The predictive capacity of patients' change- and counter-change talk:

Results from a randomized controlled trial of cognitive behavioral therapy vs. metacognitive therapy for generalized anxiety disorder.

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Acknowledgements

This graduate thesis is the penultimate chapter in the Clinical Psychology program at NTNU and marks the end of the theoretical portion of my studies. It is fitting then, that it has been the most challenging, but also most rewarding venture in my nearly six-year period of being a student. It has motivated-, but also necessitated me to watch over fifty videos of therapy sessions with a distinct focus on the patients and their explicit statements, not necessarily what the therapists were doing. I have had to learn a new coding system from scratch and how best to summarize and analyze the results from the data collection.

Being able to fully immerse myself into something new - not only to me, but also to the field I am researching in is a rare opportunity, albeit a time consuming and sometimes frustrating one. Fortunately, the positives far outweigh the negatives, for which I owe several people my thanks.

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Abstract

Patient motivation for change is thought to be an important factor for psychotherapy outcome. However, accurate measures of patient motivation have proven elusive, with self-report measures showing inconsistent results in relation to treatment success. How patients initially talk about change has been found to be a more accurate measure of their motivation, with subsequent value in predicting treatment outcome. This study investigated 24 patients receiving cognitive behavioral therapy (CBT) and 27 patients receiving metacognitive therapy (MCT) for generalized anxiety disorder (GAD), and included data from session 1 and 4. There were two aims: (1) to examine if patient language about change could predict worry reduction at post-treatment and 2-year follow-up, and (2) if there were differences between the CBT and MCT conditions on observed motivational language. Motivational language was found to be a strong predictor of worry scores at post-treatment and 2-year follow-up, beyond initial worry severity and treatment condition. For instance, both *commitments* to change at session 1, *taking steps* at session 4, and Change Talk along with Counter Change Talk at session 4 showed good predictive value, as did changes in observed Counter Change Talk. Moreover, CBT and MCT differed in their frequency of patient language during session 1, with patients in the MCT condition arguing more both for and against change, as well as being more vocal overall. These results support the importance of attending to patient motivational language in CBT and MCT for GAD with regard to psychotherapy outcome.

Keywords: Generalized anxiety disorder, Cognitive behavioral therapy, Metacognitive therapy, worry, motivation

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Generalized anxiety disorder (GAD) is a disorder that causes significant distress or impairment in functioning. According to the DSM-5 (American Psychiatric Association, 2013), GAD is characterized by excessive anxiety and worry about a number of situations, occurring more days than not for a period of at least six months. The person finds it difficult to control the worry and the disturbance is not better explained by another mental disorder or attributable to the physiological effects of a substance or another medical condition. The anxiety and worry are associated with three or more of the following six symptoms: restlessness or feeling on edge, being easily fatigued, difficulty concentrating or mind going blank, irritability, muscle tension, and sleep disturbance. Lastly the anxiety, worry, or physical symptoms cause clinically significant distress or impairment in important areas of functioning.

GAD is one of the most frequent disorders in primary care (Wittchen, 2002) as well as being common in community populations, with epidemiologic studies in the US finding a lifetime prevalence of GAD ranging from 5.1 percent (Kessler et al., 2005; Wittchen, Zhao, Kessler & Eaton, 1994) to 11.9 percent (Kessler et al., 2008) using the diagnostic criteria in DSM-III-R and DSM-IV. In Europe, a review of epidemiological studies including criteria from DSM-III, DSM-III-R, DSM-IV, and ICD-10 found a lifetime prevalence of 4.3 to 5.9 percent (Wittchen & Jacobi, 2005).

Cognitive behavioral therapy (CBT) is the most empirically supported psychotherapeutic treatment for GAD (Cuijpers et al., 2014; Hanrahan, Field, Jones & Davey, 2013) and is thus the psychotherapy of choice (National Institute for Health and Care Excellence [NICE], 2011). CBT (Borkovec & Costello, 1993) for GAD involves four different modules: detecting early cues of anxiety and worry, applied relaxation as a response to these cues, imaginal rehearsal of coping methods with self-control desensitization, and cognitive therapy for catastrophic beliefs and worry. The cognitive therapy module includes challenging automatic thoughts and beliefs, discussing types of distorted thinking/biases and logical analyses of worry. The rationale of CBT is that imaginal rehearsal of coping methods will facilitate reduction in fear and worry and the development of new coping strategies. The cognitive therapy will help reduce anxiety-maintaining thoughts and beliefs and the use of

cognitive therapy during imaginal rehearsal will provide relaxation skills and cognitive coping (Borkovec & Costello, 1993). A review of psychological therapies for GAD by Cochrane Library found that approximately 50 percent of patients assigned to CBT showed a clinical response at post-treatment (Hunot, Churchill, Teixeira, & Silva de Lima, 2007).

A more recent treatment approach is metacognitive therapy (MCT), which has shown promising results in the treatment of anxiety and depression with recovery rates of 72 to 80 percent (Nordahl et al., 2018; Normann & Morina, 2018). A recent study comparing the effectiveness of CBT with MCT for adults with GAD showed significantly greater recovery rates in MCT, this result was maintained at 2-year follow-up (Nordahl et al., 2018). Overall 65 percent of the patients receiving MCT were recovered, compared with 38 percent of the CBT group.

Metacognitive therapy revolves around the patient's metacognitive beliefs, such as the belief that worrying is harmful and uncontrollable. The focus in MCT is to eliminate negative beliefs about thinking, with little to no emphasis on the content of the patient's worrying. The rationale of MCT is that disengaging from trigger thoughts and postponing further conceptual processing can control worrying (Wells, 2009). MCT for GAD consists of five modules: Case formulation and socialization to the model, modifying beliefs about the uncontrollability and danger of worry, challenging positive beliefs about the utility and advantages of worry, implementation of alternative coping strategies, and relapse prevention (Wells, 2009).

The fourth module in MCT concerns an important facet of GAD, namely that although patients see worry as a problem for which they seek treatment, they also hold positive beliefs about worry which causes ambivalence toward change. It is possible that directly addressing this ambivalence as part of the treatment manual has contributed to the relatively high recovery rates found in studies of MCT for GAD, although no studies have investigated this directly. Should this be the case, it could be one of the reasons why MCT showed greater effectiveness in treating GAD than CBT. It has been hypothesized that if much ambivalence is not addressed in the therapy, the patient will show relatively low motivation for change (Westra, Arkowitz & Dozois, 2009). Miller & Rollnick (1991) defined motivation as "the probability that a person will enter into, continue, and adhere to a specific change strategy" (p. 19).

However, self-report questionnaires assessing treatment motivation such as URICA (McConnaughy, Prochaska & Velicer, 1983) have been unsuccessful in predicting treatment response in psychotherapy (e.g. Solem et al., 2016; Vogel, Hansen, Stiles & Götestam, 2006). URICA includes 30 statements such as "I have a problem, and I really think I should work on it", and "I think I might be ready for some self-improvement" where the answers range from strongly disagree to strongly agree. URICA is commonly used as a measure of readiness to change in treatment outcome studies (Dozois, Westra, Collins, Fung & Garry, 2004) and responders typically fall into four different subtypes of change (Precontemplation, contemplation, action and maintenance). Nevertheless, these subtypes are better at predicting dropout than they are at predicting outcome when assessed via URICA (Solem et al., 2016). Additionally, self-report measures have an inherent vulnerability in the form of social desirability bias and ceiling effects (Miller & Johnson, 2008). It is clear that instruments reflecting a deeper and more complex nature of motivation, behavioral change, and readiness to engage in specific therapy behavior are in demand. A possible alternative for estimating motivation in a more accurate and complex way could be by identifying in-session indicators of patient motivation, this can be done by applying a coding system to videos of therapy wherein patient utterances indicative of motivation are identified.

