

Hilde Marie Fardal

Emotion versus Metacognition

Mechanisms of Change in Metacognitive
Therapy for Generalized Anxiety Disorder:
Results from a Randomized Controlled Trial

Hovedoppgave i Profesjonsstudiet i psykologi

Veileder: Truls Ryum

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Norges teknisk-naturvitenskapelige universitet
Fakultet for samfunns- og utdanningsvitenskap
Institutt for psykologi



NTNU

Kunnskap for en bedre verden

Forord

Målet med studien var først og fremst å benytte muligheten til å lære mer om klinisk arbeid. En rekke problemstillinger ble drøftet, og avgrensningen for datainnsamlingen ble avklart gjennom gode diskusjoner med veileder Truls Ryum og medstudent Hege Bergersen. Vi kom frem til at et fokus på adaptiv emosjonsregulering ville gi oss viktig lærdom om endringsmekanismer i terapi. Opplæring i og erfaring med ATOS-manualen ga oss økt innsikt i pasientenes tilgang på ulike typer følelser, noe som vil bli nyttig å ta med seg inn i arbeidet som psykolog. En annen fordel med datainnsamlingen var muligheten til å lære om metakognitiv behandling ved å observere erfarne MCT-terapeuter. Videre gjorde tilgangen til datasettet i GAD-studien det mulig å sette endring i adaptiv affekt opp mot endring i metakognisjoner som prediktorer for nedgang i symptomtrykk, noe som gjorde prosjektet ekstra spennende. Den endelige problemstillingen ble til i samarbeid med veileder Truls Ryum.

Jeg ønsker først og fremst å takke veilederen min, Truls Ryum, for interessante samtaler, bistand under gjennomføringen av analysene og god hjelp underveis i hele prosjektet. Jeg er veldig takknemlig for tilgjengeligheten, både på kontoret og på e-post.

Videre vil jeg takke Hans Nordahl og alle de involverte i GAD-studien for tilgang på både datasett og terapiopptak. Jeg vil også takke Erlend Høen Laukvik og Eirin Ferstad for tilgangen til deres ATOS-data, slik at vi kunne bygge videre på deres datainnsamling.

Jeg ønsker også å takke min samarbeidspartner Hege Bergersen, som var til stor hjelp under innlednings- og kodingsfasen. Takk for gode refleksjoner og samtaler rundt de store spørsmålene om hva som er grunnleggende faktorer for at terapi skal lykkes.

Til slutt vil jeg rette en stor takk til bestefar for støtten han har bidratt med gjennom hele studieløpet. Takk for at jeg får høste fruktene av å ha en bestefar som er glad i bøker!

*Hilde Marie Fardal
Trondheim, juli 2019*

Abstract

The data were retrieved from a study comparing metacognitive therapy (MCT) to cognitive behavioral therapy (CBT) in the treatment of generalized anxiety disorder (GAD), led by Hans Nordahl. The main objective of the current study was to compare metacognition and emotional arousal as change-mechanisms in MCT for adult patients with GAD. 20 patients were included in the analysis. The Metacognition Questionnaire-30 (MCQ-30) and the Achievement of Therapeutic Objectives Scale (ATOS) were used as process measures. Only the third ATOS subscale, "Affect experiencing", was included in the analysis. This subscale targets the patients' arousal of adaptive affect. Treatment outcome was measured by the Penn-State Worry Questionnaire (PSWQ). To the author's knowledge, this is the first study comparing change in metacognition to change in emotional arousal as predictors of outcome in MCT. The main finding was that both variables were shown to be important and separate predictors of treatment outcome. Two hierarchical multiple regressions were computed to determine whether change in the process measures predicted change in the outcome measure. The variables "Change in adaptive affect" and "Change in MCQ-30" explained respectively 41.1% and 39.9% of the variance in post treatment PSWQ when examined separately. Next, both variables were examined in the same analysis. The explained variance in post treatment PSWQ increased with 14.4% when "Change in MCQ-30" was added to "Change in adaptive affect", and with 15.6% when "Change in adaptive affect" was added to "Change in MCQ-30". In conclusion, this preliminary study implies that metacognition and emotional arousal are separate and equally important change-mechanisms on a within-person level in MCT for GAD.

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Introduction

Generalized anxiety disorder

Generalized anxiety disorder (GAD) is one of the most prevalent psychiatric disorders in primary care (Davidson, Feltner, & Dugar, 2010). During a given 1-year period, 3.1% of the population meet the criteria for GAD (Kessler, Chiu, Demler, & Walters, 2005), whereas 5.7% of the population meet the criteria at some point during their lifetime (Kessler, Berglund, Demler, Jin, & Walters, 2005). In Norway, the lifetime prevalence is estimated to be 4.5% and the 12-month prevalence is estimated to be 1.9% (Kringlen, Torgersen, & Cramer, 2001).

The disorder is characterized by excessive anxiety and worry about numerous topics, occurring more days than not for at least 6 months. Individuals with GAD often worry about everyday events or activities, such as work or school performance. Other possible symptoms are restlessness, fatigue, difficulty concentrating, irritability, muscle tension and sleep disturbance. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning (5th ed.; DSM-V; American Psychiatric Association, 2013). Worry has been defined as “a chain of thoughts and images, negatively affect-laden and relatively uncontrollable” (Borkovec, Robinson, Pruzinsky, & DePree, 1983, p. 10). In GAD, the worry process is predominantly verbal and aimed at problem solving (Borkovec & Hu, 1990; Borkovec & Inz, 1990; Wells, 2009). According to Wells and Carter (2001), the assumption that worry is uncontrollable is a central feature of GAD.

Several studies suggest that GAD is associated with a considerable degree of impairment and disability, as well as high utilization of healthcare resources. At the individual level, GAD is associated with a reduced quality of life (Lieb, Becker, & Altamura, 2005). In summary, GAD is a burden for both individuals and society as a whole, indicating the need for research aiming to improve the treatment of this disorder.

The metacognitive model of GAD

Metacognitive therapy (MCT) is theoretically grounded in the self-regulatory executive function model (S-REF model; Wells & Matthews, 1994), describing psychopathology as the result of a perseverative thinking style called the cognitive attentional syndrome (CAS). The CAS consists of dysfunctional cognitive and behavioral strategies in response to negative thoughts and feelings, resulting in prolonged psychological distress. The CAS interferes with healthy self-regulation and emotional processing. For example, worry as

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a cognitive strategy may divert attention away from distressing mental images. As a result, normal emotional processing is blocked, preventing the individual from realizing that emotions are not harmful. The model suggests that the CAS arises from negative and positive metacognitions, that is, beliefs about the need to engage in CAS activities. The treatment aims to identify and modify metacognitions related to the CAS in order to enhance attentional control and cognitive flexibility (Wells, 2009).

Metacognition refers to the internal cognitive factors that control, monitor and appraise thoughts and feelings. Metacognitions direct attention, determine the style of thinking, and direct coping responses and emotional regulation. Positive metacognitions are beliefs about the benefits of thinking and mental activity, whereas negative metacognitions are beliefs about the dangerousness and uncontrollability of thinking and mental activity (Flavell, 1979; Quirk, 2006; Wells, 2000; Wells, 2009).

GAD is associated with both positive and negative metacognitions about worrying. The use of worry as a means of coping is linked to positive metacognitive beliefs that most people hold to some extent. However, it is the activation of negative metacognitive beliefs that characterizes the transition to GAD (Wells, 2009). Wells and Carter (2001) found that several studies utilizing the Metacognitive Questionnaire (MCQ) indicate that negative beliefs about thoughts distinguish GAD patients from other anxiety disorders. Other studies showed that all subscales of the MCQ were positively correlated with trait anxiety (Cartwright-Hatton & Wells, 1997) and pathological worry (Wells & Papageorgiou, 1998), indicating that metacognitions may be an important factor in the development of anxiety disorders in general.

The metacognitive model of GAD proposes that individuals with GAD tend to use worrying as their predominant means of anticipating and coping with future problems. General worry about external events and social and physical health concerns in response to worry triggers is called "type 1 worry". This category of worry is the target of treatment in cognitive behavioural therapy (CBT). Then, negative beliefs about worrying are activated (e.g., "I could go crazy with worry"). This is called "meta-worry" or "type 2 worry". Two types of meta-worry are essential in GAD: negative beliefs about the uncontrollability of worry and negative beliefs about its dangerous or damaging consequences (e.g., "worry can lead to a heart attack"). Individuals with GAD often misinterpret anxiety symptoms as proof of the harmful effects of worrying, which in turn leads to immediately intensified anxiety and a strengthening of meta-worry (Wells, 2009).

Meta-worry is often followed by two types of coping behaviors labeled "behavioral responses" and "thought control strategies", which contribute to the maintenance of the

symptoms. The behavioral responses consist of reassurance seeking, avoidance, distraction, and so on. By handing control over to external factors, these strategies strengthen the negative metacognition that worry is uncontrollable. Thought control strategies include suppression of worry triggers and a failure to disengage from the worry process once it is activated. As a consequence, individuals using these coping behaviors have few personal experiences that could challenge the assumption that worry is impossible to control (Wells, 2009; Wenzlaff & Wegner, 2000). Negative metacognitions about uncontrollability may in turn indicate low belief in psychological treatment (Fisher & Wells, 2008). In such a context, therapy that aims to challenge assumptions about thought processes (type 2 worry) rather than focusing on thought content (type 1 worry) might be beneficial.

Treatment of GAD

Most published trials on treatment of GAD have tested the effects of different drugs, different types of CBT or treatments using relaxation therapies (Nordahl et al., 2018). However, drugs are associated with some risks, including physical and psychological dependence (Mathew & Hoffman, 2009; Noyes, Garvey, Cook, & Suelzer, 1991; Ray, Gurwitz, Decker, & Kennedy, 1992; Rickels, Schweizer, Case, & Greenblatt, 1990; Wang, Bohn, Glynn, Mogun, & Avorn, 2001). In the short term, drugs seem to confer about the same benefit as psychotherapy in the treatment of GAD, but psychological treatments seem to be more effective in the long term (Barlow, Allen, & Basden, 2007; Barlow & Lehman, 1996; Borkovec, Newman, Pincus, & Lytle, 2002).

