neuropsychological features between individuals with OCD and schizophrenia. However, insight was also dichotomized in this study via a median split of OVIS scores, which reduces sensitivity in the measure and may obscure the results. Additionally, no attempt was made to control for potentially confounding factors in the analysis of neuropsychological performance.

In summary, studies to date have failed to find a reliable neuropsychological profile of OCD. Several factors appear to account for the contradictions observed across studies, including the presence of comorbid depressive symptoms and OCD symptom severity; however, these factors are rarely accounted for in the analyses. In addition, some evidence indicates that impaired insight in OCD may be associated with deficits in executive functioning, particularly in the area of set shifting and cognitive flexibility, which may contribute to variability across studies of the neuropsychology of OCD. This observation has led some authors to propose a neuropsychological deficit model of poor insight in OCD (e.g., Tumkaya et al., 2009). However,

this hypothesis is constrained by methodological limitations in these studies, including small sample sizes, failure to control for potentially confounding variables, and dichotomizing insight. Therefore, the current research aims to clarify the relationship between degree of insight and cognitive flexibility in OCD, while attempting to improve upon the methodological limitations of previous studies.

Cognitive models of insight in OCD. The cognitive and metacognitive mechanisms involved in OCD have been extensively studied, and several cognitive theories have been proposed. Currently, very little is known about how insight relates to these cognitive variables; however, it has been suggested that poor insight is related to impaired metacognition (Beck et al., 2004; Lysaker et al., 2011).

Cognitive models propose that it is not the presence or content of intrusive thoughts, but the interpretation of such thoughts as threatening, that is critical for the onset and maintenance of OCD (Clark & Purdon, 1993; Freeston, Rhéaume, & Ladouceur, 1996; Rachman, 1998; Salkovskis, 1985, 1989; Sookman, Pinard, & Beauchemin, 1994). Salkovskis' (1985, 1989) cognitive model is based on the observation that intrusive thoughts are common, even in nonclinical populations, and that intrusive thoughts, images, and impulses are similar in content between clinical and nonclinical groups. He argued that these intrusions are automatic thoughts that originate from an internal or external trigger, which can be a thought, image, impulse, or situation. Although these thoughts are dismissed by most people, they escalate into obsessions only when they are habitually appraised as threatening and accompanied by a sense of personal responsibility to prevent harm to oneself or others. The negative appraisal cues distress and initiates efforts to neutralize the cognition by taking action, either overt behaviour or covert mental activity, to reduce the perceived responsibility. OCD is maintained when efforts to

neutralize or suppress the intrusions increase the salience, frequency, and distress associated with the intrusive thought and increase the probability of engaging in further neutralizing behaviour.

According to Salkovskis' (1989) model of OCD, responsibility for preventing harm to self or others is the key cognition in the onset and maintenance of OCD. Other authors have suggested other dysfunctional beliefs that may be pivotal in the development and persistence of OCD (e.g., Clark & Purdon, 1993; Freeston, Rheume, & Ladoucer, 1996; Sookman, Pinard, & Beauchemin, 1994). For example, Rachman (1998) proposed that obsessions are caused by catastrophic misinterpretations of the importance of one's thoughts; specifically, that the content of thoughts takes on greater significance and implies that one is bad, dangerous, or immoral. More recently, the Obsessive Compulsive Cognitions Working Group (OCCWG) developed a comprehensive cognitive model of OCD in which they identified six domains of cognitions (inflated responsibility, overimportance of thoughts, need to control thoughts, overestimation of threat, perfectionism, and intolerance of uncertainty) prominent in OCD (OCCWG, 1997, 2001). A subsequent factor analysis revealed that three factors (responsibility and threat estimation, perfectionism and tolerance for uncertainty, importance and control of thoughts) provided a more parsimonious, yet inclusive, model of obsessive-compulsive cognitions (OCCWG, 2005).

Beliefs about *inflated responsibility* arise from the assumption that the individual has an obligation to prevent harm from occurring, regardless of the probability that the negative event will occur; thus, the individual assumes responsibility even for hypothetical negative outcomes. In addition, inflated responsibility assumes that failing to act to prevent harm is as bad as actually causing harm, which increases the urge to neutralize the thought. *Overestimation of threat* is a type of belief that leads one to overestimate the probability and cost of negative events occurring. *Overimportance of thoughts and need to control thoughts* refer to the notion that the

mere presence of a thought indicates that the thought is important and control over one's thoughts is important and possible. This idea is related to *thought-action fusion*, in which thoughts are believed to be morally equivalent to actions, and that having a thought is believed to increase the likelihood that it will occur. *Perfectionism* refers to holding unrealistically high standards for oneself and others, and mistakes are perceived as intolerable, and *intolerance of uncertainty* describes beliefs in the need for certainty and that one has little ability to cope with unpredictability. In OCD, it manifests as difficulty in making decisions, expressing doubt about the accuracy of one's decisions, taking longer to complete tests of categorization, and experiencing extreme distress when faced with ambiguous or unpredictable situations.

Of these domains, some may be described as metacognitive beliefs. Metacognition is defined as the process of appraising, monitoring, and regulating cognitions (Wells, 2000). Therefore, cognitions are affected by the metacognitive factors that appraise and modify them. Metacognition is a multidimensional construct that includes knowledge about one's thoughts and the factors and strategies that affect them, and the conscious regulation of executive functions, such as attentional allocation, monitoring, checking, planning, and response to errors (Wells, 2000). It is often described as the ability to think about thinking and represents a higher level of cognitive activity than basic cognitions. Of the types of beliefs described by the OCCWG, overimportance and control of thoughts are best categorized as metacognitive, because they refer to the higher order activity of appraising the process and content of the associated thought. In addition, inflated sense of responsibility may be considered metacognitive in nature when the beliefs are oriented toward appraising the power or consequence of obsessional thoughts in managing risk.

To describe the interaction of cognition, metacognition, and regulation of responses in the

etiology of psychological disorders, Wells and Matthews (1994) developed the self-regulatory executive function (S-REF) model. Briefly, the S-REF model suggests that psychopathology is characterized by maladaptive metacognitive beliefs that direct cognitive processing activities, such as self-focused attention, activating negative self-beliefs, perseverative thinking, threat monitoring, and maladaptive coping strategies. These cognitive processes then lead to distressed emotional states that interfere with one's ability to return to normal functioning through a series of pathways (e.g., nature of the stressor, depletion of cognitive processing resources, faulty coping strategies, faulty self-beliefs). Within OCD, the S-REF model suggests that an internal (e.g., intrusive thought or doubt) or external (e.g., situational or feared stimuli) trigger activates metacognitive beliefs about the meaning of the trigger. For example, some people with OCD, particularly those with repugnant obsessions (e.g., aggressive, sexual, religious obsessions) motivated by avoidance of danger or harm, report beliefs that having a thought will make an action occur (i.e., thought-action fusion; Rachman, 1993). Similarly, some individuals with OCD report that having a thought is morally equivalent to carrying out the associated action (Rachman, 1998). In this case, the metacognitive belief is that the content of thought implies that one is bad, dangerous, or immoral. The metacognitive belief influences appraisals of intrusions (e.g., positive, negative, neutral) and appraisals of behavioural responses. These appraisals then influence the selection and implementation of behavioural responses and contribute to emotional reactions. This cycle continues until an internal stop signal is received which corresponds with one's metacognitive beliefs about the goals of the behavioural response or the desired end-state.

The significance of metacognitive variables in OCD has received empirical support. Wells and Papageorgiou (1998) found that each domain of metacognition tested (positive beliefs about worry, negative beliefs about the uncontrollability of thoughts, lack of cognitive

confidence, negative beliefs about thoughts, cognitive self-consciousness) predicted obsessional thoughts after controlling for worry. Similarly, Clark, Purdon, and Wang (2003) found that metacognitive beliefs about the need to control intrusive thoughts, perceived negative consequences of failing to control intrusive thoughts, and positive beliefs about intrusions were uniquely related to obsessions but not worry. As predicted by metacognitive models, Gwilliam, Wells, and Cartwright-Hatton (2004) reported that the relationship between inflated responsibility and OC symptoms is dependent upon metacognition. More recent tests of other metacognitive variables have also been largely supportive of the significance of metacognition in relation to OC symptoms (Hermans et al., 2008; Solem, Myers, Fisher, Vogel, & Wells, 2010), and as a predictor of treatment outcome in OCD (Fisher & Wells, 2005; Solem, Håland, Vogel, Hansen, & Wells, 2009). Further, cognitive self-consciousness, a type of metacognitive style characterized by overfocus on one's own mental processes, mediated the relationship between memory deficits on neuropsychological tests and OCD symptoms (Exner et al., 2009). Thus, metacognitive processes have been found to play a significant role in OCD.

Metacognition may play a particularly important role in delusional and poor insight OCD, with specific metacognitive beliefs leading the individual to engage in ineffective or counterproductive attempts at control that may contribute to delusional-intensity beliefs. However, evidence for the relationship between metacognition and insight in OCD is largely indirect, from examinations of insight and metacognition in schizophrenia and other psychotic disorders. Beck et al. (2004) were the first to note that insight into one's illness relies on the ability to evaluate psychotic experiences and one's inferences about these psychotic experiences, which may account for some of the inconsistencies between traditional clinical insight scales and symptom or outcome measures. Metacognitive deficiencies are thought to contribute to impaired

insight because individuals have difficulty distancing themselves from the distorted perceptions and are resistant to corrective feedback. To assess the aspects of metacognition specifically related to insight, Beck and colleagues (2004) created the BCIS (described earlier), which contains two subscales measuring self-reflectiveness and self-certainty. The self-reflectiveness scale measures the capacity and willingness to observe one's mental activity, and the self-certainty scale assesses overconfidence in the validity of one's beliefs. Among schizophrenic patients, those with active delusions report significantly greater self-certainty and lower self-reflectiveness (Bora, Erkan, Kayahan, & Veznedaroglu, 2007; Bruno, Sachs, Demily, Franck, & Pacherie, 2010; Buchy, Malla, Joober, & Lepage, 2009; Engh et al., 2010;), indicating that they are more cognitively rigid and less open to alternative interpretations for their unusual experiences.

Other studies, using self-report and behavioural measures of metacognition other than the BCIS, have found that metacognition, particularly in the domains of self-reflectivity and need to control thoughts, is impaired among those with poor insight in schizophrenia and other delusional disorders (Favrod, Maire, Bardy, Pernier, & Bonsack, 2010; Lysaker et al., 2011), supporting assertions that poor insight results from the use of maladaptive metacognitive processes. In a novel study that sought to examine the relative contributions of neuropsychological deficits and metacognition to impaired insight in schizophrenia, Koren et al. (2004) used a modification of the WCST to assess metacognitive performance, rather than metacognitive beliefs as in conventional measures of metacognition. They found that performance on traditional WCST indices was not correlated with insight, whereas some aspects of metacognitive performance were significantly associated with multiple domains of insight, such as awareness of a mental disorder, medication effects, social consequences, and current

symptoms. Further, after controlling for traditional WCST performance, metacognitive performance was uniquely predictive of insight. A more thorough examination of metacognitive and neurocognitive predictors of poor insight in schizophrenia found that there were unique relationships between specific domains of metacognition and insight even after controlling for a range of neuropsychological variables (Lysaker et al., 2011). Specifically, Lysaker et al. (2011) found that mastery, defined as using knowledge of one's mental states to solve problems and resolve distress, predicted awareness of need for treatment, consequences of illness, and overall insight after controlling for selected neuropsychological variables. Together these studies suggest that metacognition may be a significant contributor to impaired insight, although it has been a largely overlooked variable in this area of research.

