

**Title:**

Cognitive and Metacognitive predictors of symptom improvement following treatment for Social Anxiety Disorder: A secondary analysis from a randomized controlled trial.

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Negative Metacognitive beliefs in Social Anxiety Disorder

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## **Abstract**

Cognitive therapy for Social anxiety disorder (SAD) based on the Clark and Wells (1995) model emphasizes negative beliefs about the social self and self-consciousness as central causal factors. However, Wells' (2009) metacognitive model proposes that metacognitive beliefs are central to pathology universally. The relative importance of cognitive- and metacognitive beliefs in the treatment of SAD is therefore an important research question. This study examined change in negative cognitive and negative metacognitive beliefs as independent correlates of symptom improvement in forty-six SAD-patients undergoing evidence-based treatments. Both types of beliefs decreased during treatment. However, change in metacognitive belief was the only consistent independent predictor across all outcomes and change in cognitive beliefs did not significantly predict outcomes when change in self-consciousness was controlled. The implication of this finding is that metacognitive change might be more important than cognitive belief change in symptom outcome and recovery in SAD.

## **Key Words:**

Metacognition, beliefs, metacognitive beliefs, social phobia, social anxiety disorder

## 1. Introduction

According to the NICE guidelines (NICE, 2013), the treatment of choice for Social Anxiety Disorder (SAD) or Social phobia is Cognitive therapy based on the model by Clark and Wells (CT; Clark & Wells, 1995). In support of the guidelines, a recent meta-analysis concluded that the treatment based on the Clark and Wells model is highly effective and superior to other psychological treatments and drugs (Mayo-Wilson et al., 2014).

Clark and Wells' (1995) cognitive model of SAD draws on concepts from cognitive (Beck, 1976) and metacognitive (Wells & Matthews, 1994) theory, and proposes that on entering social situations, people with social anxiety experience negative automatic thoughts and a shift in attention to self-focus on a biased and distorted inner image of the self. Safety behaviors are used to deal with negative beliefs about how one appears to others but impair performance and increase self-focused attention. In addition to these factors, anticipatory worry and post-event rumination-based thinking before and after social encounters contribute to problem maintenance. This pattern of processing can be traced back to underlying negative beliefs and assumptions about the social self (e.g. "I'm boring").

The metacognitive model of psychological disorder proposed by Wells and Matthews (1994; 1996) places the emphasis on different knowledge structures to those posited in cognitive theories such as Clark and Wells. Specifically, the metacognitive approach specifies that beliefs about thinking (i.e. metacognitive beliefs) are universally involved in psychological disorders including social anxiety. In particular, beliefs concerning the uncontrollability and danger of thoughts are considered a transdiagnostic factor that contribute to distress by compromising mental self-regulation because they facilitate a particular pattern of responding to inner experiences called the *cognitive attentional syndrome* (CAS; Wells, 2009). The CAS consist of worry/rumination, threat monitoring and maladaptive coping strategies that initiate, intensify and maintain emotional distress (Wells & Matthews, 1994). Negative metacognitive beliefs (beliefs about the uncontrollability and corresponding danger of thoughts) lead to persistence of the CAS due to a failure to attempt control and because they lead to negative and threatening interpretations of mental events. The metacognitive model therefore predicts that negative metacognitive beliefs play an important role in the maintenance of self-processing strategies (e.g. anticipatory- and post-event processing, self-focused attention) in patients with SAD and suggests that these beliefs are a more important underlying factor than cognitive beliefs (schemas) in psychological disorders including SAD (Wells, 2000).

There is a limited work on the effects of psychological treatments on cognitive and metacognitive beliefs domains and the relative importance of each domain in symptom outcome. However, in one study on obsessive-compulsive disorder (OCD), metacognitive beliefs were a better predictor for outcome than responsibility and perfectionism, and only metacognition was significant when the overlap between the predictors was controlled (Solem, Håland, Vogel, Hansen & Wells, 2009). Metacognitive beliefs were also a better predictor of obsessive-compulsive symptoms than cognitive belief domains in a community sample (Solem, Myers, Fisher, Vogel & Wells, 2010). In patients with chronic fatigue syndrome treated with cognitive behavioral therapy (CBT) or graded exercise therapy (GET), change in metacognitive beliefs accounted for a significant proportion of symptom improvement in both treatment conditions (Fernie, Murphy, Wells, Nikcevic & Spada, 2016). Furthermore, one study found that metacognitive beliefs about alcohol use accounted for individual differences in drinking behavior over and above the construct of alcohol expectancies (cognitive belief domain), with only social performance alcohol expectancies explaining variance when metacognitions were added to the model (Spada, Moneta & Wells,

2007). These data support the importance of metacognitive belief domains and suggest that metacognitions may be more robust predictors of symptoms than cognitive beliefs.