Leichsenring and colleagues (2009) compared CBT and short-term psychodynamic psychotherapy (STPP) in the treatment of GAD in a randomized controlled trial (RCT). The results showed CBT and STPP to be equally effective regarding anxiety symptoms measured by the Hamilton Anxiety Rating Scale (HAM-A; Hamilton, 1959), whereas CBT was found to be superior in regard to anxiety symptoms measured by the Penn-State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990). A meta-analysis by Keefe, McCarthy, Dinger, Zilcha-Mano, and Barber (2014) suggests that psychodynamic therapies as studied in RCTs are as effective at treating anxiety disorders as other active treatments. Others argue that psychodynamic therapies are less effective than CBT in the treatment of GAD (NICE, 2012; Roth & Fonagy, 2006). An extensive literature review by Roth and Fonagy (2006) found CBT and applied relaxation (AR) to be the most efficient psychological treatments of GAD.

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The most empirically supported treatment of GAD is CBT (Cuijpers et al., 2014; Hanrahan, Field, Jones & Davey, 2013). This approach involves training clients to identify internal and external anxiety cues in order to apply new coping skills that target both the psychic and somatic symptoms of GAD (Borkovec & Ruscio, 2001). In general, CBT uses a variety of techniques to help patients change their thinking, emotions and behavior. The main objective is to teach the patients to identify, evaluate and respond to dysfunctional thoughts and assumptions with critical thinking and an active examination of how reasonable these thoughts are (Hjemdal & Kennair, 2014).

MCT is a more recent approach to GAD. Unlike CBT, MCT does not include cognitive restructuring, exposure, applied relaxation or breathing techniques (Nordahl et al., 2018). The treatment aims to increase the patients' cognitive flexibility by targeting dysfunctional metacognitions (Hjemdal & Hagen, 2012).

A randomized trial of MCT and AR in the treatment of GAD showed that MCT was superior to AR. Recovery rates for MCT at 12 months follow-up were 80% on measures of worry and 60% on measures of trait-anxiety compared with 10% and 20% following AR (Wells et al., 2010). Another randomized controlled trial compared the effectiveness of MCT with intolerance-of-uncertainty therapy (IUT) for GAD. The results showed that MCT produced better results than IUT on most outcome measures (van der Heiden, Murs, & van der Molen, 2012). Nordahl and colleagues (2018) compared MCT to the gold standard CBT for GAD in a randomized controlled trial, using the same therapists in both conditions. The results showed that MCT had a better outcome in reducing worry post treatment and in recovery rates at post treatment and follow-up. A meta-analysis including 25 studies of MCT showed that MCT is an effective treatment for a variety of psychological complaints. To date, the strongest evidence exists for anxiety and depression (Normann & Morina, 2018). The National Institute of Clinical Excellence in the United Kingdom (NICE) now approves of MCT as an evidence based treatment of GAD (NICE, 2012).

The role of emotions in GAD

Emotions may be understood as biologically based changes in relational action readiness that result from the appraisal of a situation based on a concern. This view sees emotion as an integration of affect, cognition, motivation and relational action (Frijda, 1986; Greenberg & Safran, 1989; Safran & Greenberg, 1991; Oatley & Jenkins, 1992). Tomkins (1962) describes affect as bodily sensations that guide and direct behavior. Simply put, emotions organize the individual for action (Greenberg & Korman, 1993).

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Several researchers in the social and behavioral sciences emphasize the importance of differentiating between emotions, feelings and affect. However, the debate over how to best define and distinguish these concepts is still ongoing (Eisenberg & Spinrad, 2004; Izard, 1992; Nesse, 1990; Sherer, 2005). In the academic literature, the definitions are not used consistently (Laukvik & Ferstad, 2015). Therefore, this article will not differentiate between emotions, feelings and affect.

Some argue that individuals with GAD might use worry as a strategy to avoid images that would elicit negative emotions such as anger. In a study of adults with GAD, Cassidy (1995) found an association between GAD and current unresolved anger toward childhood primary caregivers. Borkovec, Alcaine and Behar (2004) suggest that worry in GAD might switch the focus of attention away from anger related to a distressing childhood, inhibiting the imagery and somatic activation potentially accompanying those memories. Other studies have shown GAD to be related to elevated levels of trait anger and anger expression (Erdem, Celik, Yetkin and Ozgen, 2008), as well as internalized anger expression (Deschênes, Dugas, Fracalanza and Koerner, 2012). Internalized anger expression refers to the suppression (i.e. lack of expression) of angry feelings. Deschênes, Dugas, Fracalanza and Koerner (2012) found internalized anger expression to be a stronger predictor of GAD than external anger expression, indicating that patients with GAD might perceive the feeling of anger as unacceptable.

Others argue that by focusing on the verbal aspects of worrying, patients with GAD don't have the attentional capacity left for creating images of potential threats. In turn, they fail to process the images and negative affect associated with anxiety, leaving them unable to work through their problems and arrive at solutions. Worrying prevents the patients from facing the feared situation, so adaptation never occurs. Therefore, avoidance of negative emotions such as fear might be the reason why these individuals become chronic worriers (Borkovec, Alcaine, & Behar, 2004; Borkovec, Shadic, & Hopkins, 1991; Craske, 1999; Fisher & Wells, 2009; Roemer & Borkovec, 1993; Zinbarg, Craske & Barlow, 2006). The patients' perception of their own emotions, which are often considered intolerable, may be both a predisposing and a maintaining factor in GAD. Borza (2017) argues that the therapist should explore the patients' beliefs about their ability to tolerate negative emotions. According to Foa and Kozak (1986), the patients need to affectively experience the activation of fear in order for habituation and healing to occur.

However, other studies indicate that individuals with GAD try to avoid emotions in general, not just negative emotions. In psychodynamic therapies, worry is conceptualized as a

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defense mechanism protecting the individual from experiencing fantasies and emotions that are perceived as even more threatening than the contents of his or her worries (Barber & Crits-Christoph, 1996). It is possible that worry is used as a means to avoid or control inner experiences, out of fear of losing control over emotional reactions (Borkovec & Roemer, 1995; Roemer, Salters, Raffa, & Orsillo, 2005; Turk, Heimberg, Luterek, Mennin, & Fresco, 2005). Mennin, Heimberg, Turk and Fresco (2005) found that three studies provide preliminary support for an emotion dysregulation model of GAD. The results showed that individuals with GAD had stronger emotional responses, a poorer understanding of emotions and more difficulty managing their emotional reactions than controls. Mennin and colleagues (2005) argue that the combination of heightened emotional intensity, inadequate knowledge about emotions and distress associated with emotional experience may lead individuals with GAD to use maladaptive coping strategies (Laukvik & Ferstad, 2015). Difficulty identifying and describing emotions rather than processing emotions through attention, understanding and experiencing (Foa & Kozak, 1986) has been related to various forms of psychopathology (Taylor, Bagby, Parker, & Alexander, 1997).

Emotional arousal as a mechanism of change

Although emotional arousal as an essential common factor in psychotherapy was initially described by Frank (1963), there has been little empirical research on this topic. However, working with emotion has been considered important in several psychological perspectives for a long time. For instance, psychodynamic approaches emphasize emotional insight, whereas behavioral approaches promote the arousal of fear. At the present time, there is an academic interest in research on the role of emotion in psychotherapeutic change that cuts across all therapeutic modalities (Greenberg & Paivo, 1997; Whelton, 2004). While there is no single definition of common factors in psychotherapy, Cameron (2013) describes common factors as the non-technical aspects of therapeutic work that have been shown to be associated with successful outcomes.

Most research on the role of emotions in psychotherapy have focused on short-term dynamic psychotherapy (STDP) and experiential approaches such as emotion focused therapy (EFT). From an experiential therapy perspective, optimal emotional processing involves the integration of cognition and affect (Greenberg, 2002; Greenberg & Pascual-Leone, 1995; Greenberg & Pascual-Leone, 2006). Process-outcome research on the emotion-focused treatment of depression has shown that the depth of the clients' emotional experience coupled with reflection on the aroused emotion predicted good treatment outcomes (Adams &

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Greenberg, 1996; Goldman & Greenberg, 2005; Pos, Greenberg, Goldman, & Korman, 2003; Warwar & Greenberg, 2000). Several process studies using the Experiencing Scale (EXP; Klein, Mathieu, Kiesler, & Glendlin, 1969) have found a strong relationship between in-session emotional experiencing and therapeutic gain in psychodynamic, cognitive, and client-centered therapies (Casonguay, Goldfried, Wisner, Raue, & Hayes, 1996; Orlinsky & Howard, 1986; Silberschatz, Fretter, & Curtis, 1986). However, emotional arousal might not always be beneficial. For instance, the therapist should keep in mind whether the emotion is adaptive or maladaptive. Further, underregulated patients might need help to control rather than increase their affective arousal (Greenberg & Pascal-Leone, 2006; Laukvik & Ferstad, 2015; Whelton, 2004; Wisner og Arnow, 2001).

Castonguay and colleagues (1996) argue that there is a need for research on emotional processes in cognitive approaches. Their study of unique and common factors in cognitive therapy for depression showed that the client's improvement was predicted by the two common factors measured: the therapeutic alliance and the client's emotional involvement. The role of emotion in cognitive approaches have largely been ignored by both theorists and scientists. However, several researchers have taken an interest in the importance of emotional arousal during exposure interventions in CBT. Multiple studies have found arousal of fear during exposure treatment to predict habituation and recovery (Foa & Kozak, 1986; Foa, Riggs, Massie, & Yarczower, 1995; Foa, Rothbaum, & Furr, 2003; Jaycox, Foa, & Morral, 1998). From the perspective of behavioral therapy, arousal of fear caused by old distress in the presence of new information is the key to change (Greenberg & Pascual-Leone, 2006). Further, a preliminary study showed that increase in affective arousal statistically significantly predicted reduction in worry in both CBT and MCT for GAD (Laukvik & Ferstad, 2015).