There have been few investigations of the relationship between metacognition and insight in OCD. Although not directly assessing insight, Moritz, Peters, Larøi, and Lincoln (2010) found that the profile of metacognitive beliefs of OCD patients was more similar to schizophrenic patients than to healthy controls, which the authors suggest may be a vulnerability factor for delusional thinking. Unfortunately, based on the limited evidence available, any conclusions about the role of metacognition in the phenomenology of poor insight OCD is premature. Given the significance of metacognition for the conceptualization of poor insight in schizophrenia, however, a direct test of the relationship in OCD is warranted.

Other cognitive variables related to insight. While there have been several studies examining the neuropsychological, demographic, and clinical predictors of poor insight in OCD, the preceding literature review has drawn attention to the limited understanding of potentially relevant cognitive and metacognitive variables. Some authors have suggested that OCD with poor insight is akin to a form of schizotypy because of similarities between these groups in

perceptual distortions, suspiciousness, ideas of reference, and magical thinking (Enright, Claridge, Beech, & Kemp-Wheeler, 1994; Insel & Akiskal, 1986; Sobin, Blundell, Weiller, Gavigan, Haiman, & Karayiorgou, 2000). In addition, similarities have been found between the neuropsychological profile of poor insight in OCD and schizophrenia spectrum disorders, suggesting that there may be some overlap between the delusional quality of thoughts in these disorders. Two cognitive constructs that may be related to OCD, and particularly the poor insight variant, but have received little examination are magical ideation and suspiciousness.

The construct of magical ideation (MI), which has been defined as "beliefs that defy culturally accepted laws of causality" (Einstein & Menzies, 2004a, p. 539), has been most thoroughly investigated in and associated with psychotic disorders (e.g., Eckblad & Chapman, 1983). However, elevated MI has also been identified in individuals with OCD, and appears to be uniquely associated with OCD compared to panic disorder or nonclinical status (Einstein & Menzies, 2006). In OCD, MI refers to the belief that certain thoughts or behaviours exert a causal influence over outcomes. Einstein and Menzies (2004a) suggest that MI is closely related to the concept of thought-action fusion, such that thought-action fusion may be one manifestation of a general tendency towards MI in individuals with OCD. As noted earlier, thought-action fusion is one form of metacognition that has been implicated in the maintenance of OCD (Wells, 2000). Evidence suggests that MI is the central construct underlying thought-action fusion (Einstein & Menzies, 2004b), and thus may be the most relevant metacognitive variable in the phenomenology of OCD.

Although very little research has examined the relationship between MI and insight in OCD, there is reason to believe that these constructs are related. Conceptually, poor insight has been related to aspects of psychotic-like experiences assessed by the MI construct (Neziroglu &

Stevens, 2002). The only study to date to measure both overvalued ideation and MI found that individuals with religious obsessions and obsessions related to harming oneself or others had elevated MI and fixity of beliefs (Tolin, Abramowitz, Kozak, & Foa, 2001). However, this study did not look at the relationship between these constructs or their relative contribution to symptom severity, so it is unclear if MI and poor insight are related and what their relationship is with OCD severity or symptom presentation.

Similarly, paranoia and suspiciousness are commonly associated with schizotypy and have been found to be elevated in OCD. In the domain of schizophrenia, paranoia refers to the severity of delusions and suspiciousness (Drake et al., 2004). Impaired insight has been found to be associated with persecutory delusions in schizophrenia (Carroll, Sabry, Clyde, Coffey, Owens, & Johnstone, 1999), although some research indicates that poor insight is related to severity of psychopathology but not specifically to paranoia (Drake et al., 2004). The relationship is also inconsistent in anxiety disorders. Some studies suggest that mistrust, a type of paranoid suspiciousness, is the only schizotypal symptom associated with OCD symptoms (Chmielewski & Watson, 2008), although some studies note that paranoia/suspiciousness is more typical of social anxiety and panic disorder than OCD (Huppert & Smith, 2005). Thus, the relationship of paranoia and impaired insight is unclear and more research is needed to determine if and how these constructs may be related.

Summary and Implications

Poor insight into the excessiveness or senselessness of one's obsessions or compulsions is much more common than previously believed; however, impaired insight in OCD is a poorly understood construct. Because of the current conceptualization of insight in the DSM-5, research regarding insight in OCD has primarily focused on awareness of the senselessness of one's

obsessions or compulsions despite evidence that insight is a multidimensional construct including, but not limited to, strength of conviction, perception of others' views of beliefs, explanation of differing views, efforts to disprove one's beliefs, and awareness of a psychiatric source of one's symptoms. Examining these aspects of insight independently may be more informative and clinically useful than a composite insight measure. Given the variability in insight across individuals and throughout the course of the disorder, there may be meaningful differences in the types of insight observed. In addition, most research has examined the clinical and demographic features predictive of insight but more work is needed to understand the underlying cognitive and neuropsychological features associated with the independent dimensions of insight in OCD.

Understanding the cognitive and neuropsychological functioning of individuals with OCD, and those with poor insight in particular, is important because it may point to both underlying neuroanatomical features of OCD with poor insight and to higher order cognitive abilities that could affect treatment response. As Aigner et al. (2005) suggest, "poor insight may be a result of cognitive deficits and may point to organicity" (p. 174), which may suggest that different treatment strategies will be more effective than a standard treatment approach. This was the conclusion of D'Alcante et al. (2012) who found that good performance on neuropsychological measures of mental flexibility predicted better response to CBT for OCD but poorer response to fluoxetine. They concluded that individuals with different neuropsychological profiles may respond preferentially to different types of treatment.

If poor insight is associated with deficits in cognitive flexibility, these individuals may have difficulty incorporating corrective information during psychotherapy. This may call for an emphasis on behavioural rather than cognitive interventions in therapy. Alternatively, these

individuals may benefit from pharmacological treatments in addition to, or in place of, psychotherapy. This seems to be a reasonable suggestion, as Eisen et al. (2001) found that patients with poor insight responded well to SRIs. These patients may also benefit from augmentation of SRI treatment with antipsychotic medication, as evidence indicates that outcomes are enhanced in cases of treatment refractory OCD when antipsychotics are added (Bloch et al., 2006; Skapinakis, Papatheodorou, & Mavreas, 2007). Another possibility is that deficits in insight may need to be addressed independently before targeting OCD-related beliefs in therapy through neuropsychological rehabilitation strategies or other psychological therapies. For example, motivational interviewing has received some preliminary support in modifying insight in individuals with schizophrenia (Rüsch & Corrigan, 2002; Sousa, 2008), although it is unknown whether this subsequently improves treatment outcomes. Thus, determining if neuropsychological performance is related to insight in OCD is a first step in attempting to account for treatment failures and make recommendations to enhance treatment outcomes.

Purpose of the Present Study

The purpose of the present study was to examine the relationship between dimensions of insight and cognitive, neuropsychological, and metacognitive variables that may be associated with poor insight in OCD. The literature in schizophrenia has suggested that other cognitive variables may be conceptually related to insight, including metacognition, decentering, magical thinking, paranoia and suspiciousness, and cognitive flexibility. Given the limited evidence with OCD patients, and similarities between poor insight in OCD, delusions, and symptoms of schizotypy, there is some reason to believe that these other constructs may also be of interest in characterizing insight in OCD.

Metacognition may play a particularly important role in delusional and poor insight OCD

as delusions have been described as a failure to engage metacognitive processes (Beck, Baruch, Balter, Steer, & Warman, 2004). Although deficits in metacognition have been associated with symptom severity and poor treatment outcome in OCD, the relationship between metacognition and insight has yet to be directly assessed in OCD. However, deficits in metacognition have been found to be the most significant contributor to poor insight among individuals with schizophrenia (Kwon et al., 2003) and are, therefore, expected to be similarly predictive of poor insight in OCD.

Decentering is a type of metacognition that may be relevant to understanding insight in OCD. Decentering is discussed extensively in the cognitive therapy and mindfulness literature to refer to the capacity to take a detached view of one's thoughts and feelings as mental events rather than objective facts (e.g., Hayes-Skelton & Graham, 2013). Further, decentering has been described as an important mechanism of change in cognitive and mindfulness therapies (Safran & Segal, 1990; Teasdale et al., 2002) because the process of change in these treatments is thought to rely on an individual's ability to engage in effortful processing at a metacognitive level (Ingram & Hollon, 1986). Thus, decentering is similar to the construct of cognitive insight described by Beck and colleagues (2004), which has been found to be significantly related to impaired insight. It is different in that decentering refers to the process of disengaging from one's thoughts rather than to confidence in one's thoughts and resistance to correction as in the BCIS. Although these constructs may overlap, they are proposed in separate literatures to be independently associated with the ability to engage in metacognitive processing.

Although magical ideation has been found to be elevated among individuals with OCD, schizotypy, and delusions, no research has directly examined the relationship between magical thinking and insight in OCD. However, magical ideation has been described as a metacognitive

process, and thus may also be indirectly associated with impaired insight. In addition, magical ideation represents a tendency to endorse unusual types of beliefs, such as paranormal phenomena, superstitions, and unusual causal relationships like thought-action fusion. Thus, poor insight in OCD may be better described as a type of magical thinking in which the individual strongly endorses unusual OCD-related beliefs.

Some research has suggested that poor insight is associated with paranoia and suspiciousness in schizophrenia, although this relationship is not consistent across studies. This relationship has not yet been examined in OCD; however, evidence from the schizophrenia literature suggests that poor insight contributes to paranoia as some individuals with impaired insight are unable to identify a psychiatric source for their illness and may believe intrusive thoughts to be accurate and, therefore, threatening. Before such a conclusion can be reached, a relationship between these variables must first be established within OCD to determine whether more precise studies of this relationship are warranted. And finally, a characteristic feature of obsessive symptoms is their rigidity and inflexibility (Frost & Steketee, 2002). While the association between impaired insight and cognitive inflexibility has been demonstrated in a limited number of studies using neuropsychological measures, self-report measures have yet to be used to assess this relationship. At present, it is unclear how cognitive flexibility measured by neuropsychological tests compares to the type of flexibility measured by self-report measures, or its concomitant relationship with insight in OCD.

This study also sought to examine the neuropsychological basis of poor insight in OCD by evaluating the association between insight, cognitive flexibility, and metacognitive beliefs. There has been a considerable amount of research describing the neuropsychological profile of individuals with OCD. Although there are inconsistencies in the literature, individuals with OCD

tend to demonstrate deficits in cognitive flexibility, including difficulty with set-shifting, perseveration, and learning in response to feedback (Olley, Malhi, & Sachdev, 2007; Tallis, 1997), which appears to be more pronounced among those with poor insight (Kitis et al., 2007; Tumkaya et al., 2009). Although methodological limitations of these studies make it difficult to interpret the significance of the results, they suggest that cognitive flexibility underlies the capacity for insight. This has led some to propose a neuropsychological deficit model of impaired insight. Understanding the neuropsychological functioning of individuals with poor insight is important because it may point to both underlying neuroanatomical features of insight and to higher order cognitive abilities that could affect treatment response. This may indicate that modifications to a standard treatment protocol may be necessary depending on the nature of the client's weaknesses.

