

Metacognitions, responsibility, and perfectionism in obsessive-compulsive disorder

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Torun Grøtte

Abstract

The aim of this paper was to further test Wells` (1997) metacognitive model of obsessive-compulsive disorder (OCD). Metacognitions` (thought-fusion beliefs and beliefs about rituals) influence on obsessive-compulsive symptoms was evaluated and compared to the role of two central cognitive beliefs; inflated responsibility (Salkovskis, 1985, 1999), and perfectionism (e.g. Frost & Steketee, 1997). The following hypotheses were tested: (1) Metacognitions, inflated responsibility, and perfectionism will be positively and significantly correlated with obsessive-compulsive symptoms, (2) Metacognitions will be an independent predictor of obsessive-compulsive symptoms, even when depression and the cognitive beliefs are controlled, (3) The relationship between the cognitive beliefs and obsessive-compulsive symptoms will be dependent on metacognitions. The sample consisted of 62 OCD-patients, who completed an in-patient cognitive-behavioral treatment (CBT) with duration of three weeks. A series of correlational and multiple regression analyses were performed, and all three hypotheses were confirmed. The results provide further support for the metacognitive model of OCD (Wells, 1997).

1. Introduction

According to the Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV; American Psychiatric Association [APA], 1994), obsessive-compulsive disorder (OCD) is characterized by unwanted recurrent and persistent obsessions and/or compulsions.

Obsessions can be defined as ideas, thoughts, impulses, or images that cause marked anxiety and distress, where contamination and doubt are among the most common themes (Wells, 1997). Compulsions are repetitive behaviors or mental acts, often deliberately performed to reduce discomfort/anxiety or neutralize or prevent feared events (APA, 1994). The most common overt behaviors are washing and checking, while counting, prayers and silent word repetition are the most common covert acts (Wells, 1997). The obsessions and/or compulsions must cause marked distress, be time consuming, or seriously interfere with daily functioning (APA, 1994).

The Norwegian Institute of Public Health (2009) wrote a report about psychiatric disorders in Norway. They summarized results from both Norwegian and international prevalence studies of OCD, where the lifetime prevalence varied between 0.6 and 1.6 %. There does not seem to be any gender differences in prevalence (ICD-10, World Health Organization, 2008). Onset is usually in childhood or as young adult, with a medium age at onset of 19 years (De Luca, Gershenson, Burroughs, Javaid, & Richter, 2011). However, differences between childhood onset and adult onset have become increasingly in focus in research, and some argue that they represent phenomenologically and etiologically distinct subtypes of OCD (e.g. Eichstedt & Arnold, 2001), with a stronger genetic and/or biological component in early-onset cases (e.g. Bolton, 1996). If left untreated, the majority of OCD-cases seem to have a chronic history with a stable or fluctuating course (Ravizza, Barzega, Bellino, Bogetto, & Maina, 1996).

Many different factors have been proposed regarding the etiology of the disorder; e.g. genetic, neurophysiological, and psychological factors. OCD is believed to have a genetic component, but Norrholm and Ressler (2009) pointed out that the identification of allelic variants and the development of gene×environment models have been slow to develop. Van Grootheest, Cath, Beekman, and Boomsma`s (2005) review of twin studies of anxiety disorders revealed “genetic liabilities” in OCD of 45–65% in children and 27–47% in adults. At a neurochemical level, serotonin and dopamine are the primary neurotransmitters thought to be involved, while the corticostriatal-thalamocortical neural circuit is considered important at a neurophysiological level (Bartz & Hollander, 2006). Functional imaging studies have demonstrated that the orbitofrontal cortex, caudate nucleus, thalamus, and anterior cingulate gyrus are involved (Saxena, Bota, & Brody, 2001). At a psychological level, behavioral, cognitive, and metacognitive theories have been the dominating theoretical perspectives.

Several different cognitive and metacognitive perspectives on the development and maintenance of OCD have been proposed. All of them agree that it is the appraisal, and not the content, of the intrusions that matter. However, the theories differ in which types of dysfunctional beliefs that are considered important. Inflated responsibility (Rachman, 1993; Salkovskis, 1985), perfectionism (Frost & Steketee, 1997; Rhéaume, Freeston, Dugas, Letarte, & Ladouceur, 1995), intolerance of insecurity (Tolin, Abramowitz, Brigidi, & Foa, 2003a), “not just right experiences” (NRJE, Coles, Frost, Heimberg, & Rhéaume, 2003), overestimation of threat (Foa & Kozak, 1986), and metacognitions (Purdon & Clark, 1999; Wells, 1997; Wells & Matthews, 1994) are some of the beliefs that are proposed. The aim of this paper is to test the metacognitive model of OCD (Wells, 1997). Metacognitions` influence on obsessive-compulsive symptoms will be evaluated and compared to the role of two central cognitive beliefs; inflated responsibility and perfectionism.

1.1 Metacognitive theory

The first metacognitive model of OCD was developed by Wells in 1997, and later refined in 2000 and 2009. Metacognition can be defined as “internal cognitive factors that control, monitor and appraise thinking. It can be subdivided into metacognitive knowledge (e.g., “I must worry in order to cope”), experiences (e.g., “a feeling of knowing”) and strategies (e.g., ways of controlling thoughts and protecting beliefs”) (Wells, 2009, p. viii).

Three domains of metacognitive knowledge are considered important in OCD; thought-fusion beliefs, beliefs about the need to perform rituals, and stop signals. The term thought-fusion belief was originally used by Rachman (1993), who named incidents where OCD-patients equated thoughts with actions as thought-action fusion. In the metacognitive model (Wells, 1997), three types of fusion were proposed; thought-event fusion (TEF), thought-action fusion (TAF) and thought-object fusion (TOF). TEF is the belief that a thought can cause an event to occur, or means that an event already has happened. Accordingly, the intrusive thought “Have I hit someone with my car?” will be appraised as meaning you actually have hit someone. TAF is the belief that intrusions have the power to cause you to carry out actions, or that a thought equates an action. For example, the intrusive image of oneself swearing in a church will be interpreted as if the thought will lead to that. TOF is the belief that thoughts and feelings can be transferred to objects.