In summary, adaptive emotional arousal seem to be an important common factor in psychotherapy. Nevertheless, the role of emotions in cognitive approaches, especially in MCT, remains largely unexplored.

Metacognition as a mechanism of change

To date, little is known about the mechanisms of change in MCT (Hoffart, Johnson, Nordahl & Wells, 2018). In a recent study of MCT and CBT for inpatients with treatment-resistant anxiety, Hoffart et al. (2018) found that negative and positive metacognitive beliefs decreased over the course of treatment in both treatment conditions. Time-specific changes in positive beliefs predicted variations in anxiety across the two treatments, implying that

reduction in such beliefs may be important for treatment response. Both positive and negative metacognitions decreased more in MCT than in CBT.

A study of patients with obsessive-compulsive disorder (OCD) undergoing treatment with exposure and response prevention found support for the importance of metacognitions in treating OCD. Changes in metacognitions explained 22% of the variance in symptoms at post-treatment when controlling for pre-treatment symptoms and changes in mood (Solem, Håland, Vogel, Hansen, & Wells, 2009).

In a preliminary study including both the MCT and the CBT sample in the GAD study by Nordahl et al. (2018), Felberg (2012) found that change in negative metacognitions accounted for more than half of the variance in post-treatment worry.

Johnson and colleagues (2018) examined changes in cognition and metacognition in inpatient MCT and CBT for comorbid anxiety disorders. Cognition is referred to as dysfunctional thinking and beliefs which create and maintain various disorders. Decrease in cognition or metacognition was found to be associated with reduced anxiety in the subsequent week. Further, the results indicated a main effect of both cognitions and metacognitions on predicting anxiety. The reciprocal relationship of anxiety on metacognitions was larger in MCT compared with CBT. According to Johnson and colleagues (2018), the results from this study produced the first evidence that change in metacognitions is associated with change in anxiety on a within-person level.

In short, MCT is founded on the assumption that modifying dysfunctional metacognitions is the component of the treatment which lead to improvement. Several studies show that MCT is an upcoming and efficient treatment of several psychological disorders. Some studies show that change in metacognitions play an important role in MCT. However, one may ask if there are other mediating variables at play?

Limitations of previous research

Current results implicate that MCT may be superior to other psychotherapies, including cognitive behavioral interventions, in the treatment of GAD. However, it must be noted that most of the research on MCT stems from only 4-5 academic communities (Manchester, Liverpool, Trondheim, Hannover, Groningen and Sydney), and many of the trials are based on rather small samples. To date, the theory has a larger knowledge base than the treatment (Nordahl, 2014). Wells (2009) argues that this is an inevitable consequence of the systematic approach to the development and establishment of the treatment. More controlled trials, preferably from other academic communities and with larger numbers of participants, are

needed in order to draw firm conclusions about the efficiency of MCT (Nordahl, 2014; Normann & Morina, 2018). Currently, there is also a need for studies investigating change-mechanisms in MCT. To the author's knowledge, few studies have explored *why* MCT is an efficient treatment of GAD.

When it comes to affective arousal in psychotherapy, most studies have focused on depression. Further, there are few studies on the role of emotions in cognitive approaches, especially in MCT. In the existing literature, most studies have used EXP as a process measure on affective arousal. However, EXP measures the patients' verbal expression of emotion. As a result, the actual level of arousal might have been overlooked. Another weakness is that EXP does not differentiate between different types of emotions (Laukvik & Ferstad, 2015).

Study aims and hypotheses

MCT has been established as a new and efficient treatment of GAD. This is interesting, given the fact that emotional avoidance seem to be at the core of this disorder, whereas the role of emotions in MCT remains largely unexplored. Therefore, the purpose of the current study is to investigate whether metacognition and emotional arousal are separate mechanisms of change in MCT for GAD. Are these processes unrelated to each other?

In line with the previously presented literature, an increase in affective arousal from early to late in therapy and a decrease in dysfunctional metacognitions from pre to post treatment is expected. Further, the presented literature implicate that the expected increase in affective arousal and reduction in dysfunctional metacognitions should predict a reduction in worry. However, there is no basis in the existing literature to predict whether change in metacognitions or change in emotional arousal will be the strongest predictor of reduction in PSWQ. Finally, the principal objective of the study is to examine whether change in metacognition and change in emotional arousal contribute uniquely to treatment outcome.

The current study aims to investigate the following hypotheses:

H1: A statistically significant increase in the variable "Adaptive affect" measured by the Achievement of Therapeutic Objectives Scale (ATOS) from early to late in the course of therapy and a statistically significant decrease in the variable "Metacognition" measured by the Metacognition Questionnaire-30 (MCQ-30) from pre to post treatment is expected

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H2: Increase in the variable "Adaptive affect" and reduction in the variable "Metacognition" will statistically significantly predict reduction in the variable "Worry" measured by the Penn-State Worry Questionnaire (PSWQ) from pre to post treatment

H3: Do each variable ("Change in metacognition" and "Change in adaptive affect") contribute uniquely to treatment outcome when entered simultaneously into the same analysis?

Method

Design

The data in this study were retrieved from a study of adults with GAD, led by Hans Nordahl. The GAD study was conducted at the university outpatient clinic at the Norwegian University of Science and Technology (NTNU) in Trondheim, from 2008 to 2016. The main objective of the study was to compare the efficiency of Borkovec's manual of CBT (Borkovec, 1994) with Wells' manual of MCT (Wells, 1997) in the treatment of GAD (Nordahl, Kennair, Hagen, Wells & Borkovec, 2005). 246 patients were referred to the study, whereas 81 patients were included in the trial. All the patients in the trial met the criteria set by *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; DSM-IV-TR; American Psychiatric Association, 2000) of the GAD diagnosis. The patients were randomized into three treatment conditions; two treatment groups (CBT and MCT) and a wait-list control group. 12 weeks after the first randomization, the wait-list participants were offered treatment and were randomized into the two treatment conditions. The patients were assessed at pre-treatment, post-treatment and at a 2 year follow-up. In order to control for therapist factors, a crossover design of therapists was used to ensure that all the therapists delivered both treatment conditions (Nordahl et al., 2018).

Participants

The patients who participated in the GAD study (see Figure 1) were assessed at the outpatient clinic at NTNU prior to the trial. The inclusion criteria were: 1) A diagnosis of GAD; 2) Aged 18 years or older; 3) Being willing to give a written consent that the data could be used in research; 4) Accepting to withdraw psychotropic medication for a period of 3 weeks before entry to the trial. The exclusion criteria were: 1) Known somatic diseases; 2) Psychosis; 3) Recent suicidal attempts and/or current intent; 4) Primary post traumatic stress disorder; 5) Cluster A or cluster B personality disorder. The patients also had to accept random assignment to the treatment conditions.

Out of the 32 patients in the MCT condition of the GAD study, 10 patients were excluded due to missing or dysfunctional DVDs. 22 patients were rated using three of the ATOS subscales (Affect experiencing, Affect expression and Inhibition). In this study, only Affect experiencing is included in the analysis. Pair 1 rated 15 patients in an early session (session 2-4) and a late session (session 10-12). Pair 2 rated 7 patients in an early session (session 2-3), a mid session (session 5-7), and a late session (session 8-11), in addition to a

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mid session (session 5-7) from all of the 15 patients rated by pair 1. Because of missing and dysfunctional DVDs, pair 2 adapted the categories (early, mid and late session) to fit the functional DVDs in order to include as many patients as possible. In the current study, only the early and the late sessions are included in the analysis. 2 of the patients rated by pair 2 were excluded from the analysis due to missing MCQ-30. Altogether, a total of 20 patients are included in the analysis in this study.

Independent t-tests were run in order to compare the sample in the current study to the sample in the MCT condition in the GAD study. There were no statistically significant differences between the samples in age ($t(32) = .096, p = .924$), pre treatment MCQ-30 ($t(28) = -.459, p = .650$), or pre treatment PSWQ ($t(32) = .085, p = .933$).