An additional aim of this study was to explore the relative effects of metacognition and cognitive flexibility in impaired insight in OCD. One prominent theory proposes that poor insight is related to impaired metacognition (Beck et al., 2004). Specifically, the metacognitive deficit model of poor insight proposes that insight relies on the metacognitive ability to monitor, appraise, and modify abnormal experiences and one's thinking about these experiences (Beck et al., 2004); thus, poor insight reflects impaired metacognitive ability. Although there is a substantial amount of literature regarding the role of metacognition in impaired insight in schizophrenia and other delusional disorders, this relationship has received little attention in OCD. Metacognitive models of OCD (e.g., Wells & Matthews, 1994) suggest that specific metacognitive beliefs promote the use of ineffective or counterproductive attempts at control that contribute to the maintenance of the obsessive beliefs. When these metacognitive beliefs become extreme, the associated obsessional beliefs may become delusional in their intensity. However,

the only known study to date that has examined this relationship in OCD found that individuals with good insight had higher maladaptive metacognitive beliefs than individuals with poor insight (Önen, Uğurlu, & Çayköylü, 2013). Participants with poor insight reported negative metacognitive beliefs closer to, though still significantly higher than, healthy controls. Thus, while the role of metacognition and insight is better understood in delusional disorders, this relationship requires further exploration within an OCD population.

Therefore, a combined model may allow for an examination of the relative and, potentially interacting, effects of both neuropsychological functioning and metacognition. Previous research has attempted to clarify the underlying mechanisms of poor insight by examining whether clinical, demographic, and neuropsychological variables are correlated with insight. The results have been mixed, suggesting that these domains of influence are not mutually exclusive and calls for an integrative approach to understanding impaired insight in OCD. In schizophrenia and other psychotic disorders, researchers have found significant independent associations between metacognition and neuropsychological functioning with impaired insight. In addition, deficits in executive functioning have been associated with poor metacognitive ability. These independent findings suggest that these variables may contribute to a promising combined model to account for poor insight. To test this relationship, a mediation analysis was planned to test metacognition as a mediator of the relationship between cognitive inflexibility and poor insight in OCD.

A secondary aim of this study was to consider whether insight may be situational and state dependent, or whether it is a more stable characteristic even under conditions of stress. For example, individuals may have intact insight into the senselessness or extreme nature of their obsessions or compulsions when interviewed, but have poor insight at the time that an intrusive

thought is activated and negative affect is high. Some authors have noted that insight tends to fluctuate throughout the course of the disorder, with some periods being marked by fully intact insight and insight completely lacking at other times (Insel & Akiskal, 1986; Lelliott et al., 1988; Kozak & Foa, 1994). However, it may be that insight fluctuates from moment-to-moment and the individual may be able to rationally evaluate the senselessness of one's obsessions or compulsions when detached from the situation. While some data support the assertion that insight is poorer when confronted with a feared situation (Menzies & Clark, 1995), other evidence indicates that insight may be poor even in neutral situations (e.g., Foa & Kozak, 1995).

Moment to moment fluctuations in insight, particularly the degree of insight when the patient is triggered by OCD-related thoughts, may be more relevant markers of treatment outcome than the detached, objective assessment of one's symptoms that is typically obtained during clinical interviews. Degree of insight reported during a clinical interview may not be an accurate reflection of how the individual reacts to OCD-related stimuli and thus, may not be an accurate indicator of treatment engagement or response. However, to date, no studies have asked participants with OCD to reflect on their degree of conviction when in a relatively neutral testing environment compared to when OCD-related thoughts are activated. This additional perspective may help resolve some of the inconsistencies throughout the insight literature regarding the effects of poor insight.

Hypotheses

i. Because metacognition has been shown to be the strongest predictor of insight in schizophrenia, it was hypothesized that a significant positive correlation exists between metacognition and insight in OCD, and metacognition would emerge as the strongest predictor of impaired insight among the included predictor variables, after controlling for

OCD severity and depression. In particular, the composite index of the BCIS, which represents cognitive insight, is thought to contribute to the capacity for clinical insight and was, therefore, expected to be the best predictor of overall clinical insight (i.e., BABS total score). In addition, cognitive confidence was hypothesized to be the best predictor of conviction in one's beliefs because of the conceptual overlap between these variables. Importance and need to control thoughts, as well as responsibility and threat estimation, were predicted to be strongly related to fixity of beliefs, or willingness to consider the possibility that one's beliefs may be false, because individuals who hold strong beliefs about the importance of controlling thoughts or the consequences of not controlling one's thoughts, are likely to demonstrate rigid and inflexible thinking. Finally, it was expected that cognitive self-consciousness, or the tendency to focus awareness on one's thought processes, would have the strongest relationship with insight regarding a psychiatric source of one's symptoms. Individuals who frequently monitor their internal states and cognitions may be more likely to notice abnormal cognitions and ascribe a psychiatric source for aberrant thoughts.

ii. After controlling for depression and OCD symptom severity, it was expected that a significant negative correlation would be found between self-report measures of cognitive flexibility and insight. That is, lower cognitive flexibility was expected to be associated with impaired insight. There is an extensive literature demonstrating a strong relationship between neuropsychological measures of mental flexibility and insight; therefore, it was expected that self-report measures of cognitive flexibility would show a similar relationship to insight in OCD. In particular, higher cognitive flexibility was expected to be the strongest predictor of how actively one attempts to disprove one's OCD-related thoughts. Similarly, together with cognitive self-consciousness, lower self-reported cognitive flexibility was also expected to be

a significant predictor of fixity of beliefs, as individuals who endorse a more rigid thinking style were expected to hold on to their OCD-related beliefs more strongly.

iii. Decentering, or the ability to step back and disengage from one's thoughts in order to objectively assess the content of the thoughts, was hypothesized to be a significant independent predictor of overall insight. This hypothesis was derived from evidence that decentering is critical for engaging in cognitive therapy and is related to treatment outcome. Similarly, poor insight has been hypothesized to be related to treatment failures because clients are unable to disengage from their beliefs and consider alternative perspectives.

iv. It was hypothesized that a significant positive correlation would be observed between magical thinking and insight because of the conceptual similarities between impaired insight and magical, superstitious beliefs. However, because magical thinking has been described as a metacognitive construct, other metacognitive predictors (as described above) that are theoretically more strongly related to insight were predicted to account for the variance in insight scores in a regression analysis. Thus, despite a predicted significant correlation between insight and magical thinking, it was not expected that magical thinking would be a significant independent predictor of insight after accounting for metacognition and cognitive flexibility.

v. In schizophrenia, individuals with poor insight who are unable to identify a psychiatric source for their illness are more likely to report paranoid and suspicious thinking. In addition, individuals with low self-awareness, which may be analogous to poor insight, are more likely to report paranoid thinking. Therefore, it was expected that a significant negative correlation would be found between paranoia/suspiciousness and insight in an OCD sample. In particular, it was hypothesized that paranoia/suspiciousness would be a significant predictor of insight

into a psychiatric source for one's symptoms, over and above the effects of other predictor variables in the regression analysis.

vi. Lower cognitive flexibility was predicted to be associated with impaired insight in OCD. Specifically, poorer performance on neuropsychological measures of cognitive flexibility, including WCST perseverative errors, number of categories completed, and trials to complete first category, Stroop Color and Word test (interference score), Controlled Oral Word Association (total items generated), and Trails B (completion time), were expected to predict insight scores, even after controlling for differences in symptom severity and depressive symptoms.

vii. Metacognition was hypothesized to be positively related to clinical insight in OCD. Specifically, the composite index of the BCIS was expected to predict BABS total score.

viii. Metacognition (BCIS composite index) was predicted to mediate the relationship between cognitive flexibility and clinical insight (BABS total).

ix. Finally, it was expected that participants would report having significantly poorer insight when reflecting on times when OCD symptoms are activated compared to insight at the time of the assessment. For people with poor insight, however, it was hypothesized that the difference in insight scores between the neutral assessment time point and estimated insight at the time that obsessive thoughts are activated would be smaller than for individuals with good insight, suggesting that for some individuals, poor insight is a stable characteristic.

Method

Participants

Individuals referred to the Anxiety Treatment and Research Centre at St. Joseph's Healthcare, Hamilton were contacted to participate if: a) they were referred for difficulties with obsessive-compulsive symptoms and were on a waitlist for an intake assessment; b) they had previously received a diagnostic assessment and were on an OCD treatment waitlist; or c) they had completed individual or group treatment for OCD more than 6 months prior to participating in the current study. One hundred seventy-one individuals were contacted by telephone between February and December 2013 and asked to participate in a brief screening interview to assess for study eligibility. Of the 25 individuals who received an intake assessment, including a complete *Structured Clinical Interview for DSM-IV Disorders* (SCID-IV; First, Spitzer, Gibbon, & Williams, 2007), 12 met inclusion criteria and agreed to participate in the study. Of the 128 individuals on the treatment waitlist, 68 met the inclusion criteria and agreed to participate, 24 were not interested or unable to attend the study session, 18 were ineligible to participate, 15 did not attend a scheduled study session, and 3 did not respond to attempts to contact. None of the 18 individuals contacted who had completed treatment more than 6 months prior to study recruitment were eligible and agreed to participate.

Inclusion criteria included: a) between the ages of 18 and 65; and b) principal diagnosis

of OCD according to DSM-IV and DSM-5 diagnostic criteria as assessed with the SCID-IV.[1] To ensure that individuals with poor insight were not excluded from the study because of failing to meet the insight criterion, criterion B (i.e., At some point during the course of the disorder, the person has recognized that the obsessions or compulsions are excessive or unreasonable) was coded but not used to rule out a diagnosis of OCD. Exclusion criteria included: a) concurrent diagnosis of schizophrenia or another psychotic disorder; b) current alcohol or substance use disorder; c) presence of known neurological condition (e.g., stroke, head injury, tumor, epilepsy) or developmental disorder; d) severe suicidal ideation; e) lack of fluency (written and spoken) in English; f) previous experience with the neuropsychological measures used in this study; g) colour blindness or other uncorrected vision problem; and h) not on a stable dose of medications in the 6 weeks preceding the study. Participants who previously received treatment were eligible provided that diagnostic criteria for OCD were met at the time of study participation.

The sample (n = 80, 50% female) ranged in age from 18 to 64 years (M = 33.99, SD = 12.68). The mean age at onset of OCD was 19.14 years (SD = 11.33, range 5-52). The mean Y-BOCS total score was 21.30 (SD = 6.83), obsessions subscale mean was 10.70 (SD = 3.42), and compulsions subscale mean was 10.60 (SD = 4.14). The mean BABS score was 6.53 (SD = 4.21, range 0-18).

The sample identified their racial or ethnic background as White/European (n = 70,

[1] Aside from minor changes in wording, the only substantive change to the diagnostic criteria for OCD from DSM-IV-TR to DSM-5 is removal of Criterion B (i.e., At some point during the course of the disorder, the person has recognized that the obsessions or compulsions are excessive or unreasonable.). Therefore, the SCID-IV is likely appropriate for diagnosing DSM-5 OCD when the item assessing Criterion B is disregarded.

87.5%), Asian (*n* = 4, 5%), Multiracial (*n* = 3, 3.8%), Hispanic/Latin American (*n* = 1, 1.3%), and 2 individuals (2.5%) identified with another ethnicity. The majority of participants were single (*n* = 42, 52.5%), married/common law (*n* = 23, 28.8%), in a long-term relationship (*n* = 9, 11.3%), or separated or divorced (*n* = 6, 7.5%). Educational attainment was as follows: 42.5% (*n* = 34) completed college or university, 16.3% (*n* = 13) completed some postsecondary education, 16.3% (*n* = 13) completed high school, 13.8% (*n* = 11) completed some high school, and 11.3% (*n* = 9) completed graduate school. Twenty-six percent of the sample (*n* = 21) were working full time and 23.8% (*n* = 19) were working part time. Of the 36 participants (45% of the sample) who were unemployed, 41.7% (*n* = 15) reported being unable to work due to their psychological symptoms. Seventy-five percent (*n* = 60) had received psychological therapy at some time in their lives, and 77.5% (*n* = 62) were currently taking psychiatric medication. Of the individuals who were currently taking medication, 25 reported taking at least 2 different psychiatric medications, 10 individuals were taking at least 3 medications, and 2 participants were taking 4 different psychiatric medications. These included at least one selective serotonin reuptake inhibitor (SSRI) or serotonin-norepinephrine reuptake inhibitor (SNRI) (*n* = 50), benzodiazepine (*n* = 15), antipsychotic (*n* = 12), mood stabilizer/anticonvulsant (*n* = 6), or another psychiatric medication (e.g., tricyclic antidepressant, buproprion, mirtazapine, buspirone, trazodone; *n* = 16).