Beliefs about rituals deal with the need to conduct rituals and neutralizing behavior (Wells, 2009). They contain plans for guiding coping responses, and can be described as personal rules for self-regulation. Beliefs like “I have to wash my hands; otherwise this feeling of disgust will never disappear” and “If I always check for needles on the ground, I won’t be infected with HIV” are examples. Part of this plan for coping is a goal, and the goal attainment is indicated by a stop criterion/stop signal (Wells, 1997). Here, OCD-patients often

rely too much on internal and inappropriate signs, e.g. can stop washing hands when the feeling of disgust is gone, or when you can wash your hands without having a disgusting thought.

In the metacognitive model (Wells, 1997, 2000, 2009), intrusions trigger metacognitive beliefs about the intrusions' meaning and importance, especially TEF, TAF and TOF. The intrusions will then be appraised according to these metacognitive beliefs, and lead to a negative appraisal and a feeling of threat. This triggers negative feelings (primary anxiety, but also guilt, anger, depression etc.) and a need for neutralization (covert or overt action). Excessive avoidance of potential triggers is also common. Different types of neutralization exist, e.g. overt checking, washing, ordering, repeating, rumination, counting, controlling one's mind (Wells, 1997). A number of problems are associated with avoidance behavior and neutralization, and contribute to problem maintenance; they lead to increased awareness of intrusions (e.g. suppression effects), prevent the individual from disconfirming fusion beliefs and beliefs about rituals, and make people act as if the thought is important and therefore reinforce the dysfunctional beliefs (Wells, 2009).

Several studies have supported the relationship between metacognitions and obsessive-compulsive symptoms. A significant positive correlation has been found in both non-clinical (e.g. Sica, Steketee, Ghisi, Chiri, & Franceschini, 2007; Wells & Papageorgiou, 1998) and clinical samples (Solem, Myers, Fisher, Vogel, & Wells, 2010b). This relationship remained significant, even when controlling for worry (e.g. Myers, Fisher, & Wells, 2009a), responsibility (e.g. Gwilliam, Wells, & Cartwright-Hatton, 2004), and perfectionism (e.g. Solem, Håland, Vogel, Hansen, & Wells, 2009a). Further support for the metacognitive model has come from a case series study (Fisher & Wells, 2008) and experimental studies (Fisher & Wells, 2005a; Myers, Fisher, & Wells, 2009b; Rassin, Merckelbach, Muris, & Spaan, 1999).

Cognitive beliefs have also been linked to obsessive-compulsive symptoms. Proponents of cognitive perspectives see them as central parts of development and maintenance of OCD, while in the metacognitive theory of OCD (Wells, 1997) these are seen as more peripheral by-products of metacognitions. Two of the most central cognitive beliefs, inflated responsibility and perfectionism, will be introduced and later evaluated against metacognitive beliefs` influence on obsessive-compulsive symptoms.

1.2 Responsibility

Salkovskis (1985, 1999) has formulated a model of OCD, in which inflated responsibility is given a prominent role. He proposed that the key to development and understanding of OCD lies not in the nature of the intrusive thoughts, images, impulses and doubts, but in the interpretation of these. Obsessional thoughts are viewed as stimuli which may provoke automatic thoughts, and these automatic thoughts will *only* provoke anxiety and distress when they have some meaning to the individual experiencing those (Salkovskis, 1985). One of the most central parts in Salkovskis (1985, 1999) model of OCD is that the content of the automatic thoughts is mainly centered on responsibility. The intrusions are being appraised as indicating that the person may be responsible for harm, to self or others, unless they take action to prevent it. Salkovskis (1999, p. S33) defined responsibility as:

“The belief that one has power which is pivotal to bring about or prevent subjectively crucial negative outcomes. These outcomes are perceived as essential to prevent. They may be actual, that is, having consequences in the real world, and/or at a moral level.”

Salkovskis and Forrester (2002) point to Thought-action fusion (TAF, Rachman, 1993) as a particularly powerful type of responsibility belief. According to Rachman (1993), this phenomenon can be defined as a fusion between thoughts and actions, i.e. the obsessional

activity and the forbidden action are seen as morally equivalent. Thinking about hitting a child with your car is seen as morally equivalent to actually hit a child.

Responsibility appraisals such as these trigger experiences of discomfort and motivation to carry out neutralizing behaviors. Neutralizing can be seen as attempts to avoid or reduce the possibility of being responsible of harm (Salkovskis, 1985). Adverse mood and neutralization contribute to maintenance of the disorder, as it can increase the likelihood of further intrusions. Neutralization efforts also reduce discomfort and the perceived responsibility, and therefore become a powerful reinforcement agent.

Several studies have supported the relationship between responsibility and obsessive-compulsive symptoms, both in non-clinical populations (e.g. Gwilliam et al., 2004; Myers & Wells, 2005; Smári & Hólmsteinsson, 2001) and in clinical samples (Salkovskis et al., 2000; Shafran, 1997). The relationship remains significant even when controlling for depression (e.g. Emmelkamp & Aardema, 1999), perfectionism (Rhéaume et al., 1995), and worry (Salkovskis et al., 2000).

1.3 Perfectionism

A lot of research on the relationship between obsessive-compulsive symptoms and perfectionism has been done during the last 20 years. The definitions of perfectionism have varied, but Frost, Novara, and Rhéaume (2002, p. 92) postulate that the dominating theme has been that perfectionism “represents an attempt to avoid something unpleasant (i.e., criticism, disaster, uncertainty, lack of control)... The major feature is the avoidance of mistakes, rather than the achievement of goals”. Perfectionism has been operationalized in many different ways, e.g. the Frost Multidimensional Perfectionism Scale (Frost, Marten, Lahart, & Rosenblate, 1990), the Perfectionism Questionnaire (Rhéaume, Freeston, & Ladouceur, 1995, in Coles et al., 2003), the Positive and Negative Perfectionism Scale (Terry-Short, Owens,

Slade, & Dewey, 1995), and on the Perfectionism/Intolerance of uncertainty subscale of the Obsessive Belief Questionnaire – 44 (Obsessive Compulsive Cognitions Working Group [OCCWG], 2005).