Figure 1: Sampling and Flow of Subjects in the GAD Study

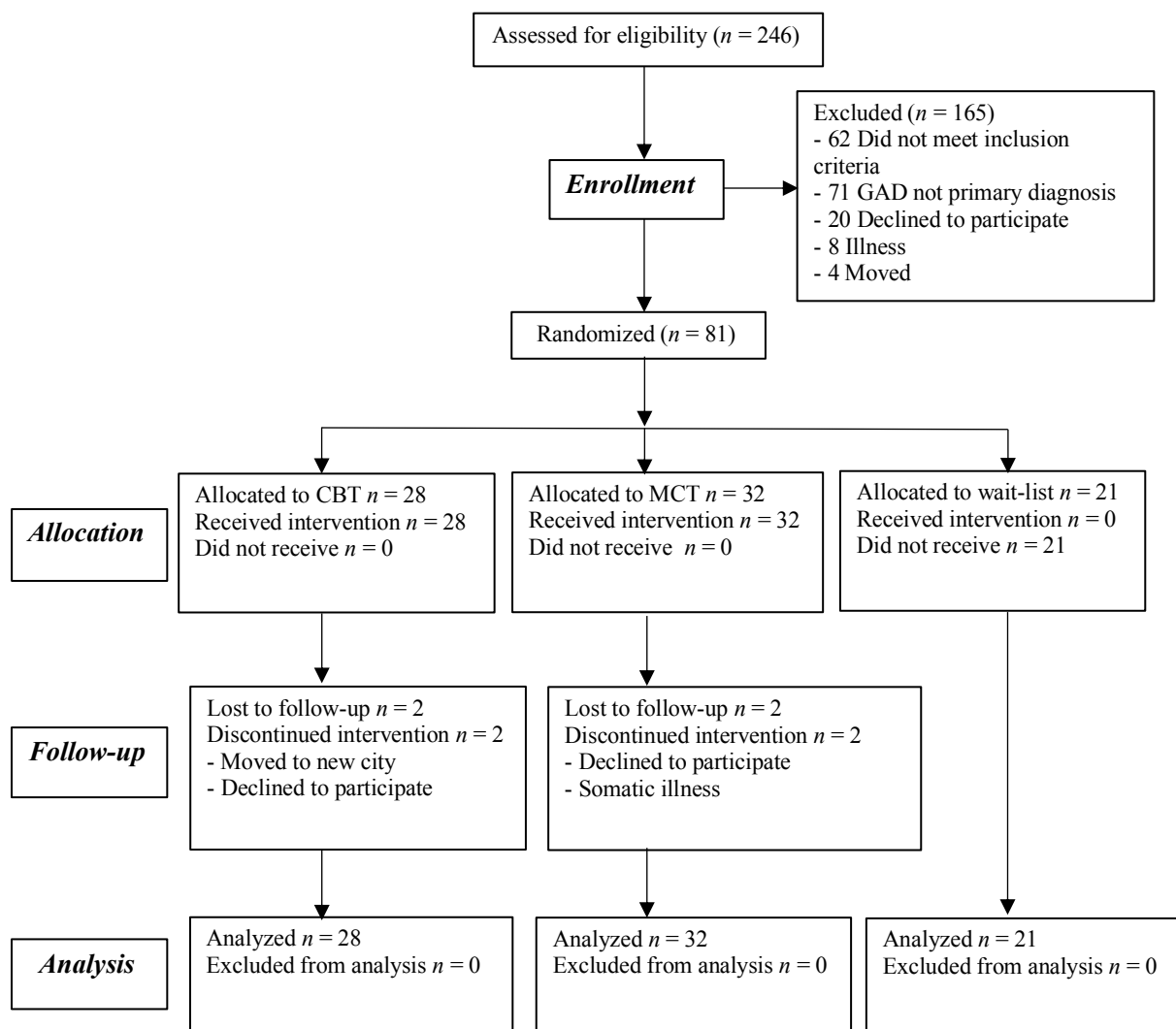


Figure 1. Consort diagram of participant flow in the GAD study. CBT = cognitive-behavioural therapy; GAD = generalised anxiety disorder; MCT = metacognitive therapy. Adapted from "Metacognitive therapy versus cognitive-behavioural therapy in adults with generalised anxiety disorder," by H. M. Nordahl, T. D. Borkovec, R. Hagen, L. Kennair, O. Hjemdal, S. Solem, B. Hansen, S. Haseth, and A. Wells, 2018, *BJPsych open*, 4, p. 395.

Treatment

The treatment in the MCT condition in the GAD study was based on a published treatment manual of MCT (Wells, 1997). The goal in MCT for GAD is to eliminate negative metacognitive beliefs about worry and to teach the patients how to disengage from triggering thoughts. Metacognitive beliefs related to worry, primarily beliefs about uncontrollability and dangerousness, were challenged by verbal means and by behavioural experiments (Nordahl et al., 2018; Wells, 1997).

The therapists used the following checklist for the progression of the therapy: 1) Case formulation and socialisation (sessions 1-2); 2) Modifying beliefs about the uncontrollability and danger of worry (sessions 3-6); 3) Challenging positive beliefs about the utility and advantages of worry (sessions 7-8); 4) Implementation of alternative coping strategies (sessions 9-10); 5) Relapse prevention (sessions 11-12). Treatment was applied for a maximum of 12 weekly sessions of 60 minutes duration (Nordahl et al., 2018; Wells, 1997).

Procedure

The therapy sessions included in this study were coded by four psychology students with limited clinical experience. The patients were rated on three of the ATOS subscales (Affect experiencing, Affect expression and Inhibition). The first pair of raters scored 30 therapy sessions in 2015 (Laukvik & Ferstad, 2015), and the second pair of raters scored 29 therapy sessions in 2018. The training was based on the ATOS manual. In the beginning of the training period, the second pair of raters cooperated in order to score video-taped therapy sessions from the American Psychological Association (APA). This material included several types of therapy. In the same manner as the raters in the first pair, the raters in the second pair then worked separately in order to score ten video-taped therapy sessions. These sessions were performed by Leigh McCullough, one of the developers of the ATOS manual. The separate scores were then compared in order to assess the level of inter rater reliability. The scores were also compared to master scores from the developers of the ATOS-manual. When

a satisfying level of inter rater reliability ($\alpha < .7$) was obtained, the raters began scoring the therapy videos from the GAD-project. All therapy sessions were masked with respects to the number of the session. The first pair of raters did not know if they coded an early or a late session, and the second pair of raters did not know if they coded an early, a mid or a late session. Each pair guided each other during the process, and they received help from the supervisor of the study in order to discuss questions concerning general aspects of the ATOS manual. However, the raters scored the therapy sessions independently. The second pair of raters were blind to the first pair of raters' scores until the rating process was completed.

Process measures

The Achievement of Therapeutic Objectives Scale (ATOS). The Achievement of Therapeutic Objectives Scale (ATOS; McCullough, Larsen, Schanche, Andrews, & Kuhn, 2003b) is a process instrument designed to measure the extent of therapeutic effects absorbed by the patient. The scale consists of seven subscales, each representing the main objectives of short term dynamic psychotherapy (STDP). However, the ATOS scale has been written in theory neutral language in order to facilitate application to other forms of psychotherapy. Examples from both cognitive and psychodynamic orientations are provided to illustrate the flexibility of the scale for measuring common factors.

Videotapes, audiotapes or transcripts of therapy sessions are reviewed in 10-minute segments and ratings are made on each subscale at the end of each segment. Each major objective is rated on a Likert scale of 1-100. The scale is divided into ten 10-point categories. Guidelines based on observable behavior are provided for each category. Higher ratings indicate adaptive behavior, whereas lower ratings represent maladaptive behavior. The scores are reversed for the inhibition subscale, with low scores representing adaptive behavior (Valen, Ryum, Svartberg, Stiles, & McCullough, 2011).

The ATOS scale consists of seven subscales: 1) Defense recognition; 2) Defense relinquishing; 3) Affect experiencing; 4) Affect expression; 5) Inhibition; 6) Improvement in self-image; 7) Improvement in image of others (McCullough et al., 2003b).

In the current study, only the third subscale is included in the analysis. The subscale measures the degree of emotional arousal experienced by the patient. Ratings are based on the intensity of inner affective arousal as shown in vocal tone, visible physiological or bodily signs, charged verbal statements, duration of the affective arousal and relief in the experience of the feeling. Raters are taught to distinguish between adaptive and maladaptive feelings, as only adaptive forms of the feelings are coded. According to STDP theory, there are adaptive

and maladaptive versions of both positive and negative feelings. For example, adaptive anger may help the patient set appropriate limits while helpless frustration is viewed as a maladaptive version of anger. In general, adaptive affect is thought to generate relief and movement towards adaptive behavior (McCullough et al., 2003b; Valen et al., 2011).

According to Valen and colleagues (2011), ATOS is a valid instrument. They found that raters obtained good to excellent intraclass correlation coefficients (ICCs) in both cognitive therapy (CT) and STDP, indicating that ATOS is a suitable research instrument for both STDP and CT. The ATOS scale has been shown to be sensitive to differences among patients and differences among subscales within patients (Berggraf, Ulvenes, Wampold, Hoffart & McCullough, 2012). A study by Ryum and colleagues (2014) has provided support to the theoretical three-factor solution of the ATOS (restructuring of defences, restructuring of affects and restructuring of sense of self and others).

Schanche, Nielsen, McCullough, Valen and Mykletun (2010) showed that clinically inexperienced students obtained an excellent reliability level (ICCs in the range of .76 - .95) when given 35 hours of training and being allowed to focus on two subscales at a time rather than the full scale. The ICCs were poorer when the students were given less hours of training and when they rated all subscales simultaneously. In line with these results, it seems likely to expect that the raters in the current study should be able to reliably score the ATOS-subscale "Affect experiencing", given that an adequate amount of training is provided and only three of the subscales are coded (Laukvik & Ferstad, 2015).

The Metacognition Questionnaire-30 (MCQ-30). The MCQ-30 (Wells & Cartwright-Hatton, 2004) is a brief, refined version of the Metacognition Questionnaire (MCQ; Cartwright-Hatton & Wells, 1997). The MCQ is a multidimensional measure of metacognitions consisting of 65 items, whereas the MCQ-30 has been reduced to 30 items. Each item is rated on a Likert scale from 1 (Do not agree) to 4 (Agree very much). A high total score on the MCQ-30 indicate more dysfunctional metacognitive beliefs (Ryum et al., 2017).

The MCQ-30 measures metacognitive beliefs, judgments and monitoring tendencies considered important in the metacognitive model of psychological disorders. Metacognitions are measured on five subscales: 1) Positive beliefs about worry; 2) Negative beliefs about worry concerning uncontrollability and danger; 3) Cognitive confidence; 4) Need to control thoughts; 5) Cognitive self-consciousness. Analyses of the subscales have shown that negative metacognitive beliefs may be particularly important in the development of anxiety (Ryum et al., 2017).

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The results in a study by Wells and Cartwright-Hatton (2004) suggested an acceptable fit to a five-factor model consistent with the original MCQ. Further, the MCQ-30 has shown good internal consistency and convergent validity, and acceptable to good test-retest reliability, suggesting that the instrument is a suitable measure of metacognitions with the advantage of being more economical in use than the original MCQ (Grotte et al., 2016; Martin et al., 2014; Spada, Mohiyeddini, & Wells, 2008; Wells & Cartwright-Hatton, 2004).