Measures

Clinical assessment. Each participant received a complete SCID-IV (First et al., 2007) within 1 to 259 days of participating in the study (*M* = 69.23 days). The OCD module of the SCID-IV was readministered at the testing session, along with the Yale-Brown Obsessive Compulsive Scale-Self-Report Version (Baer, 2012), to confirm diagnosis and clarify the type and severity of their obsessive-compulsive symptoms, and the BABS (Eisen et al., 1998) to

assess the degree and type of insight.

Yale-Brown Obsessive Compulsive Scale-Self-Report Version (Y-BOCS-SR; Baer, 2012). The Y-BOCS-SR is a self-report scale that assesses severity of obsessive-compulsive symptoms. It is an alternative form of the Y-BOCS clinician-administered interview, which is a widely used measure of symptom severity in OCD and has been described as the gold standard for measuring OCD symptom severity (Shear, Brown, & Clark, 2008). The Y-BOCS-SR includes a 58-item symptom checklist that assesses the presence of a wide range of current and past obsessions and compulsions, and a 10-item scale reflecting the severity of current obsessions (5 questions) and compulsions (5 questions). Symptoms endorsed on the checklist are assessed on the severity scale in terms of: (a) time spent; (b) interference; (c) distress; (d) resistance; (e) and control over obsessions and compulsions. Responses are recorded using a 5-point Likert scale (higher ratings indicating greater severity), with total scores ranging from 0 to 40, and obsession and compulsion subscale scores range from 0 to 20. An additional item assesses the patient's insight into the degree of senselessness or excessiveness of their obsessions or compulsions. The item is scored from 0 (excellent insight) to 4 (lacks insight, delusional), though the item is not included in the total severity score. The Y-BOCS-SR has demonstrated good psychometric properties (Steketee, Frost, & Bogart, 1996), and moderate to high concordance with the interviewer-rated version (Federici et al., 2010; Steketee et al., 1996).

Brown Assessment of Beliefs Scale (BABS*;* Eisen, Phillips, Baer, Beer, Atala, & Rasmussen, 1998). The BABS is 7-item clinician-administered semistructured interview designed to assess delusional thinking across a range of psychiatric disorders. Based on the premise that insight is a continuous and multidimensional construct, the scale assesses the degree delusionality of beliefs on the following characteristics: a) conviction in the belief; b) perception

of others' views; c) explanation of differing views; d) fixity of beliefs; e) attempt to disprove beliefs; and f) recognition of a psychiatric source for one's symptoms. In addition, a seventh item, which is not included in the total score, assesses ideas or delusions of reference. Specific obsessional beliefs that the patient has experienced in the past week are identified and then rated on the dimensions described above. Item scores range from 0 to 4, with higher scores reflecting a greater degree of delusionality, and the first six items are summed to produce the total score (range = 0 – 24). In addition, the clinician provides an impression of the participant's level of insight from 0 (excellent insight; fully rational) to 4 (lacks insight; delusional), which is not included in the total score. The scale has good psychometric properties, including treatment sensitivity, test-retest and interrater reliability, and internal consistency (Eisen et al., 1998) and has been found to correspond well with other measures of insight in OCD (Shimshoni, Reuven, Dar, & Hermesh, 2011). In this study, each item was considered separately to assess the hypothesized dimensions of insight independently. In addition, the BABS was administered in its entirety to obtain a current assessment of insight, and again with the client asked to reflect on his or her insight at the moment that they experience OCD symptoms.

Neuropsychological assessment. Many of the tests in this battery provide several scores, which results in numerous possible variables. In order to reduce the number of variables in subsequent analyses, a limited subset of the variables were selected a priori. However, multiple measures were selected to ensure that a broad assessment of cognitive flexibility was assessed. The use of multiple tests provides convergent validity and may indicate the particular neuropsychological deficits associated with poor insight in OCD. Across the neuropsychological measures used, higher scores reflect better performance and greater cognitive flexibility.

Wisconsin Card Sorting Test (*WCST*; Heaton, 1981). The WCST is a 64-item card-

sorting test that is thought to be a measure of aspects of executive functioning, including the patient's ability to form abstract concepts, shift sets, and utilize feedback (Strauss, Sherman, & Spreen, 2006). The computerized version of the WCST was administered, in which the individual is presented with 64 different cards on the screen that can be distinguished by number, colour, or shape of the figure. Individuals have to complete several series (10 cards per series) in which they are required to sort the cards into the correct category based on a predetermined classification strategy. The individual has to maintain the correct sorting category throughout each series and search for a new classification strategy at the end of each series. The number of trials to complete first category (FC) and total number of categories (NC) completed reflect the ability to switch cognitive set and learn from feedback. Perseverative errors (PE) refers to continuing to use a sort strategy even when the participant has been provided with feedback that the strategy is wrong. The WCST also provides indices of other aspects of executive functioning (e.g., nonperseverative errors, failure to maintain set, total trials, percent conceptual level responses); however, the PE, NC, and FC are thought to be the best measures of cognitive flexibility. Psychometric properties of the WCST have been studied in a wide range of clinical and nonclinical samples, and the WCST has been identified as one of the most reliable and valid measures of executive functioning and set shifting (Lezak et al., 2012).

Trail-Making Test (*TMT*; Reitan, 1993). The TMT assesses attention, cognitive flexibility, and the speed of visual search and motor functions (Strauss, Sherman, & Spreen, 2006). It consists of two tests; Part A involves connecting encircled numbers from 1 to 25 dispersed randomly on the test sheet, and Part B involves alternately connecting 25 encircled numbers and letters. The tests are scored in terms of the time (in seconds) to complete each part of this test. It has excellent psychometric properties and is one of the most frequently used

measures of executive functioning because of its superior sensitivity in detecting neurological impairment (Strauss, Sherman, & Spreen, 2012).

Stroop Color and Word Test (Stroop; Golden & Freshwater, 2002). The Stroop test measures response inhibition and cognitive flexibility. The test consists of three parts, each 45-seconds in length. In Part 1 (W), the participant is asked to read the words "red," "green," and "blue" printed in black ink repeated in random order in columns on the page. In Part 2 (C), the participant names the ink colour in which an X is printed in columns on the page. In Part 3 (CW), the participant is asked to name the ink colour in which colour words are printed (the colour word and ink colour do not match). The test yields three scores reflecting the total number of items completed on each sheet plus an interference score, though for the purposes of this study, only the interference score was analyzed. The Stroop test has adequate reliability and validity, and has been used extensively with psychiatric populations, including individuals with OCD (Strauss, Sherman, & Spreen, 2012).

Controlled Oral Word Association (*COWA*). The COWA is a measure of verbal fluency designed to assess the individual's ability to produce verbal responses according to set rules (i.e., response initiation). It includes letter fluency (i.e., say words that begin with the letters F, A, and S) and category fluency (i.e., say words that belong to a semantic category, such as animals). Participants are asked to produce as many instances of the designated category in a set period of time, usually 1 minute. Scores are provided for number of correct responses generated for each condition and summed to provide a total score across all trials. This test has adequate reliability and validity (Strauss, Spreen, & Sherman, 2012), and may be more sensitive to executive functioning deficits than other executive measures (Henry & Crawford, 2004).

Questionnaire-based Measures.

Beck Cognitive Insight Scale (BCIS; Beck, Baruch, Balter, Steer, & Warman, 2004). The BCIS is a 15-item self-report measure that was designed to assess the ability to distance oneself from distorted thoughts and reevaluate anomalous experiences and misinterpretations. It contains two subscales: a 9-item subscale labeled self-reflectiveness that measures introspection and openness to feedback, and a 6-item self-certainty subscale with items intended to assess certainty about one's beliefs and judgments, and resistance to correction. Agreement with each item is rated on a 4-point scale. In addition, a composite index can be calculated by subtracting the self-certainty score from the self-reflectiveness score, yielding an overall cognitive insight score that ranges from -18 to 27. There were methodological limitations in the scale development study that likely resulted in the poor psychometric properties reported; however, a subsequent qualitative review of 21 studies that have used the BCIS confirmed the 2-factor structure and documented adequate psychometric properties in patients with psychotic and mood disorders (Riggs, Grant, Perivoliotis, & Beck, 2012). The only study to date that has used the BCIS with OCD patients reported acceptable internal consistency for both the self-reflectiveness (α =.71) and self-certainty (α =.59) subscales (Shimshoni, Reuven, Dar, & Hermesh, 2011), which were comparable to the internal consistencies of the self-reflectiveness (α = .69) and self-certainty (α = .71) subscales observed in the current study. The composite index of the BCIS was used in this study as a measure of metacognition, given that it was intended to measure the capacity for insight (i.e., a metacognitive ability) rather than the pathology of insight.

Metacognitions Questionnaire – 30-item version (MCQ-30; Wells & Cartwright-Hatton, 2004). The MCQ-30 is the short form derived from the original 65-item scale that was developed to measure several dimensions of metacognitive beliefs (Cartwright-Hatton & Wells, 1997). The MCQ-30 contains five factor-derived subscales, including cognitive confidence (e.g., "I do not

trust my memory"), positive beliefs about worry (e.g., "Worrying helps me cope"), cognitive self-consciousness (e.g., "I monitor my thoughts"), beliefs about uncontrollability and danger of thoughts (e.g., "When I start worrying I cannot stop"), and beliefs about the need to control thoughts (e.g., "I should be in control of my thoughts at all times"). Agreement with each item is rated on a 0 to 4 scale. Subscale scores are calculated by summing the six items on each subscale, and a total score is obtained by summing all items. The MCQ-30 has demonstrated good internal consistency and convergent validity, as well as acceptable test-retest reliability in nonclinical samples (Spada, Mohiyeddini, & Wells, 2008; Wells & Cartwright-Hatton, 2004), and good internal consistency (total and subscales) and sensitivity to change with treatment in patients with OCD (Solem, Håland, Vogel, Hansen, & Wells, 2009). In this study, only the cognitive confidence and cognitive self-consciousness subscales were included to ensure that the most relevant and psychometrically sound measures are used and to avoid overlap with other measures. Both subscales demonstrated good internal consistency in the current study (cognitive confidence: $\alpha = .89$; cognitive self-consciousness: $\alpha = .83$).

Obsessive Beliefs Questionnaire, 44-item version (OBQ-44; OCCWG, 2005). The OBQ-44 is a 44-item self-report measure that assesses presence and strength of obsessional beliefs. It is a revision and refinement of the original 87-item version of the OBQ (OCCWQ, 2001) and has demonstrated adequate psychometric properties with clinical OCD and nonclinical populations (OCCWG, 2005). Items are rated on a 7-point scale from "disagree very much" to "agree very much", and yields three subscale scores that are calculated by summing responses to the respective items. The subscales include Responsibility/Threat Estimation, Perfectionism/Certainty, and Importance/Control of Thoughts, and a total score represents overall strength of OCD-related beliefs. In the current study, only the Responsibility/Threat

Estimation and Importance/Control of Thoughts subscales were used as measures of specific metacognitive beliefs, which yielded excellent internal consistency (Responsibility/Threat Estimation: α = .93; Importance/Control of Thoughts: α = .90).