The current study aimed to explore the relative importance of cognitive beliefs and negative metacognitive beliefs for outcome in a clinical sample that underwent treatment for SAD. Identifying which knowledge structures underlie social anxiety and its maintenance factors is important as it would suggest what belief domains (cognitive and/or metacognitive) should be targeted in treatment, and hence has the potential to inform better understanding and further development of effective treatments of SAD. Our hypotheses were as follows: 1) Both cognitive belief and metacognitive belief domains will decrease during treatment; 2) self-consciousness will decrease during treatment; 3) negative metacognitive beliefs will account for a significant amount of the variance in symptom outcome, after controlling for symptom severity at pre-treatment, gender, change in cognitive beliefs and self-consciousness.

## 2. Method

### 2.1 Participants

Forty-six patients diagnosed with Social anxiety disorder (DSM-IV-TR; American Psychiatric Association, 2000) were included in the analyses. These patients were participants in a larger RCT-study (Nordahl et al., 2016). We excluded all participants in the placebo pill condition as they had not received an effective treatment and we were interested in the changes that underlie improvement in effective evidence-based treatments. Thirty participants from the active treatment conditions in the original RCT could not be included in the present study because they did not complete the metacognitions questionnaire. A detailed description of the final sample's demographic and diagnostic information is provided in table 1.

**Insert table 1 here**

### 2.2 Measures

The following self-report questionnaires were administered at pre-treatment and post-treatment:

The Fear of Negative Evaluation scale (FNE; Watson & Friend, 1969) is a 30-item measure of apprehension and anxiety over anticipated social evaluations. This measure uses a true-false scale and has shown good internal consistency ( $\alpha = .94$ ) and test-retest reliability ( $r = .78$ ) (Watson & Friend, 1969). FNE has a range from 0 to 30, high scores indicating higher levels of social anxiety. In the current study, the Cronbach's alpha was .87.

The Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987) is a 24-item measure of fear and avoidance related to social interaction and performance. A higher score indicates higher levels of social anxiety. Its internal consistency has been found to be excellent ( $\alpha = .96$ ) (Heimberg et al., 1999) and the scale has good test-retest reliability ( $r = .83$ ) (Baker, Heinrichs, Kim & Hofman, 2002). In the current study, the Cronbach's alpha was .90.

The Social Avoidance and Distress scale (SAD; Watson & Friend, 1969) is a 28-item measure of distress in social situations and avoidance, using a true-false scale. Its internal consistency has been found excellent ( $\alpha = .94$ ) and its test-retest reliability ranged from .68 to .79. SAD has a range from 0 to 28, high scores indicating higher levels of social anxiety. In this study, the Cronbach's alpha was .92.

The Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) is a 20-item scale that measure fear of and responses to social interactions. It has shown high internal consistency ( $\alpha = .93$ ) and test-retest reliability (.92), and high correlation with the FNE (.66,  $p$

< .001). SIAS has a range from 0 to 80, high scores indicating higher levels of social anxiety. In this study, the Cronbach's alpha was .93.

The Social Phobia Rating Scale (SPRS; Wells, 1997) has five rating scales assessing key components of one of the most commonly employed CT treatments for social phobia (Clark & Wells, 1995); distress, avoidance, self-consciousness, use of safety behaviors, and negative beliefs. In our analyses, we used two of the subscales from the SPRS: 1. Self-consciousness; patients are asked to rate how self-conscious they have felt in difficult situations the last week on a scale ranging from 0 (not at all) to 8 (extremely self-conscious). 2. Cognitive beliefs; we computed a variable we called *cognitive beliefs* out of the negative beliefs rating scale. The scale consists of 14 items, e.g. "I look bad" and "They will notice I'm anxious", each item ranging from 0 – 100. This scale was used as measure of cognitive beliefs typical for social phobic patients, ranging from 0 to 1400. The scale had high internal consistency at pre-treatment ( $\alpha = .90$ ) and at post-treatment ( $\alpha = .97$ ).

The MCQ-30 (Wells & Cartwright-Hatton, 2004) is a 30-item self-report scale measuring beliefs about thinking. Responses are required on a four-point scale ranging from 1 (do not agree) to 4 (agree very much). A five-factor structure exists: 1) positive beliefs about worry; 2) negative beliefs about the controllability of thoughts and corresponding danger; 3) cognitive confidence; 4) need to control thoughts; and 5) cognitive self-consciousness. High scores reflect more reported problems with the item in question. In our analyses, we focused on the fourth factor measuring negative metacognitive beliefs about the controllability and danger of thoughts, e.g. "My worrying is dangerous for me", as these beliefs are important for maintaining distress according to the S-REF model. The MCQ-30 has demonstrated good psychometric properties (Cronbach's alpha ranging from .72 to .93) and the internal consistency of the uncontrollability and danger subscale has been shown to be excellent ( $\alpha = .93$ ) (Wells & Cartwright-Hatton, 2004). In the current study, the Cronbach's alpha for the subscale was .71.