Outcome measure

The Penn-State Worry Questionnaire (PSWQ). The PSWQ is a self-report measure of pathological worry. The instrument emerged from factor analysis of a large number of items and was found to possess high internal consistency and good test-retest reliability. It is designed to capture important features of clinically relevant worry, specifically: 1) Generality over time and situations; 2) Intensity/excessiveness; 3) Uncontrollability (Meyer, Miller, Metzger, & Borkovec, 1990; Molina & Borkovec, 1994).

The PSWQ consists of 16 items. Each item is rated on a Likert scale from 1 (Not at all typical) to 5 (Very typical). A high total score on the PSWQ indicates high levels of worry and uncontrollability (Meyer, Miller, Metzger, & Borkovec, 1990).

Statistical analysis

The data were analysed using the SPSS software, version 25. Independent t-tests were run to compare the sample in the current study to the sample in the MCT condition in the GAD study. ICCs on the measure of the subscale "Adaptive affect" from the ATOS scale were calculated using a two way random mixed model. A paired samples t-test was performed to assess the level of change in the main variables. In order to assess the relationship between the variables "Pre treatment PSWQ", "Pre treatment MCQ", "Adaptive affect in an early session" and the dependent variable "Post treatment PSWQ", a Pearson's product-moment correlation was run. Two hierarchical multiple regressions were computed to determine whether the independent variables ("Change in adaptive affect from an early to a late session" and "Change in MCQ from pre to post treatment") predicted change in the dependent variable ("PSWQ post treatment"). In the first hierarchical multiple regression, "Change in PSWQ" was entered in the first step, "Change in adaptive affect" was entered in the second step, and "Change in MCQ" was entered in the third step. In the second hierarchical multiple

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regression, "Change in PSWQ" was entered in the first step, "Change in MCQ" was entered in the second step, and "Change in adaptive affect" was entered in the third step.

Results

Means, standard deviations and intraclass correlation coefficients (ICCs) on the measure of the subscale "Adaptive affect" from the Achievement of Therapeutic Objectives Scale (ATOS) are presented in Table 1.

Table 1

Means, Standard Deviations and Intraclass Correlation Coefficients on the Measure of the ATOS Subscale "Adaptive Affect".

		Early		Late		Pair 1	Pair 2
ATOS subscale	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>ICC</i>	<i>ICC</i>
Adaptive Affect	20	35.07	14.50	43.29	18.56	.85	.78

Note. ATOS = the Achievement of Therapeutic Objectives Scale.

The level of inter-rater reliability in this study was based on the standards set by Cichetti (1994), who proposed the following categories; poor (less than .40), fair (.04 - .59), good (.60 - .74), excellent (.75 - 1.00). Based on this classification, both rating pairs obtained an excellent reliability level, as evident from Table 1.

In order to assess the level of change in the main variables, a paired samples t-test was performed. Firstly, the variable "Adaptive affect" elicited a statistically significant increase from early to late in the course of therapy, $M = 8.22$, 95% CI [16.15, 0.29], $t(19) = 2.17$, $p = .04$. Secondly, MCQ-30 elicited a statistically significant decrease from pre to post treatment, $M = -.74$, 95% CI [-.48, -.99], $t(19) = -6.01$, $p < .001$. Thirdly, PSWQ elicited a statistically significant decrease from pre to post treatment, $M = -25.40$, 95% CI [-19.48, -31.32], $t(19) = -8.97$, $p < .001$. The increase in adaptive affect indicates increased adaptive emotional arousal from early to late in the course of therapy, whereas the decrease in MCQ-30 indicates a reduction in dysfunctional metacognitions from pre to post treatment. With regards to treatment outcome, increase in adaptive affect and decrease in MCQ-30 are hypothesized to represent positive change. The decrease in PSWQ indicates a reduction in worry from pre to post treatment. These findings were as expected from the theory presented in the introduction. In order to assess the relationship between the variables "Pre treatment PSWQ", "Pre treatment MCQ", "Adaptive affect in an early session" and the dependent variable "Post

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treatment PSWQ", a Pearson's product-moment correlation was run. The results are presented in Table 2.

Table 2

Pearson Correlations for Main Study Variables

	PSWQ (pre)	ATOS (early)	MCQ (pre)	PSWQ (post)
PSWQ (pre)	1	.23	.78**	.42
ATOS (early)		1	-.01	.13
MCQ (pre)			1	.07
PSWQ (post)				1

Note. $N = 20$, ** $p < .001$. PSWQ (pre) = The Penn State Worry Questionnaire pre treatment; ATOS (early) = The Achievement of Therapeutic Objectives Scale in an early session; MCQ (pre) = The Metacognition Questionnaire-30 pre treatment; PSWQ (post) = PSWQ post treatment.

As evident from Table 2, post treatment PSWQ was not associated with pre treatment PSWQ, adaptive affect in an early session nor pre treatment MCQ. There was a statistically significant, strong positive correlation between pre treatment MCQ and pre treatment PSWQ, $r(18) = .78, p < .001$. As expected, this might suggest that metacognitions are associated with the patients' degree of worry. There was no statistically significant correlation between pre treatment MCQ and adaptive affect in an early session, $r(18) = -.01, p = .969$, indicating that the ATOS subscale "Adaptive affect" and the Metacognitions Questionnaire-30 measure different features of the patients. Interestingly, there was no statistically significant correlation between pre treatment PSWQ and post treatment PSWQ, $r(18) = .42, p = .068$, indicating that the process measures might convey useful information about why some patients obtain a greater reduction in PSWQ post treatment than others.

Change scores regarding PSWQ and MCQ-30 were calculated by subtracting pre treatment scores from post treatment scores. Change in "Adaptive affect" was calculated by subtracting early scores (sessions 2-4) from late scores (sessions 8-12).

In order to determine if the independent variables ("Change in adaptive affect from an early to a late session" and "Change in MCQ from pre to post treatment") predicted change in the dependent variable ("PSWQ post treatment"), two hierarchical multiple regressions were performed.

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First, a hierarchical multiple regression was run to determine if the addition of change in adaptive affect from an early session to a late session and then of change in MCQ improved the prediction of post treatment PSWQ over and above pre treatment PSWQ alone. Change in PSWQ was entered in the first step, change in adaptive affect was entered in the second step, and change in MCQ was entered in the third step. See Table 3 for full details on each regression model. The addition of adaptive affect to the prediction of post treatment PSWQ (Model 2) led to a statistically significant increase in R^2 of .41, $F(1, 17) = 16.84, p = .001$. The addition of change in MCQ to the prediction of post treatment PSWQ (Model 3) also led to a statistically significant increase in R^2 of .14, $F(1, 16) = 8.49, p = .010$. The full model of pre treatment PSWQ, change in adaptive affect and change in MCQ to predict post treatment PSWQ (Model 3) was statistically significant, $R^2 = .73, F(3, 16) = 14.33, p < .001$; adjusted $R^2 = .68$.

Table 3

Hierarchical Multiple Regression Predicting PSWQ Post Treatment From PSWQ Pre Treatment, Change in Adaptive Affect and Change in MCQ.

Variable	PSWQ post treatment					
	Model 1		Model 2		Model 3	
	B	β	B	β	B	β
Constant	-4.85		3.88		-18.10	
PSWQ (pre)	.68	.42	.61*	.37	1.08*	.66
ATOS (change)			-.52*	-.64	-.36*	-.45
MCQ (change)					-12.55*	-.50
R^2	.173		.585		.729	
F	3.78		11.97*		14.33**	
ΔR^2	.173		.411		.144	
ΔF	3.78		16.84*		8.49*	

Note. $N = 20$, * $p < .05$, ** $p < .001$. PSWQ = Penn State Worry Questionnaire; PSWQ (pre) = PSWQ pre treatment; MCQ (change) = Change in the Metacognition Questionnaire-30 from pre to post treatment; ATOS (change) = Change in the Achievement of Therapeutic Objectives Scale from an early to a late therapy session.

Another hierarchical multiple regression was run to determine if the addition of change in the MCQ from pre to post treatment and then of change in adaptive affect from an

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early session to a late session improved the prediction of the PSWQ post treatment over and above the PSWQ pre treatment alone. Change in PSWQ was entered in the first step, change in MCQ was entered in the second step, and change in adaptive affect was entered in the third step. See Table 4 for full details on each regression model. The addition of change in MCQ to the prediction of post treatment PSWQ (Model 2) led to a statistically significant increase in R^2 of .40, $F(1, 17) = 15.87, p = .001$. The addition of adaptive affect to the prediction of post treatment PSWQ (Model 3) also led to a statistically significant increase in R^2 of .16, $F(1, 16) = 9.21, p = .008$. The full model of pre treatment PSWQ, change in MCQ and change in adaptive affect to predict post treatment PSWQ (Model 3) was statistically significant, $R^2 = .73, F(3, 16) = 14.33, p < .001$; adjusted $R^2 = .68$.

Table 4

Hierarchical Multiple Regression Predicting PSWQ Post Treatment From PSWQ Pre Treatment, Change in MCQ and Change in Adaptive Affect.

Variable	PSWQ post treatment					
	Model 1		Model 2		Model 3	
	B	β	B	β	B	β
Constant	-4.85		-33.40		-18.10	
PSWQ (pre)	.68	.42	1.33**	.81	1.08*	.66
MCQ (change)			-18.55*	-.75	-12.55*	-.50
ATOS (change)					-.36*	-.45
R^2	.173		.572		.729	
F	3.78		11.38*		14.33**	
ΔR^2	.173		.399		.156	
ΔF	3.78		15.87*		9.21*	

Note. $N = 20$, * $p < .05$, ** $p < .001$. PSWQ = Penn State Worry Questionnaire; PSWQ (pre) = PSWQ pre treatment; MCQ (change) = Change in the Metacognition Questionnaire-30 from pre to post treatment; ATOS (change) = Change in the Achievement of Therapeutic Objectives Scale from an early to a late therapy session.