Patient utterances and their relation to motivation have already received attention by some researchers and is integral to Motivational Interviewing (MI) - an approach designed to increase intrinsic motivation and decrease ambivalence about change, as well as increase commitment to change (Miller, 1983; Miller & Rollnick, 2002). According to the transtheoretical model of change (TTM) (Prochaska & DiClemente, 1982), the change process involves moving from a *precontemplation* stage where one does not consider changing, to the *contemplation* stage, weighing pros and cons of changing or maintaining the behavior. As ambivalence resolves into commitment, one enters the *preparation* stage, wherein the commitment can carry through to *action* and *maintenance* if it is strengthened and maintained. Following this, patient commitment language has been proposed to play a central role in the psychotherapy process and thus warrants specific addressing (Amrhein, Miller, Yahne, Palmer & Fulcher, 2003).

Within the field of substance dependence and health-related behaviors there is strong evidence for MI's efficacy as a pretreatment to more directive non-MI interventions (Westra et al., 2009). Recently, researchers have applied MI as a pretreatment to anxiety disorders (Arkowitz, Westra, Miller & Rollnick, 2008), including GAD. Westra et al. (2009) added a MI pretreatment to CBT for GAD in a clinical randomized trial with 76 patients. The patients who received four sessions of MI-pretreatment demonstrated significantly lower post-treatment worry than patients who received only CBT, with a between-group post-treatment effect size of d=0.53 (Westra et al., 2009). It is clear, not only from this study, that patient motivation is central to the outcomes of CBT (Antony, Ledley & Heimberg, 2005; Arkowitz et al., 2008), despite our lack of accurate measures of this construct.

Motivational Interviewing Skills Code (MISC) is a therapy process coding system designed to capture elements of theoretical interest in the practice of MI. The MISC was designed to assess MI fidelity by having independent raters assign a behavioral code to each utterance spoken by the therapist and the patient[1] during therapy sessions (Lord et al. 2015). Several versions of the MISC have been developed over the years, and while the original MISC was intended as a treatment integrity measure (Miller & Rollnick, 2002), the MISC 1.1 (Glynn & Moyers, 2012) is focused only on patient motivational language. Patient motivational language consists of statements in favor of changing or sustaining a problem behavior, traditionally addictive behaviors like alcohol and substance abuse (Miller & Rollnick, 1991, 2002). In version 2.5 (Houck, Moyers, Miller, Glynn & Hallgren, 2010), each instance of motivational language is placed into one of the following seven categories: *Commitment*, *Reason*, *Desire*, *Ability*, *Need*, *Taking steps*, and *Other*. It is also given a valence that signifies it either being toward change (+) or away from change (-). Statements in favor of change are called Change Talk (CT) while statements in opposition to change are called Counter Change Talk (CCT). Statements that do not deal with changing the target behavior are classified as Follow/Neutral/Ask (F/N/A). All patient responses are classified into one of the three mutually exclusive categories of CT, CCT and F/N/A.

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[1] Within the field of MI and MISC, the terms counselor and client are primarily used in lieu of therapist and patient.

Research using MISC and other related coding systems has investigated the relationship between therapist and patient speech, and between patient speech and behavior change. Some studies have found relationships between patient motivational language and behavior change, but this research has primarily been done with regard to substance abuse (Gaume, Gmel & Daeppen, 2008; Moyers et al., 2007; Vader, Waters, Prabhu, Houck & Field, 2010).

Two studies have examined the MISC's ability to predict post-treatment worry outcomes in a population of GAD patients receiving CBT (Lombardi, Button & Westra, 2014; Poulin, Button, Westra, Constantino & Antony, 2018). Lombardi et al. (2014) examined 37 adults with a principal diagnosis of GAD receiving a total of 14 sessions of CBT following the manual developed by Borkovec and Costello (1993). A team of four coders was trained in the use of the MISC 1.1 (Glynn & Moyers, 2012) and patient motivational statements were coded for the entire first or second session of CBT depending on recording availability. The patients who did not respond to treatment had significantly higher levels of CCT compared to the patients who did respond to treatment, with a between group effect size of d=0.96, thus providing preliminary support for the capacity of early in-session patient motivational language to predict treatment outcomes in CBT for GAD (Lombardi et al. 2014). Neither CT nor CCT were correlated with self-report measures of motivation in their study.

The second study examined the predictive capacity of self-reported motivation vs. observed motivational language in CBT for GAD. Poulin et al. (2018) examined 85 adults receiving 15 weekly individual therapy sessions, as well as two booster sessions at one and three months following treatment. Forty-three of the patients received CBT for all sessions, while the remaining 42 received up to four sessions of MI at the start of treatment, and CBT integrated with MI for the remaining sessions. The MISC 1.1 (Glynn & Moyers, 2012) was used to quantify patient motivational statements. A team of three trained coders was used to code the entire first session of treatment for each patient.

Correlations among the observed language measures showed that CT was positively correlated with one type of CCT – ambivalence (CCT-A). Poulin et al. (2018) distinguished between two types of CCT: Ambivalence and Resistance (CCT-R). Both CCT-A and CCT-R had a significant medium correlation with higher post-treatment worry, including at 1-year follow-up.

Poulin et al. (2018) found that neither pre-treatment PSWQ scores, nor the self-report measures of motivation Change Questionnaire (CQ) and Client Motivation for Therapy Scale (CMOTS) had a significant effect on post-treatment PSWQ. When CT, CCT-A and CCT-R were added to the model, both subtypes of CCT were found to have a significant effect on worry, whereas CT did not. This final model accounted for 27% of the variance in post-treatment worry scores, which equated to an additional 21% explained variance, compared to the model including only PSWQ pre-treatment and self-report measures of motivation. Furthermore, all observed measures of motivation had a significant effect on the PSWQ-scores at 1-year follow-up, whereas the self-report measures did not.

To sum up, the existing studies have found preliminary evidence for the predictive capacity of early-observed motivational language in the context of CBT for GAD. Counter change talk seems to be the most potent predictor of treatment outcome, while the relationship between change talk and treatment outcome appears unclear with mixed results thus far. It is clear that there is potential for a clinical use of the MISC in this area, but there is a need for additional studies with larger sample sizes in order to determine the exact nature of its relevance.

This study is an attempt at addressing this and expands the literature on the MISC in several ways. The current study incorporates data from session 1 as well as session 4 of therapy, thus providing the opportunity of investigating changes in observed motivational language from the beginning of therapy to later in the treatment. This allows for insight into the change process and the patient's progression from one stage of the trans-theoretical model of change (Prochaska & DiClemente, 1982) to the next. Furthermore, by employing a version of the MISC (Houck et al., 2010) that includes detailed coding of both CT and CCT, we can test whether specific categories of CT and CCT are more important for outcome than others. This can provide additional information about which stage of change the patient occupies, and allows a more detailed exploration of movement through the stages during the therapy. Additionally, we can shed light on the possible distinct role of patient commitment, outside of a MI-context.

No research to date has explored the predictive capacity of observed motivational language in a metacognitive therapy for GAD, MCT is the natural next treatment choice when employing the MISC on psychological treatments for GAD, given its efficacy and pronounced emphasis on both positive and negative

metacognitions, thus addressing the ambivalence of the patient directly – believed to be an important stage in the change process. By including two treatments, we not only allow for a larger sample, it gives us the opportunity to investigate differences between the two therapies in terms of motivational language. It is possible that the focus in one therapy is more effective at eliciting and reinforcing patient motivational language than the other, but this has yet to be investigated. Identifying a reliable and valid way of assessing patient motivation would be of major benefit to patients and therapists alike. Being able to identify key markers of motivation proven to affect therapy outcome will allow therapists to intervene within a reasonable time frame and improve the overall quality of the therapy.