There is empirical support for an association between perfectionism and obsessive-compulsive symptoms. Several studies have found a significant relationship between perfectionism and obsessive-compulsive symptoms in non-clinical populations (e.g. Rhéaume et al., 1995; Tolin, Woods, & Abramowitz, 2003b; Wu & Cortesi, 2009). The same association has been found using clinical samples (Frost & Steketee, 1997; OCCWG, 2005; Sassaroli et al., 2008).

However, there is no consensus regarding the uniqueness of the association between perfectionism and obsessive-compulsive symptoms. High levels of perfectionism have been found in eating disorders (Halmi et al., 2000), depression (Sassaroli et al., 2008), and anxiety disorders (Frost & Steketee, 1997; OCCWG, 2005). It is possible that perfectionism is characteristic of general psychopathology, rather than being specifically and uniquely related to OCD. Another possibility is that perfectionism might be differentially related to one or more of the obsessive-compulsive symptom dimensions. Tolin et al. (2003b) examined this hypothesis in a non-clinical sample, and found only partial support for it. Perfectionism was most strongly associated with ordering, but the perfectionism subscale also showed a significant relationship with other psychopathology. Some studies have also explored whether some dimensions of perfectionism are more tied to OCD than other psychopathologies. Coles et al. (2003) demonstrated that “not just right experiences” (NJRE), defined as uncomfortable sensations of things not being just right, were more strongly correlated with OCD than other psychopathologies. They suggested that NJRE may represent “a specific form of perfectionism that has a unique relationship to obsessive-compulsive features” (Coles et al., 2003, p. 697).

1.4 Earlier comparative research on metacognitions, responsibility, and perfectionism

The relationship between obsessive-compulsive symptoms, metacognitions, responsibility, and perfectionism has been explored in some recent studies. Gwilliam et al. (2004) did a correlational and multiple regression analysis of the relationship between obsessive-compulsive symptoms, metacognitions, and responsibility in a non-clinical sample. Consistent with each model, they found positive inter-correlations between all measures. Partial correlational analysis showed that the correlation between responsibility and obsessive-compulsive symptoms was dependent on metacognitions, while the relationship between metacognitions and obsessive-compulsive symptoms was not dependent on responsibility. The same results were demonstrated by Emmelkamp and Aardema (1999), Myers and Wells (2005), and Myers et al. (2009a). The main finding is that metacognitions emerge as an independent predictor of obsessive-compulsive symptoms, while responsibility seems dependent on metacognitions. Solem et al. (2010b) came to the same conclusion, using a clinical sample.

Perfectionism's relationship with obsessive-compulsive symptoms, metacognitions, and responsibility has also been examined (e.g. Myers et al., 2009a; Solem et al., 2009a; Solem et al., 2010b). Myers et al. (2009a) tested the metacognitive model of OCD by a series of hierarchical regression analyses. Penn State Worry Questionnaire was entered on the first step to control for worry. Cognitive measures were added on step two, i.e. responsibility, perfectionism, and overestimation of threat. Then, the metacognitive measures were entered in theoretically determined sequence on step three; thought fusion, beliefs about rituals, and stop signals. Correlational analyses demonstrated that all the measures were positively inter-correlated. Regression analyses demonstrated that each metacognitive predictor made a significant contribution in the final step, after controlling for worry and cognitive measures.

When the entry of the metacognitive and cognitive measures was reversed, the cognitive measures did not make a significant contribution.

Solem et al. (2010b) explored if the results obtained in Myers et al.'s (2009a) study would be replicated in a Norwegian sample. As in Myers et al.'s (2009a) study, metacognition emerged as an independent predictor of obsessive-compulsive symptoms, while responsibility did not. However, contrary to Myers et al.'s (2009a) findings, perfectionism emerged as an independent predictor. Solem et al. (2009a) explored whether metacognitions changed during exposure and response prevention (ERP) treatment for OCD, and explored the extent to which cognitive (responsibility/threat, perfectionism/certainty, importance/control) and metacognitive change predicted symptom improvement and recovery. Regression analyses showed that metacognitive changes took place, and that it explained 22 % of the variance in symptoms at post-treatment. Cognitive changes were not significant.

1.5 Aims of the current study

The aim of this paper was to further test the metacognitive model of OCD (Wells, 1997). Earlier studies have mainly used non-clinical samples. In studies using clinical samples, treatment given has often been out-patient ERP treatment. This study extended existing research by using a clinical OCD- sample, which was given an intensive in-patient cognitive-behavioral treatment (CBT). Metacognitions' influence on obsessive-compulsive symptoms were evaluated and compared to the role of two central cognitive beliefs; inflated responsibility, and perfectionism. According to the metacognitive model (Wells, 1997, 2000, 2009), the metacognitive beliefs should be directly associated with obsessive-compulsive symptoms, while responsibility and perfectionism are seen as more peripheral by-products of metacognitions. Therefore, they should add little in explaining obsessive-compulsive

symptoms when metacognitions are controlled for. In light of the metacognitive model of OCD and recent research on the model, the following three hypotheses were tested:

1. Metacognitions, inflated responsibility, and perfectionism will be positively and significantly correlated with obsessive-compulsive symptoms.
2. Metacognitions will be an independent predictor of obsessive-compulsive symptoms, even when depression, inflated responsibility, and perfectionism are controlled.
3. The relationship between the cognitive beliefs (responsibility and perfectionism) and obsessive-compulsive symptoms will be dependent on metacognitions (i.e. neither of inflated responsibility and perfectionism will be independent predictors of obsessive-compulsive symptoms).

