



Change talk and sustain talk in treatment of generalized anxiety disorder: A secondary analysis of cognitive behavioral therapy and metacognitive therapy in adult outpatients

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ABSTRACT

Background and objectives: Measures of patient motivation have proven elusive, showing inconsistent results in relation to psychotherapy outcome. How patients talk about change is an alternative measure of motivation, with potential value in predicting treatment outcome. This study had two aims: (1) to examine if change talk and sustain talk (including its subcategories) predicted reduction in worry levels at post-treatment and 2-year follow-up, and (2) if there were differences between the cognitive behavioral therapy (CBT) and metacognitive therapy (MCT) conditions with respect to change talk.

Methods: This study investigated 24 patients receiving CBT and 27 patients receiving MCT for generalized anxiety disorder (GAD), and coded patients' utterances in sessions 1 and 4.

Results: Change talk was significantly associated with lower worry levels at post-treatment and 2-year follow-up, beyond initial worry severity and treatment condition. Change talk in session 4, and reduction in sustain talk from session 1 to 4, was positively associated with improvement, whilst sustain talk in session 4 showed a negative relationship. More specifically, commitment statements in session 1 and expressing signs of taking steps at session 4 were associated with reduction in worry levels. Moreover, patients in the MCT condition argued more both for and against change during session 1, but not session 4.

Limitations: The sample size was relatively small.

Conclusions: These results indicate that change talk sustain talk could be important in the treatment of GAD.

1. Introduction

Cognitive behavioral therapy (CBT) is the most empirically supported psychotherapeutic treatment for generalized anxiety disorder (GAD; Cuijpers et al., 2014). 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 72–80 percent (Normann & Morina, 2018). A recent study comparing the effectiveness of CBT with MCT for adults with GAD demonstrated significantly greater recovery rates in MCT, and this result was maintained at 2-year follow-up (Nordahl et al., 2018). Overall 65 percent of the patients receiving MCT recovered, compared with 38 percent from the CBT group.

MCT addresses an important facet of GAD, that although patients see worry as a problem, they also hold positive beliefs about worry, which

cause ambivalence towards change (e.g., attempting to reduce worry). It has been hypothesized that if ambivalence is not addressed in therapy, the patient will show low motivation for change (Westra, Arkowitz, & Dozois, 2009). Miller and Rollnick (1991) defined motivation as “the probability that a person will enter into, continue, and adhere to a specific change strategy” (p. 19). Hence, strong motivation does not lead directly to symptom improvement. However, it should be associated with engagement in treatment, thus increasing likelihood of recovery.

Self-report questionnaires used to assess treatment motivation have been unsuccessful in predicting treatment response in psychotherapy (e.g. Solem et al., 2016; Vogel, Hansen, Stiles, & Götestam, 2006). Additionally, self-report measures have an inherent vulnerability in the form of social desirability bias and ceiling effects (Miller & Johnson, 2008). A viable alternative for measuring motivation in a more accurate and complex way could be by identifying in-session indicators of patient

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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). MI is an approach designed to increase intrinsic motivation and decrease ambivalence about change (Miller, 1983; Miller & Rollnick, 2002). According to the trans-theoretical 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. Patient commitment language could play a central role in the psychotherapy process and thus warrants specific addressing (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003).

Motivational Interviewing Skills Code (MISC) is a coding system designed to capture elements of theoretical interest in the practice of MI. MISC includes detailed categories of Change talk (CT) and Sustain Talk (ST), those categories being *Reason, Ability, Commitment, Desire, Need, Taking Steps* and *Other*. Three studies have examined the role of change talk and sustain talk as predictors of post-treatment worry in a population of patients with GAD receiving CBT (Goodwin, Constantino, Westra, Button, & Antony, 2019; Lombardi, Button, & Westra, 2014; Poulin, Button, Westra, Constantino, & Antony, 2019). 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). Coders used the MISC version 1.1 (Glynn & Moyers, 2009) 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 ST compared to the patients who did respond to treatment, with a between group effect size of $d = 0.96$ (Lombardi et al., 2014).

The second study examined the predictive capacity of self-reported motivation vs. observed motivational language in CBT for GAD. Poulin et al. (2019) 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, 2009) was used to quantify patient motivational statements during the first session. Correlations among the observed language measures showed that CT was positively correlated with one type of ST – ambivalence (ST-A). Poulin et al. (2019) distinguished between two types of ST: Ambivalence and Resistance (ST-R). Both ST-A and ST-R had a significant medium correlation with higher post-treatment worry, including at 1-year follow-up.

Poulin et al. (2019) found that neither pre-treatment worry scores, nor the self-report measures of motivation had a significant effect on post-treatment worry. When CT, ST-A and ST-R were added to the model, both subtypes of ST were found to have a significant effect on worry, whereas CT did not. Furthermore, all observed measures of motivation had a significant effect on worry scores at 1-year follow-up, whereas the self-report measures did not. This treatment trial was also analyzed by Goodwin et al., 2019. They found that CBT patients with higher CT had lower worry and a faster rate of worry reduction, but this effect was not present among patients receiving MI-CBT. These findings dovetail related studies showing that CT is a more unreliable predictor of outcome than ST in the domain of addiction related disorders (Magill et al., 2018).