There are strong and consistent findings of patient motivational language predicting treatment outcome in MI for addiction. In the wake of this, researchers have begun to examine the utility of motivational language in the context of CBT for GAD, with promising preliminary findings. We expect this to still hold true in our study, and our main hypothesis is therefore that observed patient motivational language predicts treatment outcome. Because our study includes two treatment conditions (CBT & MCT) with differing treatment rationales, and because the MISC has never been applied to one of them, we also wish to investigate if they facilitate different motivational statements. Neither of the treatment conditions directly target motivation as part of the treatment manual, nevertheless, they emphasize different aspects of GAD, with potential consequences for motivation and its expression. If differences in patient motivational language were to be found, it could potentially help elucidate the disparity in treatment success reported between the two conditions. Given that MCT focuses on both positive and negative metacognitions and consequently on the ambivalence of the patient in terms of their worry, we would expect patients receiving MCT to have a higher number of utterances arguing for and against change. On this basis, our second hypothesis is that observed motivational language is different across the two treatment conditions.

Method

Participants

Video recordings of therapy sessions were obtained from a randomized controlled trial comparing metacognitive therapy with cognitive-behavioral therapy in adults with generalized anxiety disorder (Nordahl et al., 2018). A total of 81 patients

were included in the study, randomized into three conditions: CBT (n = 28), MCT (n = 32) and a wait-list control (n = 21). Of the 60 patients receiving treatment, 51 were included in the current study; videos were missing for nine of the patients and they were therefore excluded from our study. Two sessions were coded for 41 of the patients, and only one session was coded for 10 of the patients due to limited availability of video recordings. All participants were required to give written consent to enter the study, be aged 18 years or older, and have a diagnosis of GAD, assessed by independent assessors prior to treatment using the Anxiety Disorders Interview Schedule for DSM (DiNardo, Brown, & Barlow, 1994). Patients with known somatic diseases, psychosis, recent suicidal attempts and/or current intent, primary post-traumatic stress disorder, cluster A or cluster B personality disorder, substance dependence or unwillingness to accept random allocation were excluded (Nordahl et al., 2018).

Patient demographics and means and standard deviations for measures are presented in Table 1. Differences between treatment groups on demographics were assessed using *t*-tests for continuous variables and chi square analyses for categorical variables. Only the social status of the participants was significantly different between the two treatment conditions.

Table 1

Sample Demographic and Descriptive Characteristics

Measure	Total sample (N = 51)	CBT (n = 24)	MCT (n = 27)	p
	M (SD)	M (SD)	M (SD)	
Age	47.43 (23.31)	38.21 (11.34)	36.74 (13.29)	.68
Number of diagnoses	2.33 (12.31)	2.21 (1.10)	2.44 (1.19)	.47
	N (%)	N (%)	N (%)	
Female sex	39 (76)	17 (71)	22 (81)	.37
Male sex	12 (24)	7 (29)	5 (19)	
Social status				.04*
Single	5 (10)	2 (8)	3 (11)	
Not single	38 (74)	15 (63)	23 (85)	
Unreported	8 (16)	7 (29)	1 (4)	

*p< 0.05, **p< 0.01, ***p< 0.001

Treatments and therapists

Patients in both conditions received a maximum of 12 weekly sessions, lasting 60 minutes each. Published treatment manuals of CBT (Borkovec & Costello, 1993) and MCT (Wells, 2009) were used. The content of each manual and consequently the content in each session differed between the two conditions. Session 1 of the CBT condition aims to include the following: An introduction that includes the agenda and introducing the therapist and his/her role, a description of the treatment and the rationale for each treatment module, a clarification of the different roles in the therapy process, explaining and attempting diaphragmatic breathing, and finally homework for the next session. Additionally, there is a focus on rapport building during the session and various instruments and handouts are distributed throughout. In contrast, session 1 of the MCT condition includes generating a case formulation and socializing to the model, running a suppression experiment, focusing on verbally challenging the belief that worrying is uncontrollable, introducing an experiment of postponing worrying, and finally homework for session 2.

Session 4 of the CBT-manual includes verbally reviewing the past week and homework, before moving onto cognitive therapy and practicing and discussing the different types of relaxation and desensitivisation. The fourth session of MCT also includes reviewing the past week, but uses a checklist (GAD-S) in order to do so. The therapist and patient then move on to discussing homework, before challenging negative metacognitions both verbally and via an in-session experiment.

As can be gathered from the content of session 1 and 4, some elements are exclusive to their condition. For example, in the CBT condition there is no focus on meta-worries and positive or negative meta-beliefs should not be addressed. The uncontrollability of worry is also not in focus, as it is in the MCT condition. The MCT condition however, lacks some elements inherent to CBT. There is no awareness training of worry-cues, no forms of relaxation techniques or focus on relaxation, and no breathing practice or learning of diaphragmatic breathing.

Neither of the treatment manuals directly address the motivation of the patient. However, it can be argued that the MCT condition comes closest of the two in addressing motivation by focusing on both positive and negative metacognitions. How can worrying be perceived as both harmful and helpful at the same time?

Socratically eliciting such conflicting thoughts and ideas could give the therapist some insight into which stage of change the patient is in, and how motivated they are.

Six clinical psychologists trained in both CBT and MCT were selected for the study and received regular and equivalent amounts of training and supervision from the originators of the manuals. To control for therapist factors a crossover design was used, wherein three therapists used CBT while the other three used MCT on the first half of the patients, before crossing over halfway into the trial and delivering the other treatment condition (Nordahl et al., 2018).

Measures

Penn State Worry Questionnaire (PSWQ). The PSWQ is a commonly used 16-item measure of worry severity with scores ranging from 16 to 80, with a higher score representing higher worry severity. The PSWQ has evidenced good internal consistency as well as good convergent and discriminant validity (Brown, Antony, & Barlow, 1992). As such it is commonly used in treatment outcome studies of GAD, and is the principal outcome measure employed in the current study as well.

Motivational Interviewing Skills Code (MISC) Version 2.5. The MISC 2.5 (Houck et al., 2010) was used to quantify patient motivational language and statements about change. Version 2.5 was used in order to include detailed categories of Change talk (CT) and Counter Change Talk (CCT), those categories being *Reason*, *Ability*, *Commitment*, *Desire*, *Need*, *Taking Steps* and *Other*. Therapist and global ratings were not included in the present study. The MISC has been found to possess good reliability and predictive validity in the substance abuse domain (Moyers, Martin, Houck, Christopher, & Tonigan, 2009; Vader et al., 2010). The MISC has only recently been applied to the field of GAD, nevertheless several studies (e.g. Button, 2013; Lombardi et al., 2014; Sijercic, Button, Westra & Hara, 2016) have demonstrated both reliability and predictive validity for the MISC in this area of study.

Procedure

The participants were referred to the study by a physician or via secondary health care clinics, but self-referral was also an option. The study was conducted at the university outpatient clinic at the Norwegian University of Science and Technology in Trondheim from 2008 to 2016. The study was approved by the

Regional Committee for Medical and Health Research Ethics (4/2006/2369) and pre-registered at Clinicaltrials.gov (identifier: NCT00426426). All participants were administered a structured interview that included the Anxiety Disorders Interview Schedule for DSM – ADIS-IV (Di Nardo, Brown, & Barlow, 1994) and the DSM Structured Clinical Interview for Axis II – SCID-II (First, Gibbon, Spitzer, Williams, & Benjamin, 1997). Participants completed the PSWQ prior to treatment, as well as post-treatment, and 2-year follow-up.