2. Method

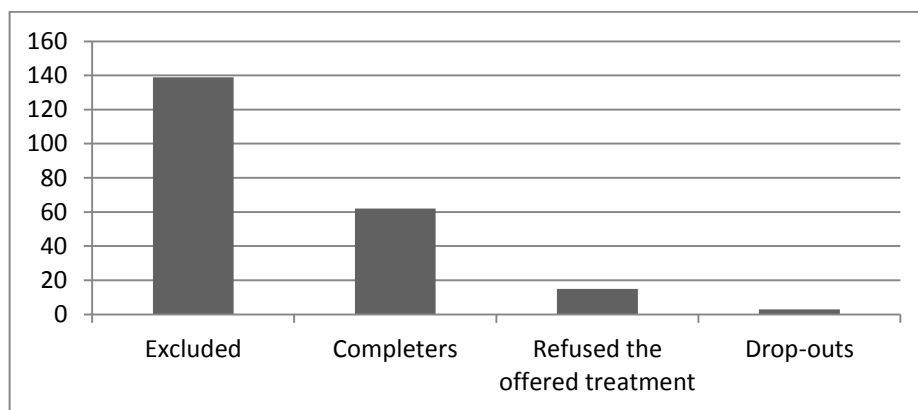
2.1 Participants

Two hundred and nineteen patients were referred to a Norwegian psychiatric in-patient clinic from April 2009 to August 2011. Patients were included in this study if they met the DSM-IV criteria for OCD according to the Anxiety Disorder Interview Schedule (ADIS-IV, Brown, DiNardo, & Barlow, 1994), and if OCD was considered the principal diagnosis. Exclusion criteria were the presence of psychotic disorder, drug/alcohol dependence, and suicidality. Anti-obsessional medications were allowed if the patients maintained dosage levels unchanged during the treatment. If there were any doubt regarding inclusion and exclusion criteria, or doubt in the patients' motivation and ability to go through with the treatment, they were excluded. Sixty-two of the referred patients were included in this study. Patients were excluded for the following reasons: OCD not present or not considered the primary diagnosis (n = 63); psychosis (n = 8); patients given out-patient treatment instead of in-treatment (n = 16); patients did not meet at the diagnostic assessment (n = 6); patients fit

the inclusion criteria, but had not received treatment yet (n = 20); and missing data (n = 26). Sixteen patients refused the offer of treatment, and two patients dropped out of treatment. A summary of this is provided in figure 1.

Figure 1.

Summary of the Numbers of Excluded Patients, Completers, Patients Who Refused the Offered Treatment, and Drop-Outs.



A description of the final sample's demographic and diagnostic information is provided in table 1. ADIS-IV (Brown et al., 1994) was used for diagnostic assessment by trained raters. No screening for axis II disorders was done. To compute OCD subtypes, the same criteria as Abramowitz, Tolin, and Diefenbach (2005) were used. Thus, a cut-off score at 8 and above in OCI-R's total score was chosen. Different OCD subtypes were present: 45.2 % had mainly washing rituals, 41.9 % checking, 64.5 % mental rituals, 17.7 % ordering, 9.7 % hoarding, and 25.8 % neutralization. The percentages exceed 100 %, as many patients met the criteria for more than one primary subtype.

Table 1.

Demographic and Diagnostic Characteristics of the OCD Sample, (N=62).

Characteristics	
Age (years)	34.1 (12.1)
Female gender	69.4%
Working/studying	50 %
Married/cohabitant	34.5 %
Comorbid depressive disorder	47.5 %
Comorbid anxiety disorder	47.5 %

2.2. Treatment

All the referred patients went through two steps of diagnostic and functional assessment; once per telephone, and once at the clinic during a three day stay for assessment combined with motivational interventions. Patients returned home, and those who met the inclusion criteria were offered treatment. The patients had on average three months wait between assessment and treatment start. The treatment had three weeks of duration, and took place at the in-patient psychiatric clinic. The treatment given was not strictly manualized, but the main ingredients were ERP, based on adaptations of a widely used treatment manual for OCD (Foa & Kozak, 1997). Some cognitive and metacognitive elements were also added on individual basis, e.g. detached mindfulness training, challenging cognitive and metacognitive beliefs, and worry postponement. The patients had minimum three exposure sessions every day; one assisted, one partly assisted, and one on their own. The exposure sessions` duration varied.

This study did not have an adequate adherence measure. Treatment adherence is therefore not consistently reported in written form, but the employees in the clinic monitored every day that the treatment instructions were being followed. If the patients didn`t adhere to the treatment, the treatment would be terminated. This happened in the two drop-out cases.

2.3. Therapists

Nine therapists administered both screening and CBT. The therapists varied in their education level and experience; from graduate psychology students to very experienced clinical psychologists. Three of the therapists were psychiatric nurses. All therapists had been taught ERP treatment and cognitive therapy, but little formal supervision was given. However, the therapists had regular weekly team-meetings, where cases were discussed and advice on treatment was exchanged. Therapists also participated in each other`s therapy sessions when needed, but this was not done on a regular basis. Two of the therapists were very experienced in cognitive and behavioral interventions. Three of the other therapists had participated as protocol therapists in Solem, Hansen, Vogel, and Kennair`s (2009b) study, and had considerable experience. Together, these five above mentioned therapists treated 93.7 % of the patients. A Games-Howell – test was run to check for differences in treatment result between these five therapists. No significant differences between the therapists were found for changes in obsessive-compulsive symptoms and metacognitive beliefs, measured by the Yale-Brown Obsessive Compulsive Scale-Self-Report (YBOCS-SR, Baer, Brown-Beasley, Sorce, & Henriques, 1993) and Obsessive Compulsive Disorder-Scale (OCD-S, Wells, 2009).

The in-patient psychiatric clinic was interdisciplinary, where therapists and milieu personnel, consisting of e.g. nurses, psychiatry nurses, and auxiliary nurses, worked in teams. The milieu personnel also contributed to the treatment given, e.g. by doing motivational work, giving emotional support, conducting some of the exposure sessions, and other kinds of milieu interventions.

2.4. Measures

To explore the relationships between metacognitions, inflated responsibility, perfectionism, depression, and obsessive-compulsive symptoms, the following measures were used:

2.4.1. The Yale-Brown Obsessive-Compulsive Scale-Self-Report (Baer et al., 1993) was used to measure severity of obsessive-compulsive symptoms. The respondents rated five aspects of both obsessions and compulsions; time spent, interference, distress, resistance, and control. A 5-point Likert scale from 0 (=”none”) to 4 (=”extreme”) was used to rate the responses. Y-BOCS-SR has demonstrated good reliability and validity (Grabill et al., 2008). Steketee, Frost, and Bogart (1996) found good test-retest reliability and internal consistency ($\alpha=.89$ in a non-clinical sample, $.78$ in an OCD-sample). No evaluation of Y-BOCS-SR’s psychometric properties has been done with Norwegian samples. Pearson correlations for the total score between Y-BOCS-SR and Y-BOCS interview version (Goodman et al., 1989a; Goodman et al., 1989b) were $.75$ in a non-clinical sample, and $.79$ in a clinical sample (Steketee et al., 1996). The Cronbach’s alpha value for the total scale in this study was $.78$.