Experiences Questionnaire (EQ; Fresco et al., 2007). The EQ is a 20-item self-report scale that was designed to measure decentering. Although it was originally intended to contain two subscales assessing rumination and the ability to take a wider perspective, factor analysis did not support the hypothesized structure and only a decentering subscale was retained. The decentering subscale contains 11 items rated on a 5-point scale, with higher scores representing greater decentering. The decentering subscale has demonstrated good psychometric properties in nonclinical and clinical samples with major depressive disorder (Fresco et al., 2007). Compared to the internal consistencies observed in the scale validation samples (α = .83 - .90), the decentering subscale attained poor internal consistency (α = .52) in the current study.

Magical Ideation Scale (MIS; Eckblad & Chapman, 1983). The MIS is a 30-item true/false scale measuring belief in causal relationships that defy culturally accepted norms or standards. Items assess a range of beliefs in magical influences, such as thought transmission (e.g., "I have never had the feeling that certain thoughts of mine really belonged to someone else"), astrology (e.g., "Horoscopes are right too often to be a coincidence"), superstitions (e.g., "I have sometimes been fearful of stepping on sidewalk cracks"), and reincarnation (e.g., "If reincarnation were true, it would explain some of the unusual experiences I've had"). It was originally developed to identify individuals who may be prone to psychosis, but has since been used to identify magical thinking in a range of psychological disorders. The MIS has demonstrated adequate psychometric properties with patients with psychotic disorders (Chapman & Chapman, 1985) and has been found to discriminate individuals with OCD from those with

panic disorder and nonanxious controls (Einstein & Menzies, 2006). In this sample, the MIS attained questionable internal consistency (α = .62).

Paranoia Scale (PS; Fenigstein & Vanable, 1992). The PS is a 20-item self-report measure of paranoid ideation intended for use with nonclinical populations that was originally derived from items on the Minnesota Multiphasic Personality Inventory. The measure provides a broad assessment of aspects of paranoia, including items that assess paranoid beliefs that external forces are trying to influence the individual, that people are against him/her, suspicion of others' motives, and that others are talking about or watching the respondent. Responses to each item are rated on a 5-point scale ranging from 1 (*not at all applicable to me*) to 5 (*extremely applicable to me*). Total scores range from 20 to 100 with higher scores indicating higher levels of paranoia. The PS has good psychometric properties, including high reported internal consistency, and adequate test-retest reliability, and convergent and discriminant validity (Fenigstein & Vanable, 1992). Internal consistency was excellent in the current sample (α = .92).

Cognitive Flexibility Inventory (CFI; Dennis & Vander Wal, 2010). The CFI is a 20-item self-report questionnaire designed to measure aspects of cognitive flexibility that are needed to successfully challenge and replace maladaptive cognitions in cognitive behavioural therapy. Specifically, its items assess: a) the tendency to perceive difficult situations as controllable (e.g., "I'm good at sizing up situations"); and b) the ability to perceive and generate multiple alternative explanations and solutions for life occurrences (e.g., "I often look at a situation from different viewpoints"). Endorsement with each item is rated on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree), and scale scores are obtained by summing the responses. In a nonclinical sample, the scale demonstrated excellent internal consistency and test-retest reliability (Dennis & Vander Wal, 2010). Given that the psychometric evaluation was not

conducted with a clinical sample, preliminary evidence was obtained for its construct validity (convergent and concurrent) in an analogue population (Dennis & Vander Wal). It was selected as the self-report measure of cognitive flexibility in this study because the items and subscales parallel those thought to be measured by neuropsychological measures of cognitive flexibility, and because of its hypothesized relevance to cognitive behavioural models of anxiety disorders. Internal consistency reliability was good (α = .83) in the current study.

Depression Anxiety Stress Scales, 21-item version (DASS-21*; Lovibond & Lovibond, 1995)*. The DASS comprises three scales that assess features uniquely associated with depression, anxiety, and psychological distress. Compared to other more commonly used measures of anxiety and depression that have been found to capture overlapping symptoms, the DASS assesses features unique to each factor. The depression subscale (DASS21-D) measures symptoms of anhedonia and dysphoric mood characteristic of depression. The anxiety subscale (DASS21-A) specifically measures symptoms of physiological arousal and fear associated with anxiety disorders. The stress subscale (DASS21-S) primarily focuses on symptoms of distress, irritability and tension. The 21-item short form has demonstrated excellent psychometric properties comparable to the original 42-item measure (Antony, Bieling, Cox, Enns, & Swinson, 1998). In the current study, the internal consistency was good to excellent for the Depression (α = .91), Anxiety (α = .82), and Stress (α = .89) subscales. The DASS-21 was used in this study to determine if there are high correlations with the primary dependent measures that suggests that emotional symptomatology may need to be controlled for in subsequent analyses.

Procedure

Individuals who satisfied the inclusion and exclusion criteria, and who expressed an interest in participating in the study, were invited into the clinic to complete the study protocol.

Following informed consent, each participant was administered the OCD module of the *Structured Clinical Interview for DSM-IV Disorders* (SCID-IV; First, Spitzer, Gibbon, & Williams, 2007) and the Y-BOCS-SR (Baer, 2012) to confirm diagnosis and clarify the type and severity of their obsessive-compulsive symptoms. The BABS (Eisen, Phillips, Baer, Beer, Atala, & Rasmussen, 1998) was then administered in its original form then again asking the client to rate their insight when they are experiencing OCD-related symptoms to assess the degree and type of insight in the neutral assessment environment and at the moment that they feel anxious. The BABS allows for the assessment of insight related to more than one belief; in cases where the client could not identify which belief is most prominent, insight for both beliefs was assessed and averaged to create a composite insight score.

Next, participants completed the neuropsychological test battery individually. Because order of administration has little impact on test scores (Strauss, Sherman, & Spreen, 2012), the neuropsychological tests were presented in the following fixed order for all participants: WCST, Trails B, Stroop, and COWA. The order of administration was selected to ensure that the theoretically more sensitive, and therefore, informative measures of cognitive flexibility were completed first. In addition, the WCST is a more cognitively demanding task so it was placed early in the protocol to maximize performance and limit the effects of fatigue, followed by the less cognitively demanding tests. In circumstances where participants expressed fatigue or requested a break, they were asked to continue until the end of the current test and then offered a rest break before moving on to the remaining tests in the battery.

Participants then completed a series of computer-administered questionnaires in random order, including demographic information, BCIS, MCQ-30, OBQ-44, EQ, MIS, PS, CFI, and DASS-21. Following the questionnaires, participants were debriefed and provided compensation.

Results

Preliminary Analyses

Prior to beginning the main analyses, the data were screened for missing values, and descriptive statistics and tests for normality were conducted to identify violations of assumptions for subsequent statistical tests. Data were entered twice to ensure accuracy. No more than 2.5% of data were missing from any one questionnaire, and less than 1% of items were missing from the total dataset. Missing values analysis indicated that the data were missing completely at random and, therefore, missing values were replaced with the group mean for the missing item. Several self-report measures, including the insight measures, were not normally distributed. Therefore, nonparametric analyses were used as appropriate. Given that several analyses were exploratory, alpha levels were adjusted to control for inflated type I error associated with multiple comparisons using Hochberg's (1988) procedure for controlling the false discovery rate.

Characteristics of Insight

Insight as assessed by the BABS (scale total and item scores) is reported in Table 1. Eisen et al. (2001) indicated that poor insight may be detected by a BABS total score of ≥ 12 together with a score ≥ 3 for the conviction item (i.e., fairly convinced that beliefs are true but an element of doubt exists). According to these criteria, 11 participants (13.75%) were categorized as having poor insight. Following the subgroups specified by Jakubovski et al. (2011), 6.25% (n = 5) of the sample were classified as having perfect insight (BABS = 0), 76.25% (n = 61) had good insight (BABS = 1-11), 16.25% (n = 13) had poor insight (BABS = 12-17), and 1.25% (n = 1) was classified as having delusional insight (BABS = 18-24). Insight, indicated by BABS total score, was not significantly correlated with Y-BOCS total score (ρ = .19, p = .09), or with Y-BOCS subtotal scores for obsessions (ρ = .16, p = .16) or compulsions (ρ = .19, p = .09).

Table 1

Mean BABS Item and Total Scores In Session and When OCD Symptoms are Activated

	BABS	
	In Session	Triggered
	M (*SD*)	*M* (*SD*)
Conviction	1.49 (1.20)	1.69 (1.00)
Perception of Others' Views	0.35 (0.73)	2.77 (0.99)
Explanation of Differing Views	0.97 (1.06)	0.56 (0.91)
Fixity of Ideas	1.56 (1.16)	1.85 (1.25)
Attempt to Disprove Ideas	1.46 (1.18)	2.67 (1.05)
Insight	0.67 (0.81)	2.16 (1.31)
Total	6.53 (4.21)	11.27 (4.68)

Note. BABS = Brown Assessment of Beliefs Scale.

To examine the range of insight scores, the frequency distribution of the key BABS items were reviewed. Conviction in OCD-related belief was positively skewed, with 25% of participants reporting being completely convinced that their beliefs were false, 30% reported that their beliefs were probably false, 18.75% were unsure if their beliefs were true, 22.5% were fairly convinced that their beliefs were true, and only 3.75% were completely certain that their beliefs were true. Similarly, fixity of beliefs was positively skewed, with 23.75% reporting no reluctance to consider that their beliefs were false, 23.75% reporting minimal resistance, 27.5% were somewhat willing to consider the possibility that their beliefs were false, 22.5% were clearly reluctant to consider that their beliefs were false, and 2.5% absolutely refused to consider that their beliefs were false. Insight into a psychiatric source for one's beliefs was also positively skewed. The majority of participants (51.25%) reported that their beliefs definitely had a psychiatric cause, 31.25% indicated that their beliefs probably had a psychiatric cause, 15% were unsure if their beliefs had a psychiatric cause, and 2.5% reported that their beliefs probably do not have a psychiatric cause. None of the participants stated that their beliefs definitely do not have a psychiatric cause.

Insight was also as assessed with the Y-BOCS item 11. The mean Y-BOCS item 11 score was 1.14 (*SD* = 1.15). Thirty participants (37.50%) indicated that their obsessions and/or compulsions were definitely unreasonable or excessive (i.e., excellent insight, fully rational), 23 (28.75%) indicated that their beliefs were probably excessive (i.e., good insight), 16 (20%) indicated that their symptoms may be excessive or irrational (i.e., fair insight), 8 (10%) did not believe their beliefs were unreasonable or excessive (i.e., poor insight), and 3 participants (3.75%) were sure that their obsessions/compulsions are reasonable (i.e., delusional intensity beliefs). Insight, indicated by Y-BOCS item 11, was not significantly correlated with Y-BOCS

total score (ρ = .17, p = .14), or with Y-BOCS subtotal scores for obsessions (ρ = .17, p = .13) or compulsions (ρ = .14, p = .23). The correlation between BABS total and Y-BOCS item 11 was significant (ρ = .40, p < .001).

Relationship Between Dimensions of Insight and Cognitive and Metacognitive Beliefs

Means and standard deviations for each measure, and correlations with BABS total scores, are reported in Table 2. Given that Y-BOCS severity score and DASS depression subscale scores (ρ = .09, p = .42) were not significantly correlated with BABS total, OCD severity and depressive symptoms were not controlled for in subsequent analyses. Spearman correlations were used to test relationships as insight measures were positively skewed.

It was hypothesized that cognitive confidence would be the best predictor of conviction in one's beliefs. This hypothesis was not supported, as BABS conviction and MCQ-30 cognitive confidence were not significantly correlated (ρ = .16, p = .17)**.**

Importance and need to control thoughts, as well as responsibility and threat estimation, were predicted to be related to fixity of beliefs. This hypothesis was not supported. The BABS fixity item was not significantly correlated with OBQ importance and control of thoughts (ρ = .13, p = .26) or with OBQ responsibility and threat estimation (ρ = .06, p = .62).