### 2.3 Treatment:

This sample was drawn from a larger RCT-study (Nordahl et al., 2016) and comprised participants who had been included in one of the following treatment conditions: treated with SSRI (paroxetine hydrochloride) administered over 26 weeks, treated with Cognitive therapy based on the Clark and Wells model (1995), or the combination of these two treatments (we excluded the untreated control group). The psychological treatment also included elements from Metacognitive therapy (Wells, 2009). Thus, there was greater systematic work on changing attention in social situations, more work on eliminating worry and rumination, and experiments were used in each session, i.e. testing social performance while changing attention. However, there was no direct work on metacognitive beliefs.

### 2.4 Overview of data analyses

For our first analysis, we calculated change scores and within-group effect sizes for all the measures using paired samples t-tests and Cohen's *d* (Cohen, 1988). Then we ran correlational analyses to investigate the relationship between the predictors; gender, change in self-consciousness, change in cognitive beliefs and change in negative metacognitive beliefs.

A hierarchical multiple linear regression analysis was conducted to predict post-treatment scores in each of the social anxiety-measures (FNE, LSAS, SAD, SIAS) whilst controlling for each of these respective variables at pre-treatment. In general, higher rates of social anxiety disorder are found in females than in males in the general population (with odds ratios ranging from 1.5 to 2.2) (DSM-V; APA, 2013). Therefore, we controlled for gender in the regression analysis. Change in self-consciousness was included and controlled in in the model as this process is a factor in both cognitive and metacognitive theory. On the

final step of the equation we entered change in negative metacognitive beliefs (beliefs about the uncontrollability and danger of thoughts) to test any unique contribution of this variable.

### 3. Results

#### 3.1 Treatment effects

All three treatment conditions were effective in the original study, but the group treated with CT alone showed a significantly greater improvement than SSRI, with the combination of treatments showing an intermediate effect (Nordahl et al., 2016). For the current study, we calculated changes and effect sizes for the overall treated sample, presented in Table 2. In this sample, the change in social anxiety symptoms indicated a large effect size for all four symptom measures as assessed by Cohen's *d*. The change in self-consciousness and cognitive beliefs also indicated a large effect size, whilst the change in negative metacognitive beliefs indicated a medium effect size.

**Insert table 2 here**

#### 3.2 Correlational analyses

We investigated the relationship between the predictor variables using bivariate correlations. Gender was not significantly correlated with any of the other predictors. Change in self-consciousness was positively and significantly correlated with change in cognitive beliefs ( $r = .33$ ,  $p = .027$ ), but was not correlated with change in negative metacognitive beliefs ( $r = -.01$ ,  $p = .926$ ). Change in cognitive beliefs and change in negative metacognitive beliefs was not significantly inter-correlated ( $r = .04$ ,  $p = .794$ ).

#### 3.3 Regression analyses

Four regression analyses were conducted, one for each outcome measure (FNE, LSAS, SAD and SIAS). The results indicated that symptom score at time 1 was a strong and significant predictor of symptom score at time 2 for all measures, also in the final step of the regression models. Gender was not related to outcome in any of the symptom measures. In step 3, change in cognitive beliefs was related to change in three out of four symptom measures, and explained 8.7 % of the variance in FNE, 8.3% of the variance in LSAS, and 9.6 % of the variance in SIAS at post treatment. Change in cognitive beliefs was not a significant predictor of SAD score at post treatment when pre treatment score and gender were controlled. In step 4, when controlling for gender and change in cognitive beliefs, change in self-consciousness was a significant incremental predictor of symptom change in three measures, and explained 9.7 % additional variance in FNE, 10.2 % in LSAS and 9.4 % in SIAS. Change in self-consciousness was not a significant predictor of post treatment SAD in this model. Moreover, adding change in self-consciousness to the model led cognitive beliefs to become non-significant as a predictor in the case of all outcome measures. In the final step, change in negative metacognitive beliefs explained a significant additional 15.9 % of the variance in FNE, 5.9 % of the variance in LSAS, 12.9% of variance in SAD, and 10.3 % of the variance in SIAS. Further, when negative metacognitive beliefs were added to the model in the final step, change in self-consciousness became a significant predictor of SAD score post treatment. In the final equation, only change in self-consciousness and change in negative metacognitive beliefs explained variance in symptom measures at post treatment, while change in cognitive beliefs was not significant a predictor in any of the models. The regression analyses are presented in Table 3.