2.4.2. The Obsessive-Compulsive Inventory-Revised (OCI-R, Foa et al., 2002) is a self-report inventory, used to measure severity of obsessive-compulsive symptoms. The OCI-R contains 18 items reflecting six subscales; washing, checking, ordering, obsessing, hoarding, and mental neutralizing. A 4-point Likert scale from 0 (=”not at all”) to 3 (=”extremely”) is used to rate the responses. The OCI-R has demonstrated good reliability, and good convergent and discriminant validity (Foa et al., 2002). These results have been replicated in both other American samples (Abramowitz & Deacon, 2006), and samples from other countries, i.e. Germany (Göner, Leonhart, & Ecker, 2008) and Norway (Solem, Hjemdal, Vogel, & Stiles, 2010a). The Cronbach’s alpha value was $.83$.

2.4.3. The Beck Depression Index (BDI, Beck, Rush, Shaw, & Emery, 1979) was used to measure presence and severity of depressive symptoms. The BDI is a self-report inventory with 21 items, where each item is rated from 0 to 3. Beck, Steer, and Garbin’s (1988) review of psychometric properties showed that the BDI is a highly reliable and valid measure. Mean internal consistency estimate was $.87$, and test-retest reliability was greater than $.60$. Aasen

(2001) replicated these findings in a Norwegian non-clinical sample on Beck Depression Inventory II (Beck, Steer, & Brown, 1996), which is highly related to the BDI (Dozois, Dobson, & Ahnberg, 1998). Comparable levels of internal consistency, test-retest-reliability, construct validity, discriminant, and convergent validity were found. The Cronbach's alpha for the total scale in this study was .83.

2.4.4. The Obsessive Belief Questionnaire – 44 (OBQ-44, OCCWG, 2005) was used to measure cognitive beliefs in OCD. There is still some controversy around the factor structure of the OBQ-44. OCCWG (2005) found a three factor solution (responsibility/threat estimation, perfectionism/intolerance for uncertainty, and importance/control of thoughts), while Myers, Fisher, and Wells (2008) found four factors (perfectionism/ intolerance of uncertainty, importance/control of thoughts, responsibility, and overestimation of threat). The OBQ-44 has demonstrated good psychometric properties; high internal consistency, and convergent and discriminant validity at a comparable level to the OBQ-87 (OCCWG, 2005). No evaluation of this scale's psychometric properties has been done with Norwegian samples. The four factor solution was used in this study, but perfectionism/ intolerance of uncertainty and responsibility were the only two subscales used in the statistical analyses. The Cronbach's alpha values were .92 for perfectionism/ intolerance of uncertainty, and .89 for responsibility.

2.4.5. The Obsessive Compulsive Disorder-Scale (Wells, 2009) is a self-report inventory, which measures four aspects of OCD. The first aspect measures how distressing and disabling the obsessions have been in the last week (rating from 0 = "not at all" to 8 = "extremely"), while the second measures frequency of different types of maladaptive coping with obsessions (rating from 0 = "none of the time" to 8 = "all of the time"). Checking, cleaning, repeating actions, using mental rituals, and asking for reassurance are some of the coping types mentioned. The third aspect measures frequency of avoidance of different situations (rating from 0 = "none of the time" to 8 = "all of the time), i.e. news items, social situations,

touching other people or things, certain thoughts, and uncertainty. The fourth aspect assesses the degree of agreement with different metacognitive beliefs about obsessions and rituals (rating from 0 = "I do not believe this at all" to 100 = "completely convinced"). There are items that measure TAF, TEF, and beliefs about rituals, e.g. "Obsessional thoughts could make me do bad things", and "My anxiety will persist if I don't perform my rituals". No evaluation of the OCD-S' psychometric properties has been done. In this study, the three last subscales of the OCD-S were used in the statistical analyses; i.e. maladaptive coping behavior, avoidance, and metacognitions. The total score was computed for each subscale. The Cronbach's alpha values were .76 for maladaptive coping behavior, .72 for the avoidance subscale, and .83 for the metacognition subscale.

2.5. Data collection

The data material has been collected and punched in a database by the employees at the psychiatric in-patient clinic, where the assessment and treatment were conducted. The author of this paper has worked part-time at this clinic for two years, and thus participated in both data- collection and punching.

2.6. Overview of data analysis

Means, standard deviations, and post-treatment effect sizes were computed, as well as clinical significant change on both OCI-R and Y-BOCS-SR. As effect size measure, Cohens *d* (Cohen, 1988) with pooled standard deviation, was used. Pre- and post-treatment correlations were computed for the measures of obsessive-compulsive symptoms (OCI-R and Y-BOCS-SR), depression (BDI), responsibility (OBQ-44), perfectionism (OBQ-44), and metacognitions, avoidance, and coping behavior from OCD-S.

A series of multiple regressions were conducted in order to investigate how much variance in obsessive-compulsive symptoms which is explained by metacognitive and cognitive

beliefs. The regressions were performed with the OCI-R and the Y-BOCS-SR as dependent variables. In all the regressions, the pre-treatment value of the dependent variable was entered on the first step. Since depression is one of the most commonly comorbid disorders with OCD (Abramowitz, 2004; Denys, Tenney, van Meegen, de Geus, & Westenberg, 2004), BDI was always entered on the second step to control for depression. In two of the regressions, cognitive beliefs (perfectionism and responsibility dimensions in OBQ-44) were added at the third steps, and metacognitions (measured by the last aspect of OCD-S) at the fourth. In the next two regressions, step three and four were reversed, so that metacognitions were entered on step three and the cognitive measures at step four.

Only post-treatment data were used in the regression analyses in this study, due to restriction of range in the data material at pre-treatment. Follow-up data is not presented because of missing data.