It was predicted that cognitive self-consciousness would have the strongest relationship with insight regarding a psychiatric source of one's symptoms. This hypothesis was supported. MCQ-30 cognitive self-consciousness subscale was significantly correlated with BABS insight regarding a psychiatric source for one's symptoms (ρ = -.24, p = .03).

A significant negative correlation was expected between self-reported cognitive flexibility and insight. In particular, self-reported cognitive flexibility was expected to be the strongest predictor of how actively an individual attempts to disprove one's OCD-related thoughts. This

Table 2

Cognitive and Metacognitive Subscale and Total Scores and Relationship with Insight

	M	*SD*	Correlation with BABS total
BCIS			
Self-reflectiveness	13.23	3.81	-.13
Self-certainty	6.71	2.95	.47*
Composite	6.52	4.78	-.38*
MCQ-30			
Cognitive Confidence	12.91	4.87	.18
Positive Beliefs	11.65	4.69	.35*
Cognitive Self-consciousness	17.41	4.27	.04
Uncontrollability and Danger	20.00	4.99	.06
Need to Control Thoughts	14.03	4.28	.23
Total	72.98	16.76	.23
OBQ-44			
Responsibility/Threat Estimation	66.60	21.30	.10
Perfectionism/Certainty	74.45	22.34	.24
Importance/Control of Thoughts	42.99	15.14	.15
EQ Decentering	32.97	3.71	.01
MIS	13.03	3.59	.09
PS	47.32	16.39	.21
CFI	96.54	12.50	-.11

Note. BCIS = Beck Cognitive Insight Scale. MCQ-30 = Metacognitions Questionnaire – 30-item version. OBQ-44 = Obsessive Beliefs Questionnaire – 44-item version. EQ = Experiences Questionnaire. MIS = Magical Ideation Scale. PS = Paranoia Scale. CFI = Cognitive Flexibility Inventory.
*$p < .001$.

hypothesis was not supported. There was no significant correlation between BABS total and CFI (ρ = -.11, p = .34). Further, the correlation between BABS attempts to disprove one's beliefs and CFI was also nonsignificant (ρ = .03, p = .79). In addition, self-reported cognitive flexibility was expected to be a significant predictor of fixity of beliefs, as individuals who endorse a more rigid thinking style are expected to hold onto their OCD-related beliefs more strongly. However, this hypothesis was not supported. The correlation between the CFI and BABS fixity item was not significant (ρ = -.05, p = .68).

Decentering was hypothesized to be a significant independent predictor of overall insight; however, this hypothesis was not supported. The correlation between the EQ decentering scale and BABS total was not significant (ρ = .01, p = .94).

It was hypothesized that a significant positive correlation would emerge between magical thinking and insight because of the conceptual similarities between impaired insight and magical, superstitious beliefs. This prediction was not supported. The correlation between the MIS and BABS total was not significant (ρ = .09, p = .42).

Finally, the hypothesis that paranoia/suspiciousness would be significantly correlated with insight into a psychiatric source for one's symptoms was not supported. The BABS insight item was not significantly correlated with PS total score (ρ = .10, p = .38).

Relationship Between Insight and Neuropsychological Indices of Cognitive Flexibility

Raw scores on the neuropsychological measures were converted to age- and education-adjusted standardized scores, as per each test's administration manual. Sample scores on all neuropsychological tests, except WCST categories completed and trials to complete first category, were normally distributed. However, given that insight scores were positively skewed, Spearman correlations were used to examine relationships among variables. Neuropsychological

performance and correlation with BABS total scores are presented in Table 3. It was hypothesized that lower cognitive flexibility, assessed by performance on neuropsychological measures, would predict more impaired insight scores. Of the examined neuropsychological variables, only Stroop interference was significantly correlated with BABS total score (ρ = -.23, p = .04), indicating that better insight was associated with better response inhibition and cognitive flexibility. To test the hypothesis that metacognition is a more significant contributor to insight, over and above deficits in executive functioning, a hierarchical multiple regression was conducted to examine the independent contributions of these constructs.

Prior to conducting the hierarchical multiple regression, the test assumptions were examined. There was a very low correlation between the predictor variables (ρ = .09, p = .22), and the VIF and tolerance statistics were well within normal limits, indicating that the assumption of multicollinearity was satisfied. To test for homoscedasticity, a review of the scatterplot of the residuals for each of the predictors showed equal variance and followed a normal distribution. Therefore, the assumption of homoscedasticity was satisfied. There were no multivariate outliers identified by the leverage value (M = .03, SD = .03) or histogram, Normal P-P plot, or scatterplot, and there were no influential cases (Cook's distance = .03). Finally, the histogram, Normal P-P plot, and scatterplot of the residuals indicated that the residuals were normally distributed. Therefore, all assumptions were satisfied. Although Y-BOCS total and DASS21-D scores were planned to be included in the first block of the regression, these variables were not significantly correlated with the outcome variable (BABS total) or the predictor variables (Stroop interference, BCIS composite) and were, therefore, excluded. Stroop interference scores were included in the first block of the regression, and the second block contained BCIS composite scores, predicting BABS total scores.

Table 3

Neuropsychological Test Performance and Relationship with Insight

	M	*SD*	Correlation with BABS total
WCST			
Perseverative Errors	48.68	10.78	-.14
Trials to Complete First Category	17.54	16.08	.09
Total Categories	5.19	1.58	-.17
TMT			
TMT-A	44.23	11.16	-.12
TMT-B	44.93	10.82	-.13
Stroop			
Word	46.29	11.66	-.17
Colour	44.36	10.58	-.20
Colour-Word	50.18	9.26	-.15
Interference	52.46	6.40	-.23*
COWA	47.15	9.64	-.10

Note. WCST = Wisconsin Card Sorting Test. TMT = Trail-Making Test. Stroop = Stroop Color and Word Test. COWA = Controlled Oral Word Association.
*$p < .05$.

The hierarchical multiple regression revealed that Stroop interference scores did not significantly contribute to the model, $F(1, 79) = 2.66$, $p = .11$, and accounted for only 3.3% of the variance in BABS total scores ($R = .18$, $R^2 = .03$, Adjusted $R^2 = .02$). Including BCIS composite score explained 18.2% of the variance in BABS total scores ($R = .43$, $R^2 = .18$, Adjusted $R^2 = .16$), which was significant, $F(2, 79) = 8.55$, $p < .001$. Thus, adding the BCIS composite index explained an additional 14.9% of the variance over and above Stroop Interference scores (R^2 change = .15). For a summary of the coefficients, see Table 4.

To further examine the relationship between insight and cognitive flexibility, exploratory analyses using the Y-BOCS item 11 insight score were conducted. There was a significant correlation between Y-BOCS item 11 and the WCST perseverative errors ($\rho = -.33$, $p = .003$). Insight was not associated with any of the other neuropsychological measures. Further, insight, assessed via Y-BOCS item 11 was not significantly correlated with BCIS composite scores ($\rho = -.13$, $p = .26$). Therefore, regression and mediation analyses to test the relative effects of metacognition and cognitive flexibility could not be conducted.

Comparison of In-session Insight and Situational Insight

To assess whether individuals with poor insight have more stable insight than individuals with good insight, the sample was divided into good ($n = 66$) and poor ($n = 14$) insight groups, based on a BABS total score of 12 or greater, as per Jakubovski et al. (2011). A 2 (good versus poor insight) x 2 (time) mixed design ANOVA was conducted to examine the difference in insight scores in-session compared to when OCD symptoms are activated. There was a significant main effect of group, $F(1,78) = 62.38$, $p < .001$, partial $\eta^2 = .44$, with the good insight group ($M = 7.60$, $SE = .39$) reporting better insight than the poor insight group ($M = 15.00$, $SE = .85$). There was a significant main effect of time, $F(1,78) = 119.29$, $p < .001$, partial $\eta^2 = .61$,

Table 4

Summary of Hierarchical Regression Analysis for Variables Predicting BABS Total Scores

Variable	*B*	*SE B*	β
Step 1			
Stroop interference	-.119	.073	-.181
Step 2			
Stroop interference	-.097	.068	-.147
BCIS composite	-.341	.091	-.387*

Note: R^2 = .033 for Step 1; ΔR^2 = .149 for Step 2.
*p < .001

indicating that in-session insight (M = 9.16, SE = .42) was significantly better than insight at the time that OCD symptoms are activated (M = 13.44, SE = .58). The interaction between insight and time was not significant, $F(1, 78) = 3.24$, $p = .08$, partial $\eta^2 = .04$, indicating that insight decreased uniformly when OCD symptoms were activated and did not vary as a function of insight group status.

Discussion

This study adds to the growing literature regarding insight in obsessive-compulsive disorder. While studies have documented the clinical and demographic features associated with poor insight in OCD, this was one of the first studies known to examine the relationship between insight and relevant cognitive, metacognitive, and neuropsychological variables. The majority of participants exhibited good insight, with only 13.75 to 17.5% of the sample categorized as having poor insight, depending on the classification criteria used. This is similar to, though somewhat lower than, previous studies, in which 15 to 30% of treatment-seeking OCD cases were associated with poor or absent insight (e.g., Alonso et al., 2008; Catapano et al., 2010). Although relatively few participants had poor insight, only 6.25% of the sample was classified as having "perfect insight," which highlights the range of insight observed in OCD. There was also variability across dimensions of insight, with only 3.75% of the sample reporting complete conviction in the veracity of their beliefs, compared to 25% who reported that they were completely convinced their beliefs were false. Similarly, 2.5% endorsed completely fixed beliefs, whereas 23.75% reported no reluctance to consider alternative interpretations of their beliefs. Thus, although insight was positively skewed, and the majority reported good insight, a sizable portion of the sample exhibited poor insight. Despite the requirement that OCD be accompanied by intact insight in DSM-IV, the range of insight observed in this study was consistent with other studies that have found that most individuals with OCD do not exhibit perfect clarity regarding the senselessness and excessiveness of their symptoms. This lends support to the recent changes in DSM-5, which saw removal of the insight criterion and instead included a specifier to indicate the degree of insight.

Notwithstanding this important change in diagnostic criteria, the degree of insight

reported in session may not adequately characterize insight into one's OCD-related beliefs in everyday life. This study found that insight is more impaired when OCD symptoms are activated regardless of the degree of insight exhibited in session. That is, individuals with OCD are better able to acknowledge the excessiveness or senselessness of their obsessions when they are in a more dispassionate state, as in the assessment session, compared to when their OCD symptoms are triggered. This supports observations (e.g., Lelliott, Noshirvani, Başoğlu, Marks, & Montiero, 1988; Kozak & Foa, 1994) that insight is not a stable characteristic of OCD symptoms, but rather fluctuates over time. This is consistent with the observations in anxiety-based disorders other than OCD by Menzies and Clark (1995), who found that participants with acrophobia made more distorted danger estimates when they were on a ladder compared to when they were on the ground. However, it is unclear whether insight changes on a moment-to-moment basis, throughout the course of the disorder, or whether it is mood state dependent. In addition, there may be other variables affecting variations in the degree of insight, including comorbidity (e.g., Elvish, Simpson, & Ball, 2010) or symptom severity (Türksoy et al., 2002). Although number and type of comorbidities were not analyzed in the current study, it should be noted that OCD and depressive symptom severity were not associated with reported insight in session or when OCD symptoms were triggered. At this time, there is considerable inconsistency across studies that have examined predictors of insight. Thus, more research is needed to understand the frequency with which insight fluctuates and variables that may contribute to these changes.