Video recordings of the first and fourth treatment session were coded in their entirety for each participant in order to quantify the frequency of CT and CCT. In the cases where these videos were unavailable, video recordings of session 2, 3 or 5 were used instead. If these too were unavailable, only one session was coded for that patient. Two sessions were coded for 41 of the patients, and only one session was coded for 10 of the patients. A total of 43 videos were coded and analyzed as session 1 (40 of them were recordings of session 1, two of them were from session 2 and one was from session 3). A total of 49 videos were coded and analyzed as session 4 (Four were recordings of session 3, thirty-four were from session 4 and eleven were from session 5). There were no significant differences between the treatment conditions on missing videos.

GAD is a heterogenous disorder and consequently a number of different therapeutic targets for change were identified and language was coded as moving toward or away from these targets. Targets differed especially between those receiving CBT and those receiving MCT as a result of different treatment rationales (e.g. thinking rationally vs. disengaging from thoughts). Each patient verbalization relating to change was given a code in accordance with the MISC 2.5 (Houck et al., 2010). Statements not relating to change were tallied up and time was registered for each session.

The coders were two students enrolled at NTNU on their fourth and fifth year of the clinical psychology-program. One of the students begun training by familiarizing himself with the MISC 2.5- and 1.1 manual, before coding a selected sample of the data. The same sample was then coded by the supervisor, and after comparing their results and reaching an adequate level of agreement, the student started coding the available material alone. Halfway through the coding period the second student received training from the first student, by coding four videos from two different patients together. Following this, the two students coded a third patient

separately, until an adequate amount of agreement on codes was reached. The second student then went on to code the remaining videos alone. Both students were in continuous dialogue with each other and their supervisor, discussing the coding process throughout the coding period. Coders were kept blind to patient outcomes.

Analyses

T-tests were selected in order to compare means between continuous variables and chi square analyses for categorical variables. Correlations between measures were included with the idea of providing a simple overview of the relationship between variables. We used a linear regression in order to isolate and determine the predicative value of our observed patient motivation. To check for multicollinearity the variance inflation factor (VIF) and the tolerance statistic were examined. The largest VIF should not exceed 10, and the average VIF should not be substantially larger than 1 (Bowerman & O'Connel, 1990). Additionally, the tolerance should not be less than 0.2 (Menard, 1995). Worry scores at pre-treatment were especially potent predictors of treatment outcome, and there were also differences between the two treatment conditions in this regard. These two variables were consequently included as step 1 and 2 for each linear regression model to account for their influence on worry scores at post-treatment and follow-up. A stepwise linear regression was used in order to identify categories of MISC most predictive of worry scores for the final step in our last linear regression. Only the categories of CT and CCT significantly correlated with post-treatment and follow-up worry scores were added to the model, and the identified category/categories were then entered in a linear regression akin to the ones described previously, in order to determine how much variance in worry scores they could explain.

Nine patients are missing from the original study by Nordahl et al. (2018), no data or tests were added to account for these missing values. Three of the included patients did not provide worry scores at 2-year follow-up, and three of the patients did not provide worry scores at post-treatment. Scores from last observation carried forward were used for these patients. For the patients missing scores from 2-year follow up this amounted to worry scores at 1-year follow up for two of the patients, and post-treatment scores for one patient. For the patients lacking post-treatment scores, last observation carried forward equated to pre-treatment scores of worry severity.

Results

Table 2 shows the worry scores and observed motivational language for the sample. Compared to the CBT group, the MCT group had significantly lower worry severity at post-treatment and at 2-year follow-up. Additionally, the two treatment groups differed in the frequency of change talk, counter change talk and total number of utterances during session 1, with the MCT group having a higher number of utterances. No such differences were present at session 4. Lastly, the MCT group had fewer CCT statements during session 4 than during session 1, with the inverse being true for the CBT group.

Table 2

Worry Scores and Language Frequency in CBT and MCT conditions

Measure	Total sample ($N = 51$)	CBT ($n = 24$)	MCT ($n = 27$)
	M (*SD*)	*M* (*SD*)	*M* (*SD*)
PSWQ			
Baseline	66.29 (7.26)	67.29 (6.12)	65.41 (8.16)
Post-treatment	48.84 (14.89)	54.96 (12.54)	43.41 (14.90)**
Two-year f-u	49.10 (15.32)	54.21 (13.63)	44.56 (15.53)*
	$N = 43$	$n = 20$	$n = 23$
Session 1			
CT	12.81 (8.38)	9.80 (6.63)	15.43 (8.98)*
CCT	5.28 (3.68)	3.00 (2.99)	7.26 (3.05)***
Utterances	107.02 (33.93)	90.60 (25.00)	121.30 (34.64)**
	$N = 49$	$n = 23$	$n = 26$
Session 4			
CT	13.06 (9.08)	11.22 (6.57)	14.69 (10.70)
CCT	4.63 (3.73)	4.00 (3.62)	5.19 (3.81)
Utterances	98.55 (24.26)	93.70 (23.40)	102.85 (24.65)
	$N = 41$	$n = 19$	$n = 22$
CT Cha	-0.59 (7.68)	-1.42 (6.42)	0.14 (8.71)
CCT Cha	0.24 (4.04)	-1.21 (3.01)	1.50 (4.44)*

Note. Utterances: Total number of patient follow/neutral/ask, change talk and counter change talk utterances; PSWQ: Penn State Worry Questionnaire; CT/CCT Cha: Changes in number of change talk/counter change talk utterances from session 1 to 4. Worry scores differ slightly from those in Nordahl et al. (2018) due to a smaller sample.

*p< 0.05, **p< 0.01, ***p< 0.001

Correlations between the main measures of patient language and worry scores are presented in Table 3. All of the worry severity scores were positively correlated with each other. PSWQ at post-treatment was negatively correlated with utterances in session 1 and CCT at session 4. PSWQ at 2-year follow-up was significantly correlated with CCT at session 4. Lastly, CT was positively correlated with CCT at session 1, but this relationship was no longer present at session 4.

Table 3

Correlations Between Measures for Both Treatment Conditions, N = 51

Measure	1	2	3	4	5	6	7	8	9
1. PSWQ pre	-	.49***	.47***	-.25	.17	-.31*	.15	.26	.02
2. PSWQ post		-	.65***	-.27	-.25	-.40*	-.27	.30*	-.08
3. PSWQ 2-year fu			-	-.19	-.12	-.25	-.22	.30*	-.12
4. CT session 1				-	.43**	.73***	.63***	.27	.51***
5. CCT session 1					-	.48**	.37*	.43**	.28
6. Utterances session 1						-	.41**	.22	.56***
7. CT session 4							-	.08	.53***
8. CCT session 4								-	.05
9. Utterances session 4									-

Note. PSWQ: Penn State Worry Questionnaire; CT: Change talk; CCT: Counter change talk;
Utterances: Sum total number of patient utterances.

*p < .05, **p < .01, ***p < .001

Table 4 shows the correlation between each category of patient motivational
language and worry scores. Both the correlation for utterances in favor of change
(CT) and utterances opposing change (CCT) are included, with the latter being
presented in parenthesis. Additionally, changes in the number of CT and CCT
utterances from session 1 to 4 are included in this table. From session 1, negative
ability-, positive *commitment*-, and positive *desire*-utterances were significantly
correlated with worry scores at post-treatment. Additionally, positive and negative
utterances of *ability*-, positive *taking steps*-utterances at session 4, and changes in
CCT were correlated with post-treatment worry. Only positive *taking steps* at session
1 and 4, along with changes in CCT were correlated with worry scores at follow-up.