3. Results

3.1 Means, standard deviations, and effect sizes

Table 2 displays the means and standard deviations for treatment completers, before and after treatment, for measures of obsessive-compulsive symptoms, depressive symptoms, and beliefs. The effect sizes following treatment are also presented. The results from both OCI-R and YBOCS-SR indicate that the treatment was effective, as the obsessive-compulsive symptoms show a great reduction during treatment. Depressive symptoms, measured by BDI, were also reduced. There were changes in all belief types, where metacognitions showed the greatest reductions and perfectionism the least.

Table 2.

Means, Standard Deviations, and Effect Sizes for OCI-R, Y-BOCS-SR, BDI, OBQ-44 Perfectionism, OBQ-44 Responsibility and OCD-S.

	Pre-treatment		Post-treatment		<i>d</i>
	M	SD	M	SD	
OCI-R	31.1	12.4	10.3	9	1.98
Y-BOCS-SR	25.3	4.7	10.2	5.9	2.72
BDI	18.8	7.8	6.8	6.7	1.60
Perfectionism	68.6	21.2	44.3	22.5	1.14
Responsibility	32.8	12.4	19.3	10	1.27
Coping	33.4	14.8	11.5	10	1.65
Avoidance	17.1	10.5	5.1	5.9	1.35
Metacognitions	461.4	216.6	85	117.6	2.15

Note. OCI-R = Obsessive Compulsive Inventory – Revised; Y-BOCS-SR = Yale-Brown Obsessive Compulsive Scale – Self-Report; BDI = Beck Depression Inventory; Perfectionism = Obsessive Beliefs Questionnaire - 44, perfectionism domain; Responsibility = Obsessive Beliefs Questionnaire - 44, responsibility domain; Coping = Obsessive Compulsive Disorder-Scale, Coping; Avoidance = Obsessive Compulsive Disorder-Scale, Avoidance; Metacognitions = Obsessive Compulsive Disorder-Scale, Metacognitions.

3.2. Clinically significant change and asymptomatic status

At post-treatment, 71 % (44 of 62) of the patients met Fisher and Wells` (2005b) standardized recovery criteria on Y-BOCS, where the cut-off point was set at 14 and reliable change index at 10. Using a cut-off point at 7 or less, 38.7 % (24 of 62) could be defined as asymptomatic. Clinical significant change was also measured by using post-treatment data from OCI-R. Using the same criteria as Solem et al. (2009b, cut-off = 21, reliable change index = 12), 66.1 % (41 of 62) achieved clinically significant change.

3.3. Correlation analyses

Pre- and post-treatment correlations between obsessive-compulsive symptoms, depression, cognitive and metacognitive beliefs are shown in table 3.

Table 3.

Correlations Between Obsessive-Compulsive Symptoms, Depression, Metacognitive and Cognitive Beliefs at Pre- and Post-Treatment. N = 62.

	Y-BOCS – SR	BDI	Perf.	Resp.	Coping (N = 61)	Avoidance (N = 57)	Meta
Pre-treatment correlations							
OCI-R	.42**	.44**	.49**	.30*	.40**	.25ns	.28*
Y-BOCSSR		.39**	.18ns	.16ns	.45**	.45**	.31*
BDI			.37**	.46**	.28*	.44**	.25ns
Perf.				.50**	.23ns	.12ns	.36**
Resp.					.43**	.41**	.51**
Coping						.57**	.32*
Avoidance							.20ns
Post-treatment correlations							
					(N = 53)	(N = 61)	
OCI-R	.80**	.60**	.61**	.45**	.66**	.30*	.67**
Y-BOCS-SR		.54**	.52**	.44**	.67**	.35*	.62**
BDI			.65**	.39**	.52**	.37**	.59**
Perf.				.57**	.53**	.32*	.51**
Resp.					.46**	.21ns	.45**
Coping						.63**	.67**
Avoidance							.53**

Note. OCI-R = Obsessive Compulsive Inventory – Revised; Y-BOCS-SR = Yale-Brown Obsessive Compulsive Scale – Self-Report; BDI = Beck Depression Inventory; Perf. = Obsessive Beliefs Questionnaire - 44, perfectionism domain; Resp. = Obsessive Beliefs Questionnaire - 44, responsibility domain; Coping = Obsessive Compulsive Disorder-Scale, coping; Avoidance = Obsessive Compulsive Disorder-Scale, avoidance; Meta = Obsessive Compulsive Disorder-Scale, metacognitions.

* $p < .05$, ** $p < .01$.

The pre-treatment correlations had a range from .16 to .52, while the post-treatment correlations ranged from .30 to .80. At post-treatment, all measures, except OBQ-44 Responsibility and OCD-S Avoidance, were inter-correlated. The OCD-S` subscales avoidance and maladaptive coping behavior were included in this correlation analysis to illustrate that the metacognitive model of OCD (Wells, 1997, 2009) involves other constructs in addition to metacognitions. The correlations between the different metacognitive constructs were .63, .67 and .53, indicating that they share some variance, but each is measuring a different construct. The cognitive beliefs are also highly correlated (.57). Consistent with

metacognitive and cognitive models of OCD, and this study's first hypothesis, all beliefs were significantly and positively correlated with obsessive-compulsive symptoms at post-treatment.

3.4. Regression analyses

The four regression analyses were conducted in order to investigate how much variance in obsessive-compulsive symptoms is explained by post-treatment levels of metacognitive and cognitive beliefs, plus depression. In regressions using OCI-R as the dependent variable, the results were as follows: With the pre-treatment scores of OCI-R on the first step (R^2 change = .22, $p < 0.01$), BDI second (R^2 change = .21, $p < 0.01$), cognitive measures (OBQ-44 Responsibility and Perfectionism) third (R^2 change = .07, $p = 0.025$), and metacognitive measure (OCD-S Metacognitions) last (R^2 change = .09, $p = 0.001$), each step explained significant additional variance. With all predictors entered in the final equation, the adjusted R^2 was .55 ($F_{5,55} = 15.9$, $p < 0.01$). All variables were significant independent predictors of obsessive-compulsive symptoms.