It was expected that individuals with poor insight would exhibit more stable and impaired insight across time compared to individuals with good insight, which may have helped to explain between group (i.e., good versus poor insight) differences in treatment outcome. Studies

demonstrating an attenuated response to treatment for individuals with poor insight (e.g., Foa, Abramowitz, Franklin, & Kozak, 1999; Himle, Van Etten, Janeck, & Fischer, 2006) have measured insight in session, where insight is more intact. Individuals with poor insight may have difficulty engaging in psychotherapeutic techniques challenging the validity of their beliefs in session, which would consequently affect treatment response. In contrast, individuals with good insight may be able to acknowledge and challenge the senselessness of their beliefs in session, and these alternative interpretations can then be applied when OCD symptoms are activated. However, the interaction between insight and time was not significant; thus, it does not appear that time-related variations in insight can account for between group differences in treatment outcome. That participants in this study were able to acknowledge variations in insight across time suggests that they exhibit a degree of awareness and self-reflection that is unrepresentative of delusional intensity beliefs. As the degree of insight, as measured by BABS total score and Y-BOCS item 11, was somewhat better in the total sample compared to other clinical samples, it is possible that the positively skewed insight scores may not have been sufficiently powerful to detect this effect, if it does in fact exist. Future studies with extreme groups analyses are recommended to explore this hypothesis.

To better understand individual variations in insight, relationships with cognitive and metacognitive variables were examined. Overall, few variables were associated with insight. Only metacognition was significantly associated with poorer insight. Specifically, the BCIS composite score was negatively related to BABS total score, indicating that insight is lower among individuals who endorse greater confidence in the validity of their beliefs. The significant and moderately strong correlation with insight scores suggests that insight, as measured by the BABS, represents strongly held beliefs that are resistant to correction, rather than beliefs that are

paranoid, magical, or delusional in content. This interpretation supports the conceptualization of poor insight as overvalued ideation (Kozak & Foa, 1994; Neziroglu & Stevens, 2002) that exists along a continuum defined by strength, and not content, of belief. Accordingly, it appears that poor insight does not represent a cognitive distortion per se, but the strength with which that distorted belief is held. At one end of the continuum, individuals with good insight are more adept at objectively evaluating distorted beliefs and are more open to correction of the misinterpretation. At the other end of the continuum, individuals with poor insight are likely to have difficulty objectively evaluating their beliefs and are more resistant to corrective information.

This interpretation of the relationship between the BCIS composite and BABS total scores is consistent with the construct of cognitive insight proposed by Beck and colleagues (2004). Cognitive insight is thought to underlie the capacity for clinical insight and represents a type of metacognitive processing. The current study does not address directionality and causality of the relationship between these variables; however, it is one of the first studies to assess the association between these constructs within an OCD sample (see also Shimshoni et al., 2011). Although the BCIS has not been psychometrically validated within an OCD population, it is interesting to note that BCIS total and subscale scores in the current study were similar to the scores of inpatients with schizophrenia or major depressive disorder obtained during the development and validation of the scale (Beck et al., 2004). This supports the notion that cognitive insight is assessing general thought patterns and the capacity for self-reflection, not the quality or content of disorder-specific beliefs.

The only independent dimension of insight, assessed via the BABS, to have a unique association with any of the cognitive or metacognitive variables was the insight dimension. The

MCQ-30 cognitive self-consciousness subscale was negatively correlated with insight regarding a psychiatric source for one's symptoms, indicating that individuals who tend to focus attention on their thought processes (e.g., "I think a lot about my thoughts," "I am constantly aware of my thought process") are more likely to acknowledge that their thoughts are due to a psychiatric cause. That is, individuals who are able to engage in metacognitive processing are more likely to attribute obsessive thoughts as a symptom of OCD rather than to an external cause, again strengthening the interpretation that metacognition underlies the capacity for clinical insight. However, a cautious interpretation of this finding is warranted given that other variables measuring similar metacognitive constructs (e.g., BCIS self-reflectiveness, MCQ-30 cognitive confidence, MCQ-30 cognitive self-consciousness, EQ decentering) were not significantly correlated with other BABS item or total scores. Although alpha levels were adjusted for multiple comparisons, the few significant correlations may have been anomalous and related to inflated type I error. Alternatively, the failure to detect other conceptually similar relationships may have been due to sample characteristics (e.g., reasonably intact insight), poor psychometric properties of the scale (e.g., EQ), or limitations of the primary insight measure. Despite these limitations, which will be addressed in more detail to follow, consistent relationships between metacognition and clinical insight were observed across indices.

The results did not support the proposed neuropsychological deficit model of poor insight in OCD (Tumkaya et al., 2009); nor did they support a combined model in which metacognition was predicted to hold an intermediate position between executive functioning and insight. Stroop interference was the only neuropsychological variable associated with BABS total score, indicating that individuals with poor insight have more difficulty inhibiting automatic semantic processing. However, although the relationship was significant, it was not a robust correlation (ρ

= -.23). Further, when Stroop interference was added together with BCIS composite scores to a regression predicting BABS insight scores, interference was not a significant predictor of insight. Nearly all of the variance in insight was accounted for by BCIS composite scores, indicating that metacognition, but not cognitive flexibility, contributes most strongly to clinical insight.

The majority of indices of set shifting and flexibility were not related to insight as measured by the BABS. That Stroop interference was related while these other measures were not is consistent with recent research that inhibition is not a distinct type of executive function, and performance on measures of inhibition, such as the Stroop task, are better accounted for by a common executive functioning factor (Friedman, Miyake, Robinson, & Hewitt, 2011). The significant relationship of Stroop interference with insight may point to a contribution of this general executive functioning factor, but not cognitive flexibility or inhibition in particular, to the capacity for insight.

In addition, it is possible that measurement error and variance unrelated to the distinct executive functions that the tests were designed to measure (e.g., set shifting, inhibition) could account for the nonsignificance of the neuropsychological measures. For example, the timed tasks of cognitive flexibility and fluency (e.g., COWA, Stroop, TMT) measure processing speed in addition to flexibility. Further, the Stroop task involves colour processing in addition to inhibition, and the TMT requires motor speed as well as processing speed and alternation. The WCST has been suggested to be one of the purest measures of set shifting; however, it also requires inhibitory control in order to suppress previously learned sorting strategies (Miyake et al., 2000). Thus, while these various measures of executive functioning tap a unitary executive function, pure measures of cognitive flexibility do not exist and may contribute to systematic variance unrelated to the core executive function. Future studies should utilize a latent variable

approach in which multiple measures of executive functioning are combined using structural equation modeling or confirmatory factor analysis to generate a single metric capturing the latent construct (Miyake & Friedman, 2012). Unfortunately, the relatively small sample size in the current study is insufficient to perform these analyses without compromising power (Jackson, 2003; MacCallum, Browne, & Sugawara, 1996). However, such an approach may be more powerful than the method used in the current study in detecting if a common executive functioning factor underlies the capacity for insight.

In summary, the degree of insight exhibited in the current sample was similar to, though somewhat better than, that reported in previous studies. Only metacognition, assessed via the BCIS, was a significant predictor of insight, as measured by the BABS. In fact, the BCIS composite index was the strongest correlate of insight, compared to other clinical (i.e., OCD and depression symptom severity), cognitive (i.e., OCD-specific beliefs, magical ideation, paranoia, self-reported cognitive flexibility), or neuropsychological (i.e., WCST, TMT, Stroop, COWA) variables. This supports a continuum hypothesis of insight, in which insight ranges from good to poor based on the rigidity or strength of belief, and the ability to engage in metacognitive processing may contribute to where along that continuum an individual falls. Insight does not appear to be stable, and participants reported that insight fluctuates over time. When obsessive thoughts are activated, insight moves along the continuum toward greater difficulty objectively evaluating beliefs and resistance to corrective feedback.

Implications

The results of this study indicate that poor insight in OCD can be conceptualized as impaired metacognition, such that individuals with poor insight tend to report lower self-reflection and greater certainty about one's beliefs. Given that the content of beliefs assessed

with the OBQ, PS, MIS were not associated with insight suggests that targeting the content of those belief domains directly will be minimally effective in modifying insight. Thus, treatment approaches that aim to challenge the validity or accuracy of distorted beliefs or misattributions are unlikely to be the most efficient treatment strategies for individuals with poor insight. Alternatively, strategies that target the rigidity of belief, rather than the content of the belief itself, are likely to be more effective in modifying insight. However, given that few unique metacognitive domains were associated with total or dimension-specific insight, it is unclear what should be targeted. In addition, not all measures of metacognition yielded corresponding results. The BCIS, but not the MCQ-30 or EQ, was associated with BABS total score, suggesting that rigidity or certainty in one's beliefs, rather than metacognition more broadly, is a more adequate target. It should be noted that the positive beliefs about worry subscale of the MCQ-30 was also correlated with BABS total scores. However, no a priori hypotheses were made about this subscale and, therefore, this relationship was not interpreted.

While studies have noted an improvement in insight with treatment (e.g., Alonso et al., 2008; Eisen et al., 2001; Himle et al., 2006), to date, no psychopharmacological or psychotherapeutic interventions have been systematically examined to target insight in OCD so it is unclear if changes in insight precede or follow symptom change. However, several interventions to modify insight in psychosis have been evaluated with mixed results (see Henry & Ghaemi, 2004 for a review). Psychoeducation, psychodynamic therapy, and medications do not appear to be effective in modifying insight (Lysaker et al., 2009). Further, this study found that deficits in executive functioning do not appear to be specific to a subset of individuals with poor insight. Therefore, costly and time-consuming cognitive remediation interventions (e.g., Franck et al., 2013) that improve basic executive functions, but not insight, are not recommended

for enhancing insight specifically.

Drawing on the psychosis literature, a broad skills-based approach that encourages detachment, appraisal, and perspective taking may be promising intervention strategies for low insight in OCD. Given that misinterpretations of thoughts is one of the central contributory and maintaining factors in several cognitive behavioural models of OCD (e.g., Clark & Purdon, 1993; Rachman, 1998; Salkovskis, 1989), CBT is well suited to target poor insight. For example, cognitive behavioural or metacognitive therapies targeting the interpretation of thoughts, rather than the content of thoughts, may be beneficial in promoting self-reflection and challenging metacognitive beliefs, thus, improving insight. It is unclear how behavioural treatments that emphasize exposure and response prevention would modify insight; however, preliminary evidence indicates that exposure is associated with changes in metacognitive beliefs (Solem, Håland, Vogel, Hansen, & Wells, 2009), which this study has identified are related to insight. It is possible that behavioural experiments that facilitate self-reflection and exploration of alternatives in a non-threatening or challenging manner may be an effective means of promoting awareness of the senselessness of one's beliefs. However, any measurable benefit in the promotion of insight is speculative at this time.

Mindfulness-based interventions are gaining attention as an intervention for OCD and appear to be well-suited to modifying insight (Didonna, 2009). Mindfulness has been defined as "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (Kabat-Zinn, 2003, p. 145). It is a specific type of attention that can be cultivated through meditative practice to focus awareness on and acceptance of one's thoughts and experiences, including body sensations, pain, and autonomic arousal. Thoughts are observed as they occur, identified, and interpreted as

transient mental events rather than objective reflections of reality or enduring personality characteristics. Hypothesized mechanisms of mindfulness include attending to one's internal and external experiences, objectively describing these stimuli, acting with awareness, acceptance, and nonreactivity (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Thus, mindfulness-based therapies may target insight by encouraging one to take a detached stance to one's beliefs, and objectively perceive one's internal and external experiences. While studies have yet to examine the effects of mindfulness-based interventions on insight in OCD, preliminary studies have noted improvements in insight for individuals with psychosis who engaged in a mindfulness-based cognitive therapy program (Lalova et al., 2013).