Table 4

Correlations between MISC categories of CT/CCT and PSWQ measures

	PSWQ-post	PSWQ 2-year		PSWQ-post	PSWQ 2-year
MISC Session 1	Pos (neg)	Pos (neg)	**Session 4**	Pos (neg)	Pos (neg)
Reason	-.15 (-.23)	-.10 (.01)		-.12 (.04)	-.21 (.25)
Ability	-.11 (**-.31***)	-.05 (-.21)		**-.33*** (**.33***)	-.21 (.27)
Commit.	**-.32***(.01)	-.18 (.15)		-.21 (.22)	-.01 (.14)
Desire	**-.37*** (-)	-.28 (-)		.12 (-)	.02 (-)
Need	.03 (-.01)	-.08 (-.10)		-.02 (-.06)	.13 (-.20)
Taking steps	-.27 (-.26)	**-.33*** (-.20)		**-.41**** (-.05)	**-.36*** (.15)
Other	-.19 (-.04)	.00 (.14)		-.08 (-.01)	-.02 (.03)
			CT Cha	.06	.12
			CCT Cha	**-.49****	**-.35***

Note. Correlations are between the number of positive utterances for each category of motivational language and PSWQ. The correlation between negative utterances for each category and PSWQ are in parenthesis. No patients expressed a *desire* not to change. CT Cha: Changes in the number of change talk utterances from session 1 to 4; CCT Cha: Changes in the number of counter change talk utterances from session 1 to 4.
*$p < .05$, **$p < .01$, ***$p < .001$

Six linear regression models were assessed in order to predict worry scores at post-treatment and 2-year follow-up using change talk and counter change talk; these can be found in Table 5. In all models pre-treatment PSWQ scores were regressed on the outcome measure to control for baseline worry. Furthermore, treatment condition was also added for all models in step 2 to control for possible effects on post-treatment worry scores.

We did not find support for the frequency of CT or CCT during session 1 predicting worry severity at post-treatment. However, CT during session 4 emerged as a significant predictor of PSWQ scores at post-treatment, explaining an additional 13% of the variance in PSWQ scores beyond pre-treatment worry and treatment condition.

The change in number of CCT utterances from session 1 to 4 was also significant at post-treatment, explaining an additional 15% of variance. Changes in CT did not explain an additional amount of variance in post-treatment scores. Finally, CT and

CCT during session 4 were both significant predictors of follow-up worry scores beyond pre-treatment worry and treatment condition, explaining an additional 12% variance here. Collinearity statistics indicated that multicollinearity was not an issue, with no VIF exceeding 2, or tolerance level falling short of .5.

Table 5

Predicting Worry Scores Using Change Talk and Counter Change Talk

	Post-treatment		2-year follow-up			Post-treatment		2-year follow-up			Post-treatment		2-year follow-up	
Step	Adj R^2	R^2 Cha	Adj R^2	R^2 Cha		Adj R^2	R^2 Cha	Adj R^2	R^2 Cha		Adj. R^2	R^2 Cha	Adj. R^2	R^2 Cha
1. PSWQ pre	.23	.25***	.19	.21**		.24	.25***	.21	.22***		.23	.24**	.19	.21**
2. Treatment	.32	.10*	.23	.06		.37	.14**	.27	.08*		.35	.14**	.23	.06
3. CT/CCT Session 1	.36	.07	.20	.01	CT/CCT Session 4	.48	.13**	.36	.12*	CT/CCT Cha	.48	.15**	.32	.12*
Final Step	β	t	β	t		β	t	β	t		β	t	β	t
PSWQ pre	.54	3.99***	.47	3.01**		.45	4.93***	.40	3.24**		.51	4.10***	.52	3.67***
Treatment	-.11	-0.72	-.18	-1.04		-.35	-3.17**	-.28	-2.25*		-.29	-2.32*	-.22	-1.57
CT Ses 1	-.01	-0.08	.03	0.20	CT Ses 4	-.32	-3.00**	-.25	-2.06*	CT Cha	.20	1.56	.29	1.94
CCT Ses 1	-.34	-1.99	-.11	-0.57	CCT Ses 4	.19	1.76	.26	2.10*	CCT Cha	-.30	-2.33*	-.16	-1.05

Note. PSWQ: Penn State Worry Questionnaire; CT: Change talk; CCT: Counter change talk; Treatment: Treatment condition; CT/CCT Cha: Changes in CT/CCT from session 1 to 4.

*p< .05, **p< .01, ***p< .001

Only variables significantly correlated with worry scores from table 4 were added to a stepwise linear regression. Different categories of motivational language emerged as the best predictors of worry scores at post-treatment and follow-up. These categories were then entered in a linear regression analysis, the results of which can be seen in Table 6. Early *commitments* to change and changes in CCT were especially important for immediate therapy outcome, explaining 24% further variance in worry scores beyond pre-treatment worry and treatment condition. At 2-year follow-up the number of positive *taking steps*-utterances from session 4 emerged as the best factor. Positive *taking steps* at session 4 explained an additional 10% variance in worry scores at follow-up.

Table 6

Categories of CT and CCT as Predictors of Worry Scores at Post and Follow-Up

Step	Post-treatment			2-year follow-up	
	Adj R^2	R^2 Cha		Adj R^2	R^2 Cha
1. PSWQ pre	.23	.24**		.21	.22***
2. Treatment	.35	.14**		.27	.08*
3. Pos *commitment* 1	.50	.16***	Pos *taking steps* 4	.36	.10**
4. CCT Cha	.59	.09**			
Final Step	β	t		β	t
PSWQ pre	.49	4.73***		.43	3.67***
Treatment	-.28	-2.56*		-.24	-2.00
Pos *commitment* 1	-.37	-3.57**	Pos *taking steps* 4	-.32	-2.75**
CCT Cha	-.32	-2.94**			

Note. PSWQ: Penn State Worry Questionnaire; CCT Cha: Change in number of counter change talk utterances from session 1 to 4.

*p<.05, **p<.01, ***p<.001

Lastly, we were unable to find any significant interaction effects between motivational language and treatment condition, and motivational language did not appear to moderate the relationship between treatment outcome and any of the other variables we investigated.

Discussion

This study set out to investigate the predictive capacity of observed patient motivation on therapy outcomes in a population with GAD. We found that patient utterances in favor of change at session 4 were significant predictors of variation in worry scores at post-treatment, and at 2-year follow-up. Also, utterances arguing against change at session 4 were significant predictors of follow-up. However, change talk and counter change talk at session 1 were not significant predictors of treatment outcome. Furthermore, changes in the amount of CCT from the beginning of therapy to session 4 was indicative of worry scores at post-treatment, particularly in combination with *commitments* to change during session 1. Lastly, we found that utterances of *taking steps* during session 4 explained significant variation in worry scores at follow-up. Motivation is an important factor for treatment outcome (Arkowitz et al., 2008) and the observed language of the patient was found to provide unique insight into this construct. Adding to this, we discovered that motivational language was more prevalent in the MCT condition than in the CBT condition during session 1.

Several of the observed measures of motivation were correlated with worry scores at post-treatment and follow-up. Moreover, we found a positive correlation between CT and CCT during session 1. Poulin et al. (2018) did not report this correlation for CCT as a whole, rather dividing CCT into two types: Ambivalence (CCT-A) and resistance (CCT-R), of which only the latter was correlated with CT. We found a medium correlation, as did Lombardi et al. (2014) and Poulin et al. (2018), indicating a complex relationship between the two. The positive nature of the correlation between CT and CCT has been posited (Moyers et al., 2017) to indicate that they are separate constructs rather than endpoints on the same continuum, and we would also argue this. One might expect that patients arguing for change would have fewer statements arguing against change, but this was not the case. The true relationship seems to be that some patients are more inclined to talk about change altogether. It is possible that during session 1 the ambivalence is at its highest and statements about change will naturally elicit statements in opposition of the previous

one. At this point we would expect that most patients are occupying the *contemplation* stage, reflecting on the pros and cons of their behavior.