In the second regression with OCI-R as the dependent variable, the entry of cognitive and metacognitive variables was reversed. When the cognitive variables of responsibility and perfectionism were entered after metacognitions, they did not make a significant contribution (R^2 change = .03, $p = .138$). Metacognition was significant on step three (R^2 change = .13, $p < 0.01$).

Analyses reported above were repeated with Y-BOCS-SR as the dependent variable. The OBQ-44 Responsibility and Perfectionism block contributed to the variance explained on step three (R^2 change = .08, $p = .032$), after controlling for the pre-treatment scores of Y-BOCS-SR (R^2 change = .13, $p = .005$) and the post-treatment scores of BDI (R^2 change = .20, $p < 0.01$). Metacognitions made a further contribution on step four (R^2 change = .07, $p = .011$). When the order of step three and four was reversed, metacognitions contributed on step three

(R^2 change = .11, $p = .001$), but the cognitive variables did not make a significant contribution on step four (R^2 change = .03, $p = .187$). The model's final adjusted R^2 was .42 ($F_{5,55} = 9.7$, $p < 0.01$). Summary statistics for the variables in the final equations are presented in table 4. Consistent with this study's hypotheses, metacognitions emerged as an independent predictor of obsessive-compulsive symptoms, while the relationship between cognitive beliefs and obsessive-compulsive symptoms was dependent on metacognitions.

Table 4.

Summary Statistics for the Final Steps of the Equations.

	β	Significance
<i>Dependent variable: OCI-R</i>		
OCI-R pre	0.21	0.029
BDI	0.14	0.256
OBQ-44 Responsibility	0.06	0.612
OBQ-44 Perfectionism	0.20	0.119
OCD-S Metacognitions	0.39	0.001
<i>Dependent variable: Y-BOCS-SR</i>		
Y-BOCS-SR pre	0.09	0.395
BDI	0.17	0.241
OBQ-44 Responsibility	0.13	0.289
OBQ-44 Perfectionism	0.14	0.347
OCD-S Metacognitions	0.35	0.011

Note. OCI-R = Obsessive Compulsive Inventory – Revised; Y-BOCS-SR = Yale-Brown Obsessive Compulsive Scale – Self-Report; BDI= Beck Depression Inventory; OBQ-44 = Obsessive Beliefs Questionnaire – 44; OCD-S = Obsessive Compulsive Disorder - Scale.

4. Discussion

This study aimed to test the metacognitive model of OCD (Wells, 1997, 2000, 2009). The treatment delivered was effective, and the clinical significance analyses revealed slightly better results than other research using ERP for OCD (Fisher & Wells, 2005b). Metacognitions' influence on obsessive-compulsive symptoms were evaluated and compared to the role of two central cognitive beliefs; inflated responsibility and perfectionism. The relative independent contributions of metacognitions, responsibility and perfectionism were tested,

while controlling for depression and the pre-scores of the dependent variables, OCI-R and YBOCS-SR. Consistent with this study's hypotheses, metacognition emerged as an independent predictor of obsessive-compulsive symptoms, while the relationship between cognitive beliefs and obsessive-compulsive symptoms was dependent on metacognitions.

As hypothesized, all beliefs were positively and significantly correlated with obsessive-compulsive symptoms at post-treatment. This result is consistent with previous research on the relationship between obsessive-compulsive symptoms and responsibility (e.g. Salkovskis et al., 2000; Shafran, 1997; Smári & Hólmsteinsson, 2001), perfectionism (e.g. Sassaroli et al., 2008; Wu & Cortesi, 2009), and metacognitions (e.g. Emmelkamp & Aardema, 1999; Myers & Wells, 2005; Sica et al., 2007). The relationship between depression and the obsessive-compulsive measures was also significant, and this demonstrated the importance of controlling for depression in examining specific predictors of obsessive-compulsive symptoms. This corresponded to Richter, Cox, and Dorenfeld's (1994) recommendation, that there always should be a control for possible effects of depressed mood in OCD studies.

Both cognitive (responsibility and perfectionism) and metacognitive beliefs predicted obsessive-compulsive symptoms, when depression and the pre-values of obsessive-compulsive symptoms were controlled. Results from the final steps showed that metacognitive beliefs were associated with obsessive-compulsive symptoms, even when responsibility and perfectionism were controlled. However, the cognitive block of responsibility and perfectionism did not significantly add any explained variance of obsessive-compulsive symptoms when metacognitive beliefs were controlled. Thus, as hypothesized, metacognition seems to be an independent predictor of obsessive-compulsive symptoms, while responsibility and perfectionism are not. The relationship between the cognitive beliefs and obsessive-compulsive symptoms seems to be dependent on the variance

shared with metacognitions. This is consistent with previous findings (Emmelkamp & Aardema, 1999; Gwilliam et al., 2004; Myers et al., 2009a; Myers & Wells, 2005; Solem et al., 2009a, 2010b), and with the metacognitive model of OCD (Wells, 1997, 2000, 2009). However, it is not consistent with theoretical models of responsibility (Rachman, 1993; Salkovskis, 1985, 1999) and perfectionism (e.g. OCCWG, 2005; Rhéaume et al., 1995), which promote responsibility and perfectionism as the primary keys to understanding and developing OCD. This replicates the role of metacognitions in changes occurring during the treatment of OCD (Solem et al., 2009a), and extends them to a new measure of metacognitions specially designed to study OCD, and for the first time to an in-patient treatment population.

Depressive symptoms were also reduced during treatment, and the regression analyses showed that depression predicted obsessive-compulsive symptoms. However, beta values indicated that depressive symptoms were not among the variables that had the largest influence on obsessive-compulsive symptoms. There has been some controversy around depression's effect on OCD-treatment. Some studies have found that comorbid depression does influence (e.g. Raffin, Fachel, Ferrão, Pasquoto de Souza, & Cordioli, 2009), while others have found no relationship between initial depression and treatment outcome (e.g. Storch et al., 2010; Anholt et al., 2011). Abramowitz, Franklin, Street, Kozak, and Foa (2000) argued that only severe depression would interfere with treatment. Anholt et al. (2011) concluded that depression more often was secondary to OCD than the reversal, and claimed that when OCD treatment was successful, depressive symptoms were likely to ameliorate as well. This study's results supported Anholt et al.'s (2011) standpoint.