Motivational interviewing has been proposed as a possible pretreatment intervention to enhance perspective-taking and improve insight in patients with schizophrenia (Rüsch & Corigan, 2002). Motivational interviewing has been described as a collaborative therapeutic method that respects an individual's autonomy, facilitates exploration of ambivalence, and supports positive belief and behaviour change (Miller & Rollnick, 2002). This is achieved through four general therapeutic principles: (a) express empathy; (b) develop discrepancy; (c) roll with resistance; and (d) support self-efficacy. Applying these principles to increase insight regarding OCD-related beliefs, motivational interviewing allows clients to engage in nonjudgmental exploration of their beliefs, pros and cons of alternative ways of interpreting these beliefs, and how these beliefs affect their behaviour. As such, motivational interviewing appears to target the very deficits associated with poor insight. However, to date, limited research has examined the efficacy of motivational interviewing for improving insight, and that which has been done, has exclusively been applied within the context of improving insight and treatment adherence in schizophrenia (Kemp et al., 1998; Sousa, Corriveau, Lee, Bianco, &

Sousa, 2013). Thus, research is needed to examine the applicability of using motivational interviewing to enhance insight into OCD-related beliefs and behaviours.

Limitations

This study has a number of limitations related to the sample, measures, and methodology. With regard to the sample, participants were seen in a hospital-based treatment clinic; therefore, they exhibited sufficient insight to acknowledge that their symptoms were excessive, distressing, or time-consuming. This likely accounts for the positively skewed insight scores, which may have resulted in limited power to detect significant relationships among the predictor variables. However, it should be noted that all known studies of insight in OCD are based on participants seeking clinical services, and the range of insight observed in the current study was comparable to previously published literature.

Participants were not assessed for number and type of comorbidities. Previous studies have reported that insight is more likely to be impaired when comorbid conditions are present (e.g., Elvish, Simpson, & Ball, 2010), and may contribute to variations in insight. Therefore, relationships among the predictor variables in the current may have been obscured by co-occurring psychiatric conditions. However, depression symptom severity, which has been identified as the most frequent and significant comorbid condition associated with poor insight (Mintz, Dobson, & Romney, 2003; Ravi Kishore et al., 2004; Türksoy et al., 2002), was assessed and not found to be related to insight scores. This suggests that co-occurring depression did not significantly influence the results.

Given that analyses were not planned to assess insight across OCD symptom dimensions or subtypes, sample size was not adequate to allow analysis of insight across OCD symptom subtypes. Recently, studies have noted systematic differences in insight across OCD symptom

domains, with lower levels of insight associated with hoarding symptoms (Fontenelle et al., 2013). It is possible that a more fine-grained analysis of correlates of insight across OCD symptom dimensions may have yielded richer data.

The sample size was somewhat small and, therefore, did not permit more sophisticated analyses. For example, as described earlier, a sample size sufficient for an analysis of the unitary and distinct executive functions (e.g., $n = 200$; Jackson, 2003; MacCallum, Browne, & Sugawara, 1996) may have provided a more accurate assessment of the cognitive deficits, if any, associated with poor insight. Despite this limitation, the sample size was adequate for the analyses contained within the current study. Considering the few significant relationships observed and small effect sizes observed, it is unlikely that these results would have changed, or obtained larger effect sizes, with a larger sample size.

Perhaps the most significant limitation of the current study is related to the shortcomings of the BABS. First, the BABS cannot be administered to individuals who are unable to articulate beliefs about the consequences of having the obsessive thought or performing compulsions. Therefore, it requires that the individual is able to independently identify and report abnormal beliefs. However, some people do not recognize their beliefs to be excessive, unreasonable, or unusual and, thus, they would not spontaneously report these beliefs in an assessment. They epitomize the concept of poor insight. Further, some participants ($n = 9$) reported "not just right experiences" as their primary OCD-related concern, which were not as easily assessed by the BABS. In these cases, a secondary OCD-related belief that was amendable to assessment via the BABS was used to assess insight. Thus, the mean insight score may not have been accurately captured insight related to principal obsessive beliefs within the sample. Several authors have noted this limitation (e.g., Ravi Kishore et al., 2004) and elected to exclude participants who are

unable to articulate underlying beliefs about performing compulsions. However, the decision was made to retain these participants to capture the range of insight within a typical OCD population.

In contrast, some participants reported multiple beliefs, and were unable to select one or two beliefs that were the most distressing. In these cases, a composite score was created averaging the insight ratings for the two most prominent obsessive beliefs, as per the test's administration guidelines. However, this may underestimate insight as some beliefs may be characterized by good insight while others are characterized by poor insight. Even if averaged, this score does not reflect the true nature of the participant's insight. Future research could resolve this limitation by assessing insight per belief, instead of per disorder, as was done by Fontenelle and colleagues (2013). Although this approach is more time-consuming and laborious, it may provide a more accurate estimate of belief-related insight as opposed to disorder-related insight.

Finally, the BABS assesses insight as conceptualized within the DSM; that is, insight is the awareness of the excessiveness or senselessness of one's beliefs. While this is not a limitation of the validity of the BABS, evidence does not support the assertion that the BABS is a multidimensional measure of insight. In the scale validation paper (Eisen et al., 1998), the six items loaded on a single factor, with factor loadings ranging from .48 to .92, suggesting that the BABS is better conceptualized as a unidimensional assessment tool. This is further evident in the current study where the intercorrelations among BABS items were high (range = .49 to .86) and the pattern of correlation among the individual items and associated cognitive and metacognitive variables deviated minimally from the associations with BABS total score. Thus, the primary insight measure used in the current study appears to be assessing a single domain of insight. To assess other proposed dimensions of insight, such as awareness of the need for treatment,

awareness of the consequences of the disorder (e.g., social, occupational, quality of life), and awareness of specific signs or symptoms of a disorder (Amador & Gorman, 1998), other measures should be used. For example, measures such as the *Scale to Assess Unawareness of Mental Disorder* (Amador et al., 1993), widely used to assess insight in psychotic disorders, may be adapted to be more applicable to an OCD population.

Procedurally, assessment of insight when OCD-symptoms are activated relied on participants' ability to reflect on and report their own experience. Therefore, estimates of insight may have been inaccurate. Future studies should consider using an imaginal exposure or in vivo exposure procedure to attain a more accurate, ecologically valid assessment of insight. However, in vivo exposures may present a trade off in terms of feasibility (e.g., time, availability and idiosyncratic nature of stimuli) for in session assessment. Further, most participants had no difficulty reporting on times when OCD symptoms are activated, suggesting that these times represent a clear departure from one's typical experience. Therefore, while this procedure does present limitations and may overestimate the difference in insight in session compared to when OCD symptoms are activated, it offers valuable preliminary information about an individual's perception of his or her inner experience.

Future Directions

This study suggests several avenues for future research. First, studies have demonstrated that change in insight is correlated with treatment outcome (Alonso et al., 2008; Eisen et al., 2001; Foa, Abramowitz, Franklin, & Kozak, 1999; Himle et al., 2006; Lelliott et al., 1988; Ravi Kishore et al., 2004; Matsunaga et al., 2002); however, it is unclear whether change in insight precedes or follows symptom change. Time-series analysis to determine the sequence of changes may indicate the most efficient means of sequencing interventions. Foa and colleagues (1999)

hypothesized that the strength or rigidity of beliefs mediates symptom change in exposure and response prevention, because individuals who hold beliefs more strongly would have difficulty incorporating corrective information and, therefore, benefiting from treatment. If this hypotheses is substantiated by research, implementing a pretreatment interventions, such as MI, to enhance insight may be warranted to ultimately improve treatment outcomes. Alternatively, if symptom change is independent of change in insight, allocating resources (e.g., time, therapist contact, development of an intervention) to improving insight may be unnecessary. However, the directionality of this relationship has yet to be determined.

If this line of research indicates that targeting insight improves treatment efficacy, subsequent randomized controlled trials should be undertaken to determine what is the most efficacious and efficient method for improving insight. As reviewed earlier, cognitive behavioural therapy, metacognitive therapy, mindfulness, and motivational interviewing have all demonstrated promise as insight interventions. In addition, a recent case study has indicated that augmenting SSRIs with the atypical antipsychotic aripiprazole has some efficacy in improving insight in treatment-resistant OCD (Fornaro, Gabrielli, Mattei, Vinciguerra, & Fornaro, 2008). It should be noted that, in the case study reported above, the patient required a stable dose of aripiprazole for 120 days to achieve a 6-point reduction on the BABS, which was not sufficient to move below the poor insight range. Thus, the duration of the psychopharmacological intervention exceeded that of the psychotherapies described earlier and may not be a more efficient, effective, or well-tolerated, solution.

Modifications in sample selection and study methodology may also help clarify relationships among the cognitive, metacognitive, and insight variables. As mentioned previously, a sufficiently large sample size to analyze the neuropsychological data according to

the underlying unitary and distinct executive functions will be crucial. Further, expanding the range of neuropsychological measures to include other aspects of cognitive functioning in addition to flexibility may point to other processing deficits associated with poor insight. For example, in their meta-analysis of 35 studies assessing neurocognitive performance in individuals with schizophrenia, Aleman and colleagues (2006) found a specific memory deficit, in addition to deficits in executive functioning and IQ, associated with poor insight. Similarly, Kashyap et al. (2012) found that individuals with poor insight in OCD demonstrated impairments in verbal memory and fluency compared to those with good insight. The authors suggested difficulties in memory organization might inhibit access to information that actually exists in memory, preventing access to corrective information. Although these studies are suggestive of broader cognitive deficits associated with poor insight, more work is needed to examine the potential neuropsychological and combined models of poor insight in OCD.

Addressing the limitations associated with a self-referred, treatment-seeking, community sample will be necessary to adequately determine the true population base rate of poor insight in OCD. Recruiting individuals referred by a friend or family member, or assessing insight with information from collateral informants (e.g., parent, child, primary care physician, community support worker) may be a reasonable alternative to patient-reported insight assessment. Additionally, administering the BABS or OVIS to undergraduate samples selected for high OCD-related beliefs, but not necessarily seeking help for or meeting diagnostic criteria for OCD, may be an ecologically valid means of assessing insight. Further, incorporating multiple measures of insight (e.g,. BABS, OVIS, Y-BOCS item 11) and adapting other insight measures (e.g., SUMD) for use with individuals with OCD may provide a more comprehensive picture of the multidimensional nature of insight in OCD.

Summary and Conclusions

Despite the limitations noted above, this study has made an important contribution to our understanding of the cognitive and metacognitive factors associated with poor insight in OCD, and provided several avenues for future research. To date, there have been few consistent clinical or demographic predictors of OCD, and no known studies assessing cognitions associated with poor insight. The results of this study indicated that individuals who endorse greater confidence in the validity of their beliefs are more likely to exhibit poor insight. In fact, the BCIS composite index was the single best predictor of insight, compared to other clinical (i.e., OCD and depression symptom severity), cognitive (i.e., OCD-specific beliefs, magical ideation, paranoia, self-reported cognitive flexibility), or neuropsychological (i.e., WCST, TMT, Stroop, COWA) variables. This supports Foa and colleagues' (1999) hypothesis that individuals who hold beliefs more strongly may have difficulty incorporating objective information and benefitting from treatment. However, given the cross-sectional nature of this study, future research is needed to explore the causal relationship between metacognition, insight, and symptom change.

In addition, this study supports a continuum hypothesis of insight, in which insight ranges from good to poor based on the rigidity or strength of belief, and the ability to engage in metacognitive processing may contribute to where along that continuum an individual falls. Finally, insight does not appear to be a stable feature of OCD and participants reported fluctuations in insight over time. Future research is needed to determine the frequency and degree of change, and factors involved in shifting insight.

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