As evident by visual inspection of Table 3 and Table 4, "Change in adaptive affect" and "Change in MCQ-30" explained respectively 41.1% (see Table 3, Model 2) and 39.9% (see Table 4, Model 2) of the variance in post treatment PSWQ when examined separately. As expected from the theory presented in the introduction, these results indicate that both

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variables were important predictors of treatment outcome. When "Change in adaptive affect" was entered in the second step and "Change in MCQ-30" was entered in the third step, "Change in MCQ-30" explained an addition of 14.4% of the variance in post treatment PSWQ (see Table 3, Model 3). When "Change in MCQ-30" was entered in the second step and "Change in adaptive affect" was entered in the third step, "Change in adaptive affect" explained an addition of 15.6% of the variance in post treatment PSWQ (see Table 4, Model 3). These results show that change in metacognition and change in emotional arousal contributed uniquely to treatment outcome when entered into the same analysis.

Discussion

This study compared metacognition with emotional arousal as change-mechanisms on a within-person level in MCT for GAD. To the author's knowledge, this is the first study comparing these two mechanisms of change in MCT. Based on data from a RCT, the current study examined change in metacognition and change in emotional arousal as predictors of change in post treatment PSWQ. PSWQ elicited a statistically significant decrease from pre to post treatment. Nevertheless, there was no statistically significant correlation between pre treatment PSWQ and post treatment PSWQ, suggesting that the process measures revealed meaningful information about why some patients obtained a greater reduction in worry than others.

Change in metacognition as a predictor of treatment outcome

There was a statistically significant decrease in MCQ-30 from pre to post treatment, as hypothesized. Change in this variable explained 39.9% of the variance in post treatment PSWQ (see Table 4, model 2). Pre treatment MCQ-30 was not associated with post treatment PSWQ, indicating that change in metacognition was a better predictor of treatment outcome than metacognition pre treatment. There was a statistically significant, strong positive correlation between pre treatment MCQ-30 and pre treatment PSWQ, implying that metacognition was associated with worry before the treatment started.

These results are in line with the previously presented studies indicating that change in metacognition is associated with treatment outcomes such as reduction in anxiety (Hoffart, Johnson, Nordahl & Wells, 2018; Johnson et al., 2017) and worry (Felberg, 2012) in MCT and CBT.

The finding that change in metacognition was a better predictor of treatment outcome than metacognition pre treatment, may imply that specific features of the treatment elicited a positive change in PSWQ by changing dysfunctional metacognitions. Nevertheless, causality and treatment interventions were not examined, leaving this interpretation a speculation.

Moreover, the results in the current study may be explained by metacognitive theory. The metacognitive model of GAD suggests that metacognitions, primarily negative ones, maintain the disorder. In turn, MCT aims to target and change dysfunctional metacognitions in order to remove the CAS. In MCT for GAD, this means challenging negative and positive metacognitive beliefs about worry and teaching the patient new strategies to enhance attentional control (Wells, 2009). This may be the reason why change in metacognition was shown to be a predictor of reduction in worry post treatment. Thus, positive change in

metacognition is consistent with the metacognitive model and treatment of GAD (Wells, 2009). The association between positive change in metacognition and positive change in treatment outcome in the current study adds support to the metacognitive model. However, therapeutic interventions were not examined in the present study. Therefore, the current study did not reveal the cause of the positive changes in metacognition and worry.

Change in emotional arousal as a predictor of treatment outcome

The variable "Adaptive affect" elicited a statistically significant increase from early to late in the course of therapy, as expected from the previously presented literature. Change in this variable explained 41.1% of the variance in post treatment PSWQ (see Table 3, Model 2). Adaptive affect in an early session was not associated with post treatment PSWQ, indicating that change in adaptive affect was a stronger predictor of treatment outcome than adaptive affect in an early session.

The increase in the ATOS subscale "Affect experiencing" is consistent with the findings in a study of cluster C personality disorder (Schanche, Stiles, McCullough, Svartberg, & Nielsen, 2011; Valen et al., 2011). The raw scores in the current study were slightly higher than the raw scores in both the STDP condition ($n = 24$) and the CT condition ($n = 24$) in the cluster C-study. In the STDP condition, the scores increased from 28.20 early in therapy to 38.22 late in therapy. In the CT condition, the scores increased from 30.03 to 32.84. In the present study, the scores increased from 35.07 to 43.29. By visual inspection of the raw scores, it is evident that although the scores in the present study were slightly higher, the increase of 8.22 in the current study is approximately similar to the increase of 10.02 in the STDP condition. The CT condition elicited an increase of 2.54, which is smaller than the increase in the current study. These differences may have been caused by small sample sizes in both studies. Another possible explanation is the theoretical differences underlying the treatment models.

The ATOS manual states that raters should choose one predominant affect for each segment when rating STDP. Anger/assertion, grief, feelings of closeness or attachment to others, and care or compassion for self (referring to positive feelings associated with the self), are listed as the most common core feelings dealt with in STDP. The manual states that linking of the ratings to a specific affect may not be necessary in other forms of therapy (McCullough et al., 2003b, pp. 5-6).

The raters in the second pair chose to link the ratings to a specific affect in each segment. The chosen feeling was nearly always "positive self feelings". According to

McCullough and colleagues (2003a), this is an important category because of the significance of sense-of-self issues to mental health. McCullough and colleagues (2003a) divided "positive self feelings" into self-compassion, self-care, self-esteem, (healthy) pride or joy in self, self-confidence, and self-worth. When reviewing the notes from the rating process, it became evident that the second pair of raters often interpreted "self confidence" as the most relevant feeling, as the themes in the sessions often revealed whether the patients had faith in their own capability of controlling their attentional focus.

In STDP, a main focus is to link the patient's defense with the affect it is blocking (McCullough et al., 2003b). In light of this theory, worry may be seen as a defense against the arousal of self-confidence. This may explain why the increase in adaptive affect predicted reduction in post treatment PSWQ. This interpretation is in line with the psychodynamic theory presented in the introduction. In other words, positive self feelings may be perceived as more threatening by the patient than the contents of his or her worries (Barber & Crits-Christoph, 1996).

Additionally, the findings may be in line with EFT theory (Laukvik & Ferstad, 2015). Timulak and McElvaney (2016) suggest that patients with GAD lack an inner trust in their ability to process potential triggers without being overwhelmed. In turn, GAD patients often present with hopelessness and helplessness. These feelings are labeled secondary feelings, and are thought to cover more primary, painful and unprocessed core emotions (Timulak & Pascual-Leone, 2014). The ATOS scale may have tapped into these particular secondary feelings, as they may be the counterpart of positive self feelings, indicating low scores on the Affect experiencing subscale. The results in the current study showed that change in adaptive affect was a better predictor of treatment outcome than adaptive affect in an early session. One way to interpret this finding is that the patients' response to treatment was a better predictor of treatment outcome than the patients' ability to process feelings adaptively in the early stages of the treatment. Regarding the feelings of hopelessness and helplessness observed by Timulak and McElvaney (2016), this finding could yield hope to GAD patients with low scores on adaptive affect in the beginning of the treatment. However, the current study did not include measures of therapeutic interventions, leaving questions about the relationship between therapeutic interventions and the variables examined in this study unanswered. Moreover, the increase in adaptive affect may represent an increased trust in the ability to cope with potential worry triggers. Such a newfound trust may be a direct consequence of the therapeutic interventions in MCT targeting negative metacognitive beliefs. Once again, the current study did not examine specific therapeutic interventions,

leaving this hypothesis unexplored. Furthermore, Timulak and McElvany (2016) suggest that GAD is associated with several negative feelings towards the self. Thus, enhancing positive self feelings may be an effective intervention in the treatment of GAD.

In EFT, facilitation of adaptive emotional arousal is a central feature of the treatment. EFT for GAD aims to transform core emotional pain by generating adaptive emotional responses (e.g. self-compassion and protective anger) to unmet needs (McNally, Timulak & Greenberg, 2014; Pascual-Leone & Greenberg, 2007; Timulak & McElvany, 2016). However, in the present study, adaptive affect increased although this is not an explicit focus in MCT. According to the metacognitive model of GAD, excessive worrying interferes with adaptive emotional processing. In short, MCT seem to facilitate emotional processing indirectly by targeting the metacognitions blocking emotional processing rather than making emotional arousal a focus in the therapy sessions (Wells, 2009). This may explain why there was a statistical significant increase in adaptive affect, even though feelings were rarely an explicit focus in the therapy sessions included in this study (Laukvik & Ferstad, 2015).

The increase in adaptive affect in the present study may be consistent with the emotion dysregulation model of GAD by Mennin and colleagues (2005), as suggested by Laukvik & Ferstad (2015). One way to understand this finding is that specific elements of MCT, such as detached mindfulness, may have generated adaptive self regulation skills. Detached mindfulness is described as a state where internal events are observed without being avoided or suppressed (Wells, 2009, p. 93). Patients are taught to observe their thoughts without getting involved in them (Hjemdal & Hagen, 2012). The patients in the current study may have used this strategy to experience their emotions without being overwhelmed (Laukvik & Ferstad, 2015). If emotion dysregulation is a maintaining factor in GAD, self regulation skills learned in therapy could explain why an increase in adaptive affect predicted positive change in the outcome measure.

Further, the results may be in line with a study by Borkovec and Roemer (1995), suggesting that reduction in worry gives rise to exposure to the feared emotion previously being avoided. Borkovec and Costello (1993) suggest that a possible function of worry in GAD is to escape anxiety-provoking imagery. Thus, one possible interpretation of the current results is that reduced levels of worry may have generated more exposure to anxiety-related emotions (Laukvik & Ferstad, 2015).

Nevertheless, the results in the current study do not imply whether reduction in worry leads to increased emotional arousal, or whether higher levels of emotional arousal leads to reduction in worry.