Shortly summarized, this study demonstrated changes in obsessive-compulsive symptoms, depressive symptoms, and cognitive and metacognitive beliefs during treatment. All parts of the metacognitive model of OCD (metacognitions, avoidance, and maladaptive

coping behavior) were significantly associated with obsessive-compulsive symptoms. In addition, these metacognitive constructs were independent predictors of obsessive-compulsive symptoms, while controlling for depression, responsibility, and perfectionism. How should these results be interpreted? According to the metacognitive model of OCD (Wells, 1997, 2000, 2009), metacognitions can cause obsessive-compulsive symptoms to develop. However, this study used a cross-sectional design, and therefore cannot conclude in regard to causation. The reversed possibility; that obsessive-compulsive symptoms can lead to dysfunctional metacognitions, is also possible.

A third possibility is that the treatment has taught the patients that metacognitions are important, i.e. the relationship found between obsessive-compulsive symptoms and metacognitions is spurious. This possibility exists, due to some use of metacognitive interventions, plus the fact that two therapists were undergoing training in metacognitive therapy. Thus, there may be doubt about where their allegiance lay, and whether/at which extent this was communicated to the patients. However, despite some use of metacognitive elements at an individual basis, the treatment in this study was not centered on metacognitions. The primary interventions were cognitive-behavioral, with much focus on ERP. This training up of changes in cognitions still apparently didn't have any effect on results from the regression analyses. Further, the pre-treatment correlations showed that the relationship between obsessive-compulsive symptoms and metacognitions was significant before treatment began. This pre-treatment association was found despite the restricted range in the data material, which often makes it difficult to find correlations. The correlation between obsessive-compulsive symptoms and metacognitions grew stronger during treatment, but that could possibly be explained by the increased variance in the severity of OCD-symptoms after treatment. Thus, the relationship between metacognitions and obsessive-compulsive symptoms does not seem taught during treatment, but probably existed before

treatment. These results provide further support for the metacognitive model of OCD (Wells, 1997, 2000, 2009) and the relationship between metacognitions and obsessive-compulsive symptoms.

4.1 Limitations

The current study had several limitations. As previously mentioned, this study had a cross-sectional design, which means that no conclusions about causation can be made. The metacognitive model of OCD (Wells, 1997, 2000, 2009) proposes that metacognitions can cause obsessive-compulsive symptoms to develop, but a correlational design cannot exclude the reversed possibility; that obsessive-compulsive symptoms can lead to dysfunctional metacognitive beliefs. However, Rassin et al. (1999) and Myers et al. (2009b) demonstrated that thought-fusion beliefs had a causal effect on obsessive-compulsive symptoms. Further prospective studies are needed to test the direction of causation.

Second, all data were collected using self-report measures. Numerous problems are associated with the use of self-report measures, e.g. response styles, impression management and self-deception (Matthews, Deary, & Whiteman, 2003). Further, lack of method variance potentially inflates correlations. Interviewer ratings (e.g. interview Y-BOCS) or peer reports could have been informative methods.

Third, a relatively new questionnaire (OCD-S) was used, which has unknown psychometric properties. Research is needed to evaluate its psychometrics. Nevertheless, the results are consistent with those obtained by studies using measures of metacognitions which are considered valid and reliable, such as the Metacognitions Questionnaire – 30 (e.g. Myers & Wells, 2005), Beliefs About Rituals Inventory (e.g. Myers et al., 2009a; Solem et al., 2010b), and the Thought-Fusion Instrument (e.g. Gwilliam et al., 2004). Perfectionism and responsibility were measured by OBQ-44, but different measures could possibly have

captured other important aspects of the beliefs and/or added more strength to the findings, e.g. the Frost Multidimensional Perfectionism Scale (Frost et al., 1990) or the Responsibility Appraisal Questionnaire - Revised (RAQ – R, Rachman, Thordarson, Shafran, & Woody, 1995). However, the results are consistent with those obtained by studies using both the OBQ-44 (e.g. Myers et al., 2009a; Solem et al., 2010b) and other measures like RAQ-R (e.g. Gwilliam et al., 2004), and Responsibility Attitude Scale (e.g. Myers & Wells, 2005).

Fourth, the sample size in this study was relatively small, which can increase the risk of Type II errors. However, the sample size was within the limits of “the rule of thumb”, which is to have at least ten times as many participants as predictor variables in the regression analyses (Maxwell, 2000).

Fifth, adequate measures of inter-rater reliability of the diagnostic assessments would have improved the strength of these findings, i.e. to secure a representable sample of OCD-patients. Measures of treatment integrity and adherence could also have improved this study, since measures of this kind would have given better estimates of what kind of treatment which was given, and whether the treatment actually was being followed.

4.2 Conclusions

Despite the above limitations, these results provided further support for the metacognitive model of OCD (Wells, 1997, 2000, 2009) and the relationship between metacognitions and obsessive-compulsive symptoms. The results suggested that metacognition has an important and central role in OCD.

The potential scientific use of these results lies in a better understanding of OCD and its precursors, while a potential clinical use lies in both a better understanding and a better treatment of OCD. ERP treatment is regarded as “the treatment of choice”, while CBT and some pharmacological treatments also are considered effective treatment alternatives

(Abramowitz, 1997; Eddy, Dutra, Bradley, & Westen, 2004; Fisher & Wells, 2005b; van Balkom et al., 1994). However, ERP treatment has some drawbacks, e.g. high rates of refusal (Kozak, 1999) and high drop-out rate (Whittal & McLean, 1999). This study's results confirm this picture, with its high post-treatment effect sizes and clinical significance ratings of CBT, and a total sum of refusal and drop-out rate at nearly 23 %. Therefore, this study's support to the metacognitive theory of OCD and metacognitions' role in OCD also strengthens the notion of metacognitive therapy as a possible treatment alternative to ERP. Metacognitive therapy aims to treat OCD by modifying metacognitive beliefs directly, and refines the use of exposure, i.e. claims that prolonged exposure and habituation is no longer required for belief change (Wells, 1997, 2000, 2009). Metacognitive therapy has some preliminary promising results, which suggest that metacognitive therapy could be a brief and effective treatment (Fisher & Wells, 2005a, 2008).

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