However, the CT-CCT correlation at session 4 was not significant. By session 4 some of this ambivalence is resolved and thus the correlation between the two constructs could diminish, as some patients are moving into the *preparation* or *action* stage of Prochaska & DiClemente (1982)'s model. Following this line of reasoning, we would expect the statements relating to change later in the therapy (session 4) to be more indicative of the patient's true motivation, as they have alleviated some of the confusion as to what change, in either direction, actually entails. With patients occupying different stages of change we could also expect more variation in utterances, which consequently differentiates the patients able to benefit from the therapy from those unable to. This theory is supported by the fact that CT in session 4 emerged as the only significant predictor of both post-treatment and follow-up worry. However, it does not adequately explain why our results from session 1 do not match those of Lombardi et al. (2014) and Poulin et al. (2018), who both found support for CCT during session 1 explaining post-treatment worry. A contributing factor to this discrepancy could be the use of different treatment manuals as well as different treatment conditions.

We found that *commitments* during session 1 emerged as an important factor for post-treatment outcome. Patient commitments have received special attention by some investigators (Aharonovich, Amrhein, Bisaga, Nunes & Hasin, 2008; Amrhein et al., 2003), but not while studying the use of the MISC in CBT or MCT for GAD, until now. The number of patient *commitments* toward change during session 1 explained a significant amount of variance in post-treatment PSWQ scores, more so than pre-treatment worry scores and treatment condition did alone. Verbal patient commitments have an empirical connection with subsequent behavior (e.g., Putnam, Finney, Barkley & Bonner, 1994; Mussell et al., 2000) and are believed to help elucidate the relationship between psychotherapy processes and outcome (Amrhein et al., 2003). It is likely that utterances of this type distinguish the patients on the verge of entering or already occupying the *preparation* stage (Prochaska & DiClemente, 1982) from those still *contemplating* change.

The number of *commitments* to change, coupled with the additional variable of changes in CCT could explain 25% further variance in post-worry beyond pre-worry and treatment condition. This reflects to a certain degree the previous findings

(Lombardi et al., 2014; Moyers et al., 2007) that CCT is a more potent predictor of treatment outcome than CT, despite being significantly less frequent than CT in all sessions and treatment conditions investigated. Perhaps more importantly though, it suggests that moving in the direction of expressing fewer utterances opposing change indicates that the patient is resolving some of the ambivalence present during session 1, and is likely moving on, or has moved on from the *contemplation* stage and either into *preparation*, or the *action* stage of the TTM (Prochaska & DiClemente, 1982). It is likely that these variables provide the most accurate distinction between patients occupying the *preparation* or a later stage, from those occupying previous stages of change.

The TTM can also be used as a frame of reference for understanding which type of motivational language is indicative of follow-up worry. We found that positive utterances of *taking steps* at session 4 were significant in this regard. Patients who began taking steps in the direction of change already during the fourth session of therapy ended up with less worry severity at follow-up. These patients are likely occupying the *action* stage, having begun adjusting their behavior after going through *contemplation* and *preparation*. Perhaps the speed in which one moves through the first stages of the TTM (Prochaska & DiClemente, 1982) during therapy is a useful indicator of who is able to stay at the *maintenance* stage 2 years following treatment, while early resolving of ambivalence leading to *commitments* - thus reaching the *contemplation* stage, is what's most important for immediate worry reduction during the treatment period.

We are not able to compare these findings with any previous ones directly, as we went beyond previous studies by investigating categories of CT and CCT, and by including data from session 4. Poulin et al. (2018) were able to predict 1-year follow-up scores using CT and CCT at session 1. In contrast, we were only able to predict follow-up scores using these measures at session 4, as well as with the category of *taking steps* spoken at session 4.

Differences between CBT and MCT

We employed the MISC (Houck et al. 2010) on patients receiving metacognitive therapy for GAD for the first time and found that their motivational language during session 1 differs from that of patients receiving cognitive-behavioral therapy.

The CBT condition had fewer CT, CCT and total utterances overall than the MCT condition, however this was only significant at session 1. The treatment groups differed in one other way - on changes in CCT from session 1 to session 4. The MCT group had fewer CCT statements in session 4 than they did in session 1, while the opposite was true for the CBT group. The CBT group in our study had a considerably lower amount of both types of motivational language than the CBT group in the study by Poulin et al. (2018), which was more comparable to the frequency of motivational language in the MCT condition. This disparity could be a result of using different treatment manuals, as Poulin et al. (2018) utilized CBT adapted from several evidence-based protocols (Westra et al. 2016).

Patients receiving MCT were more vocal than the CBT group in all aspects of speech during session 1. We used the Borkovec & Costello (1993) manual, which included practicing diaphragmatic breathing - a nonverbal task. With this in mind, it is not wholly surprising that the MCT condition includes more statements, both neutral and relating to change, given that several minutes of the CBT session is completed in silence. Session 4 on the other hand is freer in structure across the treatment conditions, and thus allows for more natural unprompted conversation, which could lead to both patient groups speaking a similar amount. As we are the first to employ the MISC (Houck et al., 2010) on session 4, we are unable to compare these frequency numbers with others.

An important thing to note in relation to the MCT condition is the case formulation composed in session 1. When creating the case formulation, the therapist elicits a lot of *reasons* for changing, including positive and negative metacognitions – the patients' false beliefs about the usefulness and danger of worry. A successful MCT treatment would lead to a decrease in such metacognitions, giving us a false impression of the patient's motivation if you looked at motivational language in isolation. This could have affected our results in two ways: It could have contributed to our finding that CT and CCT during session 1 were not significant predictors of post-treatment worry, as well as exacerbated the differences in motivational language found between MCT and CBT in session 1. This has likely had the largest effect on CT, as negative metacognitions (coded as positive *reasons)* are both more prevalent, and targeted earlier in therapy than positive ones. Given the large differences found, particularly in CCT, as well as the difference in total utterances between MCT and

CBT, we would argue that the treatments are in fact dissimilar in their facilitation of motivational language, even if metacognitions were to be accounted for.

Lastly, it should be noted that previous studies (Lombardi et al., 2014; Poulin et al., 2018) have divided CT and CCT by the total number of utterances in the session to account for differences in patient verbosity. This was not included in the current study, and we concede that this decision could have affected our results and made them less comparable with the results of Lombardi et al. (2014) and Poulin et al. (2018). Nevertheless, we maintain that attempting to account for differences in verbosity loses important information about therapy participation which in and of itself could indicate motivation, or lack thereof. Additionally, both treatment conditions are quite structured and include a number of questions, allowing for fewer differences in utterances due to loquacity to emerge.

In sum, the results regarding differences in CBT and MCT in terms of motivational language are unsettled, but promising. MCT seemed to elicit more speech during session 1 than CBT, possibly due to its pronounced emphasis on the ambivalence of the patient. A large portion of session 1 consists of composing a case formulation, which appears effective at engaging the patient and eliciting conflicting and erroneous ideas about cognition which are subsequently targeted during the following sessions. Whether this is conducive to the superior results in MCT when compared to CBT is for future research to discover. In contrast, we found no differences during session 4, when the treatment agendas were less rigid and the CBT condition contained less nonverbal practice of relaxation. This can be taken to mean that the treatment rationales themselves do not mean much in terms of facilitating motivational language, but that therapists working within a CBT framework could benefit from restricting time spent on in-session relaxation practice and engaging the patient more during session 1.

Limitations

While some of the limitations from previous research have been addressed in the present study, it is not without fault. The current study suffers from a relatively small sample size, improving on this should be of high priority for later studies examining the predictive capacity of motivational language on therapy outcome. We also limited our outcome measure to a singular variable – the primary outcome

variable from the Nordahl et al. (2018) study. Future studies can benefit from including more than just the PSWQ data when assessing treatment outcome.