**Insert table 3 here**

## 4. Discussion

This study set out to evaluate changes in cognitive and negative metacognitive beliefs in patients undergoing treatment for SAD, and to evaluate specific changes as predictors of symptom improvement. We found that both cognitive beliefs and negative metacognitive beliefs changed during treatment but that these changes were not correlated with each other. Self-consciousness also significantly decreased during treatment and this change was positively associated with change in cognitive, but not metacognitive beliefs.

The main finding of our study was that change in negative metacognitive beliefs explained a large proportion of the variance in SAD-symptoms at post treatment when symptoms at time 1, gender, change in cognitive beliefs and change in self-consciousness were controlled, and this finding was consistent across all four symptom measures. Together with change in negative metacognitive beliefs, change in self-consciousness was also a significant predictor in the final equation in all measures, but for one of the models (SAD), change in self-consciousness was only a significant predictor when entered together with change in negative metacognitive beliefs. An unexpected finding was that change in cognitive beliefs had no predictive value in any of the models when controlling for change in self-consciousness and change in negative metacognitive beliefs. These results suggest that the relationship between change in cognitive beliefs and SAD symptoms in patients undergoing the treatment conditions here is dependent on change in attention-based processes. Furthermore, change in negative metacognitive beliefs added predictively over and above change in cognitive beliefs and change in self-consciousness, and therefore seemed to be a more important underlying correlate of symptom improvement than change in cognitive beliefs.

These results demonstrate that hypothesized cognitive and metacognitive factors change during effective CT and drug treatments for SAD and that these changes are related to symptom improvement. However, the data shows that metacognitive belief change was a stronger predictor of symptom improvement than cognitive belief change in this trial. These results suggest that rather than aiming to modify cognitive beliefs in the psychological treatment of SAD, treatment may be better placed if it deals with the specific attentional processes (Self-consciousness) and negative metacognitive beliefs about the uncontrollability and danger of thoughts, as would be predicted by the metacognitive model. It has been suggested that cognitive beliefs might simply act as the trigger for or output of repetitive negative thinking in psychopathologies and it is necessary to modify the metacognitive control factors that can help bring such universal maladaptive thinking patterns under control (Wells & Matthews, 1994; 1996). Whilst cognitive therapy and medications (SSRI) do not directly target metacognitive beliefs, we would expect any effective treatment to impact on underlying maintenance mechanisms, and metacognitive beliefs may be one such mechanism for which there are multiple pathways (involving different treatments) to change. For example, Solem et al. (2009) showed that change in metacognition predicted symptom improvement in patients undergoing exposure and response prevention (ERP) for OCD despite the fact that metacognitive beliefs are not directly targeted in ERP.

There are several implications of these results; negative metacognitive beliefs seem to be an important factor for symptom improvement in SAD, and changing these beliefs could possibly produce more effective and faster outcomes than targeting cognitive beliefs. It may be the case that change in negative automatic thoughts or underlying schemas are not necessary to promote recovery. This implies that current models of SAD might be modified to include relevant metacognitive beliefs. Moreover, new measures of metacognitive beliefs could be developed to assess metacognitive knowledge in social anxiety that may determine

the efficacy of treatment and could be used to predict improvement rate and to monitor underlying maintenance factors.

A major limitation of the current study is that a substantial number of the participants from the RCT-study (Nordahl et al., 2016) could not be included in this secondary analysis due to missing data. However, our findings were consistent across all four outcome measures even though the predictor to participant ratio was not exemplary. Further, we used a pooled group of treated individuals where the treatments were different and we cannot infer what predicts outcome in the different forms of treatment. Since this is the first test of metacognitive and cognitive change as predictors of outcome in SAD, our research question was much more general; what changes and correlates independently with outcome when individuals undergo effective treatment? The fact that the group is heterogeneous in treatment modality could be viewed as a potential strength in that only the most robust and universal correlates are likely to emerge from the dataset.

In conclusion, the present study is the first to show that improvement in SAD symptoms is associated with change in negative metacognitive beliefs over and above change in cognitive beliefs, and somewhat surprisingly that cognitive beliefs made no statistical contribution to improvement when metacognitive beliefs and self-attention were simultaneous predictors. These data bring further support to the metacognitive model of psychological disorder, and appear to modify a core assumption of cognitive models and treatments for SAD that give emphasis to changing cognitive schemas.

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