Metacognition versus emotional arousal as mechanisms of change in MCT

Pre treatment MCQ-30 was not statistically significantly correlated with adaptive affect in an early session, indicating that MCQ-30 and the ATOS subscale "Affect experiencing" measure different features of the patients. "Change in MCQ-30" and "Change in adaptive affect" were shown to explain respectively 39.9% (see Table 4, Model 2) and 41.1% (see Table 3, Model 2) of the variance in post treatment PSWQ when examined separately. In other words, metacognition and emotional arousal were shown to be equally important change-mechanisms. These findings confirmed H1 and H2. In order to explore H3, both variables were examined in the same regression model. The explained variance in post treatment PSWQ increased with 15.6% when "Change in adaptive affect" was added to "Change in MCQ-30" (see Table 4, Model 3), and with 14.4% when "Change in MCQ-30" was added to "Change in adaptive affect" (see Table 3, Model 3), indicating that both variables contributed uniquely to treatment outcome.

The results in the current study imply that metacognition and emotional arousal are separate predictors of treatment outcome. However, one may wonder if the increase in the activation of positive self feelings, more specifically, self confidence, was somehow related to change in the negative metacognition about the uncontrollability of worry? This question remains unanswered, as the current study only investigated MCQ-30 as a whole.

The cognitive model of psychopathology refers to cognition, emotion and behaviour as connected processes influencing one another mutually (Wells, 1997, p. 213). In CBT, therapists use interventions targeting cognition and behaviour. Emotional change is thus viewed as an indirect consequence of change in cognition or behaviour. The findings in the current study may be explained by the theoretical foundation of CBT; that by changing one of the processes, the other processes will be influenced indirectly (Borkovec & Costello, 1993; Laukvik & Ferstad, 2015). In MCT, the component being targeted is metacognition. In light of this theory, the positive change in both metacognition and adaptive emotional arousal in the present study may be caused by a mutual influence between these processes, or by a third variable influencing both processes.

It is of importance to note that the present study does not imply that an explicit focus on affect is the only way to facilitate adaptive emotional arousal. On the contrary, different treatment models may lead to similar outcomes through different pathways (Johnson et al., 2018; Valen et al., 2011). The positive change in adaptive affect measured in the current study may have been elicited by specific metacognitive techniques used by the therapists. MCT

aims to facilitate emotional processing indirectly by removing the CAS rather than making emotional arousal a focus in the therapy sessions. Hence, the increase in adaptive arousal in the current study should be viewed as a finding that adds support to the metacognitive model.

Strengths and limitations

The present study has several notable strengths. Firstly, data were retrieved from a RCT. Secondly, the therapists in the RCT were trained and supervised by the originators of the treatment modalities, enhancing competence and adherence to the treatment protocols (Nordahl et al., 2018).

Thirdly, MCQ-30 was shown to be a statistically significant predictor of treatment outcome. This is a strength with regards to MCT being the treatment modality included in the current study, indicating that treatment outcome may be explained by the theoretical foundation of the treatment.

Moreover, the process measures did not consist of subjective assessments alone. ATOS is a behavioral observation scale, scored by trained raters. Consequently, ATOS gives another perspective on therapeutic change than the MCQ-30, which is a self-report measure scored by the patient. Therefore, the findings of positive change in both process measures should be considered a strength regarding MCT. Another strength concerning ATOS is that the sessions included in the study were scored by two separate pair of raters. Both pairs obtained excellent ICCs, adding support to the reliability of the ATOS scale.

Furthermore, there are some limitations to consider. All therapy sessions were masked with respects to the number of the session. Nevertheless, the content in each session often revealed whether the session was from the beginning or the end of therapy. This might have influenced the ATOS scores, given that the raters might have expected certain changes in the patients (Laukvik & Ferstad, 2015). However, the raters aimed to rate the videos as objectively as possible. For the second pair of raters, it was not always possible to distinguish the mid sessions from the early or late sessions.

We did not rate the earliest and the latest sessions in the GAD study. If we had rated earlier and later sessions, the change in emotional arousal might have been even greater. Further, the content in the sessions were arbitrary. Other sessions might have elicited deeper emotional responses if other themes were in focus. Therefore, the focus in the sessions included in the study may have impacted the results (Laukvik & Ferstad, 2015).

Another possible limitation is that only three of the ATOS subscales were rated. However, being able to focus on fewer subscales might improve ICC's for students with little clinical experience (Laukvik & Ferstad, 2015; Schanche et al., 2010).

Further, the sample was small, but this is a common limitation to clinical studies given the resources needed to carry out the treatment. There were few men compared to women in the sample. However, a study by Kringlen, Torgersen and Kramer (2001) estimated that twice as many women as men in Norway have a GAD diagnosis. The GAD study and the present study were conducted in Norway. As a consequence, cultural aspects may have affected the results (Johnson et al., 2018).

The outcome measure was based on a self-report assessment, which could be influenced by the patients' expectations of change. On the other hand, a recent meta-analysis of GAD by Cuijpers and colleagues (2014) showed that patient bias was lower than therapist bias in the rating of treatment outcomes (Nordahl et al., 2018).

Implications for future research

Future research should aim to replicate the current study in larger samples in order to examine the reliability of the current results. To supplement the present study, future studies should include repeated measures of MCQ-30 and ATOS during the course of therapy. Repeated measures could reveal information about the temporal relationship between metacognition and emotional arousal. Future studies should aim to investigate whether these processes are independent of each other, or whether a causal relationship between them exist. In order to further explore the relationship between emotional arousal and metacognition, future studies should also examine the association between emotional arousal and the different subscales of the MCQ-30.

The current study do not convey information about the elements of the treatment contributing to positive change in the process measures and the outcome measure. Future research should aim to investigate the relationship between specific therapeutic interventions and positive change in ATOS and in MCQ-30.

To add on the present study, future studies should aim to investigate how therapists could enhance adaptive emotional arousal in patients undergoing MCT for GAD – for example by using the ATOS Therapist Scale (Osborn, 2009). Sensitivity to the patients' emotional arousal might be a beneficial skill for metacognitive therapists, especially regarding the emotion self confidence. Enhancing the activation of this particular feeling may help the patients move from helplessness to vigour and action as they work towards the goal of

gaining control over their attentional focus. This topic should be further examined in future studies.

Conclusion

There was a statistically significant increase in adaptive affect from early to late in therapy as well as a statistically significant decrease in MCQ-30 from pre to post treatment. The variables "Change in adaptive affect" and "Change in MCQ-30" were found to explain respectively 41.1% and 39.9% of the variance in post treatment PSWQ when examined separately. These findings confirmed H1 and H2. In order to explore H3, both variables were examined in the same regression model. The explained variance in post treatment PSWQ increased with 14.4% when "Change in MCQ-30" was added to "Change in adaptive affect", and with 15.6% when "Change in adaptive affect" was added to "Change in MCQ-30". These results indicate that both variables contributed uniquely to treatment outcome. In conclusion, this preliminary study implies that metacognition and emotional arousal are separate and equally important change-mechanisms on a within-person level in MCT for GAD.

The current study expands on previous research by examining both emotion and metacognition in the same analysis, revealing new information about the role of these two change-mechanisms in MCT for GAD. This information could be of interest to researchers working to develop new and existing treatment models of this particular disorder. Finally, various psychological treatments aim to change specific symptoms through targeting one or more processes on a within-person level (Johnson et al., 2018). The findings in the present study should therefore be of particular interest to clinicians working with GAD.

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Appendix A: Checklist for MCT in the GAD study

**Generalized Anxiety Disorder
Checklist for Meta-cognitive therapy**
(adapted from Wells, 1997)

Patient _____ Therapist _____ Date _____

YES	NO
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SESSION 1

- Generated a case formulation
- Socialised to the model
- Run suppression experiment
- Focus on verbal challenging uncontrollability belief
- Introduce worry postponement experiment
- Homework: Worry postponement, use WTR if necessary

SESSION 2

- Check homework & GADS, especially uncontrollability beliefs
- Verbal and behavioural reattribution to challenge uncontrollability
- Homework: Continue worry postponement & loss of control experiment

SESSION 3

- Check homework & GADS, especially uncontrollability beliefs
- Continue to challenge uncontrollability
- Run loss of control experiment in session if needed
- Begin to focus on challenging beliefs about danger
- Homework: Continue worry postponement, reverse worry avoidance

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SESSION 4

- Check homework & GADS, especially uncontrollability beliefs
- Begin challenging beliefs about danger of worry
- Try to go crazy, damage self with worry experiment
- Homework: Push worry to test dangers

SESSION 5

- Review danger beliefs on GADS
- Continue challenging beliefs about danger
- Homework: behavioural experiments to challenge danger

SESSION 6

- Review danger beliefs on GADS
- Continue challenging beliefs about danger
- Homework: behavioural experiments to challenge danger

SESSION 7

- Review danger beliefs on GADS
- Continue challenging beliefs about danger
- Homework: behavioural experiments to challenge danger

SESSION 8

- Check GADS
- If negative at zero, move to challenge positive beliefs
- Homework: Mismatch strategy, increase/decrease worry strategy

SESSION 9

- Check GADS
- If negative at zero, move to challenge positive beliefs

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- Homework: Mismatch strategy, increase/decrease worry strategy

SESSION 10

- Check GADS
- If negative at zero, move to challenge positive beliefs
- Homework: Mismatch strategy, increase/decrease worry strategy

SESSION 11

- Check residual scores on GADS, beliefs and avoidance
- Deal with residual avoidance/beliefs
- Introduce practices of alternative strategies to worry
- Relapse prevention: write therapy blueprint
- Homework: Specify based on above issues

SESSION 12

- Check residual scores on GADS, beliefs and avoidance
- Deal with residual avoidance/beliefs
- Introduce practices of alternative strategies to worry
- Relapse prevention: write therapy blueprint
- Homework: Specify based on above issues

NOT PART OF THE MCT CONDITION:

- No awareness training of worry-cues
- No forms of relaxation techniques or focus thereon
- No breathing practice or learning of diaphragmatic breathing

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Appendix B: Excerpt from the Achievement of Therapeutic Objectives Scale (ATOS)

INTENSITY OF AROUSAL OF ADAPTIVE AFFECT: IN-SESSION BODILY EXPOSURE TO PHOBIC AFFECTS 27 Aug 08

STDP: *Affect Experiencing: Degree of Bodily Arousal of Adaptive Affects (to desensitize Affect Phobias)*

CBT: *Affect arousal is not a primary focus – and may or may not be present*

DBT: *Mindfulness and management of internal reactions. Emotional modulation vs reactivity. Affect tolerance.*

MAIN COMPONENTS:

1. Intensity of arousal of **adaptive affect** (rate **peak** degree of arousal for anger, grief, or excitement and the **deepest** arousal for joy, closeness, or self feelings). Base the rating on intensity of inner affective arousal as shown in vocal tone, facial expression, non-verbal behavior/movement or charged verbal statements. This is not a rating of intensity of interpersonal expression, which would be rated as Affect Expression/New Learning.
2. Duration of the affective arousal (a few seconds to many minutes).
3. Relief in the experience of the feeling.