This study is the first to examine the use of the MISC in MCT for GAD; studies with larger sample sizes should look to include a MCT condition to further examine the utility of the MISC in the context of MCT. In addition to the sample size, the current study utilized inexperienced coders who underwent substantially less training than the coders in the studies of Lombardi et al. (2014) and Poulin et al. (2018). This was partially the result of a limited time frame for the study, and partially due to a lack of access to experienced MISC coders. Following this, there were no statistical tests of inter-rater reliability, something future studies should aim to include. Coders were kept blind to treatment condition and outcome, despite this, which treatment condition the patients were in was made clear in the videos, and both coders were familiar with the results of the Nordahl et al. (2018) study. This meant that coders knew that the patients receiving MCT benefitted more from therapy than the patients receiving CBT, which could have led to a bias in the coding, with patients undergoing MCT receiving more favorable codes.

Some patients lacked worry scores at post-treatment (6%) and 2-year follow-up (6%); imputation using last observation carried forward was therefore used to include as many patients as possible. Additionally, videos were missing for some patients, which led to differences in which session was coded. These sessions differed slightly in their content, and our solution to include the next or previous session in lieu of session 1 and 4 could therefore have skewed our results somewhat. We erred on the side of inclusion rather than exclusion in order to maintain an adequate sample, but urge future researchers to keep recording availability and coding material as uniform as possible.

Implications

In terms of clinical implications, these findings indicate that there exists significant value in monitoring patient motivation through observation. This study in particular highlights the importance of attending to changes in patient speech, and suggests that certain types of change talk are of particular importance. Although not as frequent as other types of speech, utterances opposing change are especially valuable indicators of motivation for the therapist, and should be addressed if they do not decrease in frequency during the first therapy sessions. Furthermore, therapists

should be on the lookout for patients willing to commit to behavioral changes already during the first session, as well as monitor whether patients have begun to take steps in the direction of change by session 4.

The effect of motivational statements on outcome implies that learning to identify these moments in therapy may be critical, so that markers of negative therapeutic processes can be addressed as they occur, not allowing them to halt the therapy over the course of weeks. Learning what to look out for can provide opportunities for therapists to enhance treatment outcome, and these findings encourage research identifying the optimal ways for therapists to respond to these markers. There are some differences between patient speech in CBT and patient speech in MCT, but this is only during session 1 and its implications are unclear. There is growing support and interest for the use of the MISC outside the context of addiction and MI, where patient counter change talk in particular continues to emerge as a valuable aspect of motivation which therapists should pay attention to when assessing and adapting the therapy. Additionally, there exists valuable information in the type of motivational language used by the patient, with certain types of speech being powerful predictors of therapy outcome.

Conclusion

This is the first study to employ the MISC on a study comparing MCT with CBT for GAD. Early in-session language in favor of change is a significant measure of patient motivation, which in turn predicts outcome. Language arguing against change can inform therapists about expected outcome when monitored over the course of therapy, and motivational language early in therapy can predict worry scores at 2-year follow-up. The applied treatment manual for MCT is more effective at stimulating patient participation and verbosity during session 1 than the CBT manual used in the current study. This in turn provides the therapist with more opportunities to gain insight into the patients' motivation, with subsequent benefit in optimizing the remaining sessions and maximizing worry reduction. To this end, therapists should look to encourage verbal commitments to change already during session 1, as well as look for signs that the patient has begun taking steps in the direction of change by session 4.

References

Aharonovich, E., Amrhein, P. C., Bisaga, A., Nunes, E. V. & Hasin, D. (2008). Cognition, Commitment Language, and Behavioral Change Among Cocaine Dependent Patients. *Psychology of Addictive Behaviors, 22(4),* 557-562. https://doi.org/10.1037/a0012971

American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.) text revision. Arlington, VA: American Psychiatric Press.

Amrhein, P. C., Miller, W. R., Yahne, C. E., Palmer, M. & Fulcher, L. (2003). Client commitment language during motivational interviewing predicts drug use outcomes. *Journal of Consulting and Clinical Psychology, 71*(5), 862-878. https://doi.org/10.1037/0022.006X.71.5.862

Antony, M. M., Ledley, D. R. & Heimberg, R. G. (Eds.). (2005). *Improving outcomes and preventing relapse in cognitive-behavioral therapy.* New York, NY: Guildford Press.

Arkowitz, H., Westra, H. A., Miller, W. R. & Rollnick, S. (Eds.). (2008.) *Motivational interviewing in the treatment of psychological problems.* New York, NY: Guildford Press.

Borkovec, T. D. & Costello, E. (1993). Efficacy of applied relaxation and cognitive-behavioral therapy in the treatment of generalized anxiety disorder. *Journal of consulting and clinical psychology, 61*(4), 611-619. https://doi.org/10.1037/0022-006X.61.4.611

Bowerman, B. L. & O'Connel, R. T. (1990). *Linear Statistical Models: An Applied Approach* (Second Edition). Belmont, California: Duxbury Press.

Brown, T. A., Antony, M. M. & Barlow, D. H. (1992). Psychometric properties of the Penn State Worry Questionnaire in a clinical anxiety disorders sample. *Behavior research and therapy, 30*(1), 33-37. https://doi.org/10.1016/0005-7967(92)90093-v

Button, M. (2013). Using in-session change talk and counter-change talk to predict engagement in cognitive-behavioral therapy (Unpublished manuscript). Department of Psychology, York University, Toronto, ON.

Cuijpers, P., Sijbrandij, M., Koole, S., Huibers, M., Berking, M. & Andersson, G. (2014). Psychological treatment of generalized anxiety disorder. *Clinical psychology review, 34*(2), 130-140. https://doi.org/10.1016/j.cpr.2014.01.002

Di Nardo, P. A., Brown, T. A. & Barlow, D.H. (1994). *Anxiety Disorder Interview Schedule for DSM-IV: Lifetime version (ADIS-IV-L).* Oxford University Press.

Dozois, D. J., Westra, H. A., Collins, K. A., Fung, T. S. & Garry, J. K. (2004). Stages of change in anxiety: psychometric properties of the University of Rhode Island Change Assessment (URICA) scale. *Behavior research and therapy, 42*(6)*, 711-729.

First, M. B., Gibbon, M., Spitzer, R. L., Williams, J. B. & Benjamin, L. (1997). Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II). American Psychiatric Association, 1997.

Gaume, J., Gmel, G. & Daeppen, J. B. (2008). Brief alcohol interventions: Do counsellors' and patients' communication characteristics predict change? *Alcohol and Alcoholism, 43*(1)*, 62-69. https://doi.org/10.1016/S0005-7967(03)00193-1

Glynn, L. H. & Moyers, T. B. (2009). Manual for the motivational interviewing skill code (MISC), Version 1.1: Addendum to MISC 1.0. Retrieved from http://casaa.unm.edu/download/MISC_1.1_Manual.pdf

Hanrahan, F., Field, A. P., Jones, F. W. & Davey, G. C. (2013). A meta-analysis of cognitive therapy for worry in generalized anxiety disorder. *Clinical psychology review, 33*(1), 120-132. https://doi.org/10.1016/j.cpr.2012.10.008

Houck, J. M., Moyers, T. B., Miller, W. R., Glynn, L. H. & Hallgren, K. A. (2011). Elicit Coding Manual: Motivational Interviewing Skill Code (MISC) 2.5. Albuquerque, NM: Center on Alcoholism, Substance Abuse, and Addictions, The University of New Mexico. Retrieved from https://casaa.unm.edu/download/misc25.pdf

Hunot, V., Churchill, R., de Lima, S. & Teixeira, V. (2007). Psychological therapies for generalized anxiety disorder. *The Cochrane database of systematic reviews.* https://doi.org/10.1002/14651858.CD001848.pub4

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R. & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of general psychiatry, 62*(6), 593-602. https://doi.org/10.1001/archpsyc.62.6.593

Kessler, R. C., Gruber, M., Hettema, J. M., Hwang, I., Sampson, N. & Yonkers, K. A. (2008). Comorbid Major Depression and Generalized Anxiety Disorders in the National Comorbidity Survey follow-up. *Psychological Medicine, 38*(3), 365-374. https://doi.org/10.1017/S0033291707002012

Lombardi, D. R., Button, M. L. & Westra, H. A. (2014). Measuring motivation: Change talk and counter-change talk in cognitive behavioral therapy for generalized anxiety. *Cognitive Behavior Therapy, 43*(1)*,* 12-21. https://doi.org/10.1080/1650673.2013.846400

Lord, S. P., Dogan Can, M. S., Yi, M., Marin, R., Dunn, C. W., Imel, Z. E., Georgiou, P., Narayanan, S., Steyvers, M. & Atkins, D. C. (2015). Advancing methods for reliably assessing motivational interviewing fidelity using the Motivational Interviewing Skills Code. *Journal of Substance Abuse Treatment, 0,* 50-57. https://doi.org/10.1016/j.jsat.2014.08.005

McConnaughy, E. A., Prochaska, J. O. & Velicer, W. F. (1983). Stages of change in psychotherapy: Measurement and sample profiles. *Psychotherapy: Theory, Research & Practice, 20*(3), 368-375. https://doi.org/10.1037/h0090189

Menard, S. (1995). *Applied Logistic Regression Analysis: Sage University Series on Quantitative Applications in the Social Sciences.* Thousand Oaks, California: Sage.

Miller, W. R. (1983). Motivational Interviewing with Problem Drinkers. *Behavioral and Cognitive Psychotherapy, 11*(2), 147-172. https://doi.org/10.1017/S0141347300006583

Miller, W. R. & Johnson, W. R. (2008). A natural language screening measure for motivation to change. *Addictive behaviors, 33*(9), 1177-1182. https://doi.org/10.1016/j.addbeh.2008.04.018

Miller, W. R. & Rollnick, S. (1991). *Motivational Interviewing: Preparing people to change addictive behavior.* New York, NY: Guildford Press.

Miller, W. R. & Rollnick, S. (2002). *Motivational interviewing; Preparing people for change* (2nd ed.) New York, NY: Guildford Press.

Moyers, T. B., Martin, T., Christopher, P. J., Houck, J. M., Tonigan, J. S. & Amrhein, P. C. (2007). Client language as a mediator of motivational interviewing efficacy: Where is the evidence? *Alcoholism: Clinical and Experimental Research, 31*(S3), 40-47. https://doi.org/10.1111/j.1530-0277.2007.00492.x

Moyers, T. B., Martin, T., Houck, J. M., Christopher, P. J. & Tonigan, J. S. (2009). From in-session behaviors to drinking outcomes: A causal chain for motivational interviewing. *Journal of Consulting and Clinical Psychology, 77*(6)*,* 1113-1124. https://doi.org/10.1037/a0017189

Mussell, M. P., Mitchell, J. E., Crosby, R. D., Fulkerson, J. A., Hoberman, H. M. & Romano, J. L. (2000). Commitment to Treatment Goals in Prediction of Group Cognitive-Behavioral Therapy Treatment Outcome for Women with Bulimia Nervosa. *Journal of Consulting and Clinical Psychology, 68*(3), 432-437. https://doi.org/10.1037/0022-006X.68.3.432

National Institute for Health and Care Excellence. (2011). *Generalized anxiety disorder and panic disorder in adults: management.* (Clinical guideline CG113). Retrieved from https://www.nice.org.uk/guidance/cg113/chapter/1-Guidance#principles-of-care-for-people-with-generalised-anxiety-disorder-gad

Nordahl, H. M., Borkovec, T. D., Hagen, R., Kennair, L. E. O., Hjemdal, O., Solem, S., Hansen, B., Haseth, S. & Wells, A. (2018). Metacognitive therapy vs. cognitive-behavioral therapy in adults with generalized anxiety disorder. *BJPsych Open, 4*(5), 393-400. https://doi.org/10.1192.bjo.2018.54

Normann, N. & Morina, N. (2018). The Efficacy of Metacognitive Therapy: A Systematic Review and Meta-Analysis. *Frontiers in Psychology, 9*: 2211. https://doi.org/10.3389/fpsy.g.2018.02211

Poulin, L. E., Button, M. L., Westra, H. A., Constantino, M. J. & Antony, M. M. (2018). The predictive capacity of self-reported motivation vs. Early observed motivational language in cognitive behavioural therapy for generalized anxiety disorder. *Cognitive Behaviour Therapy, 48*(5), 369-384. https://doi.org/10.1080/16506073.2018.1517390

Prochaska, J. O. & DiClemente, C. C. (1982). Transtheoretical therapy: Toward a more integrative model of change. *Psychotherapy: Theory, Research & Practice, 19*(3), 276-288. https://doi.org/10.1037/h0088437

Putnam, D. E., Finney, J. W., Barkley, P. L. & Bonner, M. J. (1994). Enhancing commitment improves adherence to a medical regimen. *Journal of consulting and clinical psychology, 62*(1)*,* 191-194. https://doi.org/10.1037//0022-006x.62.1.191

Sijercic, I., Button, M. L., Westra, H. A. & Hara, K. M. (2016). The interpersonal context of client motivational language in cognitive behavioral therapy. *Psychotherapy, 53*(1)*,* 13-21. https://doi.org/10.1037/pst0000017

Solem, S., Husby, Å. S., Håland, A. T., Launes, G., Hansen, B., Vogel, P. A. & Hagen, R. (2016). The University of Rhode Island Change Assessment as Predictor of Treatment Outcome and Dropout in Outpatients with Obsessive-Compulsive Disorder Treated with Exposure and Response Prevention. *Psychotherapy and Psychosomatics, 85*(2)*,* 119-120. https://doi.org/10.1159/000441361

Vader, A. M., Walters, S. T., Prabhu, G. C., Houck, J. M. & Field, C. A. (2010). The language of motivational interviewing and feedback: Counselor language, client language, and client drinking outcomes. *Psychology of Addictive Behaviors, 24*(2)*,* 190-197. https://doi.org/10.1037/a0018749

Vogel, P. A., Hansen, B., Stiles, T. C. & Götestam, K. G. (2006). Treatment motivation, treatment expectancy, and helping alliance as predictors of outcome in cognitive behavioral treatment of OCD. *Journal of Behavior Therapy and Experimental Psychiatry, 37*(3)*,* 247-255. https://doi.org/10.1016/j.jbtep.2005.12.001

Wells, A. (2009). *Metacognitive Therapy for Anxiety and Depression.* Guildford press.

Westra, H. A., Arkowitz, H. & Dozois, D. J. A. (2009). Adding a motivational interviewing pretreatment to cognitive behavioral therapy for generalized anxiety disorder: A preliminary randomized controlled trial. *Journal of Anxiety Disorders, 23*(8)*,* 1106-1117. https://doi.org/10.1016/j.janxdis.2009.07.014

Wittchen, H. U. & Jacobi, F. (2005). Size and burden of mental disorders in Europe – a critical review and appraisal of 27 studies. *European neuropsychopharmacology: the journal of the European College of Neuropsychopharmacology, 15*(4), 357-376. https://doi.org/10.1016/j.euroneuro.2005.04.012

Wittchen, H. U. (2002). Generalized anxiety disorder: prevalence, burden, and cost to society. *Depression and anxiety, 16*(4)*,* 162-171. https://doi.org/10.1002/da.10065

Wittchen, H. U., Zhao, S., Kessler, R. C. & Eaton, W. W. (1994). DSM-III-R generalized anxiety disorder in the National Comorbidity Survey. *Archives of*

general psychiatry, 51(5), 355-364.

https://doi.org/10.1001/archpsyc.1994.03950050015002