NOTE: This scale does **not** measure **inappropriate** or regressive affective arousal, which is defensive.

BRIEF OVERVIEW OF DEGREE OF INTENSITY OF AFFECTIVE AROUSAL (IN-SESSION EXPOSURE TO PHOBIC AFFECTS)

81-100 - Full experience of emotion, well-integrated. Full grief, full openness/tenderness/trust, full justifiable outrage, full joy, etc.

61-80 - Strong experience of emotion. Strong affect quickly cut off or sustained but a little held back.

41-60 - Moderate experience of emotion. Some grief, some anger, some openness/tenderness/trust/care, etc. Some holding back.

21-40 - Low experience of emotion. Beginning indications of grief, anger, openness/tenderness/trust/care/joy, etc. Much holding back.

1-20 - Little/no physiological experience of emotion in facial expression, verbal report, tone of voice, body movement. Flat, dull, bland presentation.

- 91-100 Full and complete affective arousal.** Full and vivid feeling, imagery, and memories sustained over several minutes (ebbing and flowing); e.g. full sobbing, with other affects, e.g. murderous but justifiable outrage, openness/care/tenderness/joy/trust deeply felt as shown in face, vocal tone or body. Excellent ability to modulate or control affect, and integrate it with other affects that balance and enrich the experience, e.g. rage with compassion, tenderness with limit-setting. Full relief and resolution.
- 81-90 Very strong affective arousal.** Very strong feeling, imagery, and memories, well sustained (ebbing and flowing) just slightly inhibited or interrupted by other affects as shown in face, vocal tone or body. The affect is partially integrated with other affects, e.g. rage with some compassion; care/trust with limits. Very strong but not full relief.
- 71-80 Strong affective arousal.** Strong feeling either sustained (ebbing and flowing) with a little holding back or strong feeling that slowly diminishes or is interrupted by another affect; e.g., strong bursts of sobs or anger, strong expressions of caring/tenderness as shown in face, vocal tone or body. Minimal integration with other feelings. Imagery or memories with strong emotional content. Strong relief
- 61-70 High-moderate affective arousal.** Much feeling, somewhat sustained (ebbing and flowing) with some holding back or quickly cut off. e.g., bursts of crying or anger, much caring/tenderness/warmth/trust as shown in face, vocal tone or body. Only beginning indications of integration with other affects. Imagery or memories with much emotional content. Much relief.
- 51-60 Moderate affective arousal.** Moderate feeling; moderate duration/moderate holding back, e.g. tearing up, moderate anger, some tender feelings as shown in face/vocal tone/body. Imagery or memories with moderate emotional content. Moderate relief.
- 41-50 Low-moderate affective arousal.** Mild feeling with much holding back shown in face, vocal tone or body, e.g. briefly tears up, raises voice a little in anger, or says a few tender words for short duration, speaks openly. Imagery or memories with some emotional content. Some relief.
- 31-40 Low affective arousal.** Low, quickly passing experience of feeling shown in face, vocal tone or body; e.g. clenching fist, sighs, grimaces, choking up, slight sadness/anger/care for self but quickly stopped. Imagery or memories with low emotional content but appears very restrained/held back/constricted. Very little relief.
- 21-30 Very low affective arousal.** Minimal or barely visible/audible signs of feeling of short duration shown in face, vocal tone or body. May report slight change in internal bodily state. Imagery/memories have very low expression of feeling. Almost no relief.
- 11-20 No affective arousal, but bland verbal report of feeling.** Almost no expression on face. Flat/dull/bland tone of voice, stiff or barely moving body. Patient may sense a change in internal bodily state, but is unsure whether it is a feeling or not. Only bland, unfeeling report of images or memories with emotional content. No relief.
- 1-10 No affective arousal. No report of feeling.** No observable experience of feeling on face. Flat/dull/bland tone of voice. Stiff, unmoving body. No imagery or memories with emotional content. Emotionally numb and/or tense. Self hate/negation. No relief.

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Appendix C: The Metacognition Questionnaire-30 (Norwegian translation)**MCQ-30**

Denne undersøkelsen handler om forestillinger personer har om egne tanker. Under finner du et utvalg av forestillinger personer har uttrykt. Vennligst les hvert spørsmål og si hvor mye du vanligvis er enig ved å sette en ring rund det riktige tallet. Vennligst svar på alle spørsmålene. Det finnes ikke noe riktige eller gale svar.

Kjønn: _____
Født: _____

	Ikke enig	Litt enig	Ganske enig	Svært enig
1. Å bekymre meg hjelper meg å unngå problemer i fremtiden.	1	2	3	4
2. At jeg bekymrer meg, er farlig for meg.	1	2	3	4
3. Jeg tenker mye om tankene mine.	1	2	3	4
4. Jeg kan gjøre meg selv syk av å bekymre meg.	1	2	3	4
5. Jeg er oppmerksom på at måten sinnet mitt arbeider når jeg tenker gjennom et problem.	1	2	3	4
6. Dersom jeg ikke kontrollerte en bekymringstanke, og det så skjedde, ville det være min skyld.	1	2	3	4
7. Jeg trenger å bekymre meg for å forbli organisert.	1	2	3	4
8. Jeg har lite tiltro til min hukommelse for ord og navn.	1	2	3	4
9. Mine bekymringstanker går ikke bort uansett hvordan jeg forsøker å stoppe dem.	1	2	3	4
10. Å bekymre meg hjelper meg å sortere ting i sinnet mitt.	1	2	3	4
11. Jeg kan ikke ignorere bekymringstankene mine.	1	2	3	4
12. Jeg holder oversikt over tankene mine.	1	2	3	4

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13.	Jeg burde ha kontroll over tankene mine hele tiden.	1	2	3	4
14.	Hukommelsen min kan fra tid til annen villedde meg.	1	2	3	4
15.	Mine bekymringstanker kan gjøre meg gal.	1	2	3	4
16.	Jeg er konstant oppmerksom på hvordan jeg tenker.	1	2	3	4
17.	Jeg har en dårlig hukommelse.	1	2	3	4
18.	Jeg følger nøye med på hvordan sinnet mitt fungerer	1	2	3	4
19.	Bekymringer hjelper meg å holde ut.	1	2	3	4
20.	At jeg ikke er i stand til å kontrollere tankene mine, er et tegn på svakhet.	1	2	3	4
21.	Når jeg starter å bekymre meg, kan jeg ikke stoppe.	1	2	3	4
22.	Jeg kommer til å straffes for at jeg ikke kontrollerer visse tanker.	1	2	3	4
23.	Å bekymre meg hjelper meg å løse problemer.	1	2	3	4
24.	Jeg har lite tillit til min hukommelse for steder.	1	2	3	4
25.	Det er dårlig å tenke visse tanker.	1	2	3	4
26.	Jeg stoler ikke på hukommelsen min.	1	2	3	4
27.	Dersom jeg ikke kunne kontrollerer tankene mine, ville jeg ikke være i stand til å fungere.	1	2	3	4
28.	Jeg trenger å bekymre meg for å arbeide bra.	1	2	3	4
29.	Jeg har lite tillit til min hukommelse for handlinger.	1	2	3	4
30.	Jeg gransker tankene mine konstant.	1	2	3	4

Appendix D: The Penn-State Worry Questionnaire (Norwegian translation)

The Penn State Worry Questionnaire (PSWQ)

Skriv det tallet, som best beskriver hvor typisk eller beskrivende hvert utsagn er for deg, ved siden av hvert utsagn.

1	2	3	4	5
Ikke beskrivende		Noe beskrivende		Veldig beskrivende

- ___ 1. Jeg blir ikke bekymret selv om jeg ikke har tid til å gjøre alt. (R)
- ___ 2. Jeg blir overveldet av mine bekymringer.
- ___ 3. Jeg pleier ikke å bekymre meg. (R)
- ___ 4. Jeg blir bekymret i mange situasjoner.
- ___ 5. Jeg vet jeg ikke burde bekymre meg, men jeg klarer ikke la være.
- ___ 6. Jeg bekymrer meg mye når jeg blir stresset.
- ___ 7. Jeg bekymrer meg alltid for noe.
- ___ 8. Jeg synes det er lett å se bort fra bekymringer. (R)
- ___ 9. Straks jeg er ferdig med en oppgave begynner jeg å bekymre meg for alt annet jeg må gjøre.
- ___ 10. Jeg bekymrer meg aldri for noe som helst. (R)
- ___ 11. Når det ikke er noe jeg kan gjøre med et problem, slutter jeg å bekymre meg. (R)
- ___ 12. Jeg har vært en som bekymrer seg hele mitt liv.
- ___ 13. Jeg merker at jeg har bekymret meg.
- ___ 14. Har jeg først begynt å bekymre meg, kan jeg ikke slutte.
- ___ 15. Jeg bekymrer meg hele tiden.
- ___ 16. Jeg bekymrer meg for oppgaver inntil de alle er gjennomførte.

Navn: _____

Dato: _____

Total: _____