The current study expands the literature on the MISC as it incorporates data from Session 1 as well as Session 4 of therapy. Previous studies have only coded the first session. This gives the opportunity of investigating changes in observed motivational language from the beginning of therapy to later in the treatment. Doing so 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, Moyers, Miller, Glynn, & Hallgren, 2011) that includes detailed coding of both CT and ST, we can test whether specific categories of CT and ST (e.g., commitment and taking steps) are more important for outcome. Previous studies have not investigated these categories although Poulin et al. (2019) tested two types of ST. Furthermore, no research to date has explored the predictive capacity of observed motivational language in metacognitive therapy for GAD. Our main hypothesis, based on research reviewed above, was that observed patient motivational language would be associated with treatment outcome. More specifically, we hypothesized that more change talk could be associated with better outcomes, while more sustain talk should be related to worse outcomes (both for Session 1 and 4). We also expected that high CT/low ST ratio, and increase in CT and reduction in ST would be associated with improvement.

We also investigated the predictive value of specific change talk categories as well as changes in change talk and sustain talk. However, this research aim was exploratory, as no previous research existed on this topic. Furthermore, given that MCT focuses on both positive and negative metacognitions and consequently on the ambivalence of the patient in terms of their worry, we expected patients receiving MCT to have a higher number of utterances arguing for and against change. On this basis, our second hypothesis was that observed motivational language would be different across the two treatment conditions.

2. Method

2.1. 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 because video recordings were missing for nine patients. A total of 43 Session 1 recordings were coded and 49 from Session 4. There were 41 patients that had both sessions coded. Therefore, total N for the analyses including change in CT and ST scores was 41. All participants were required to give written consent to enter the study, be aged 18 years or older, and have a diagnosis of GAD. 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 characteristics 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.

Table 1
Sample demographic and descriptive characteristics.

Measure	Total ($N = 51$)	M (SD)		p
		CBT ($n = 24$)	MCT ($n = 27$)	
Age	37.43 (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 (%)			
Female sex	39 (76)	17 (71)	22 (81)	.37
Social status				.04*
Single	5 (10)	2 (8)	3 (11)	
Partner	38 (74)	15 (63)	23 (85)	
Unreported	8 (16)	7 (29)	1 (4)	

* $p < .05$.

Only the social status of the participants (more unreported cases in the CBT condition) was significantly different between the two treatment conditions. Fourteen patients had GAD as their only diagnosis. The number of diagnoses ranged from one (GAD only) to five. All comorbid disorders were from the F30 or F40 chapter of the ICD-10, except for two patients that had eating disorders, and three patients with avoidant personality disorders. The most common comorbidity was major depressive disorder ($n = 21$), social phobia ($n = 15$), and panic disorder ($n = 10$).

2.2. Treatments and therapists

Patients in both conditions received a maximum of 12 weekly sessions, lasting 60 min each. All patients were offered 12 sessions, however some could finish earlier if they were remitted. There were no dropouts in the study. Published treatment manuals of CBT (Borkovec & Costello, 1993) and MCT (Wells, 2009) were used. Session 1 of the CBT condition aimed 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 was a focus on rapport building during the session and various instruments and handouts were distributed throughout. In contrast, Session 1 of the MCT condition included 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 included verbally reviewing the past week and homework, before moving onto cognitive therapy and practicing and discussing the different types of relaxation and desensitisation. The fourth session of MCT also included reviewing the past week. The therapist and patient then moved on to discussing homework, before challenging negative metacognitions both verbally and with an in-session experiment.

As can be gathered from the content of Sessions 1 and 4, some elements were exclusive to their condition. For example, in the CBT condition, there was no focus on meta-worries and positive or negative meta-beliefs should not be addressed. The uncontrollability of worry was also not in focus, as it was in the MCT condition. The MCT condition however, lacked some elements inherent to CBT. There was 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 addressed the motivation of the patient. However, it can be argued that the MCT condition came 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? By using Socratic questioning conflicting thoughts were elicited and could give the therapist some insight into which stage of change the patient is in, and how motivated they were.

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).

2.3. Measures

2.3.1. Penn State Worry Questionnaire (PSWQ)

The PSWQ (Meyer, Miller, Metzger, & Borkovec, 1990) 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).

2.3.2. 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. Therapist and global ratings were not included in the present study. 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 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, 2009) is focused only on patient motivational language. Patient motivational language consists of statements in favor of changing (change talk; CT) or sustaining a problem behavior (sustain talk; ST), traditionally addictive behaviors like alcohol and substance abuse (Miller & Rollnick, 1991, 2002). In version 2.5 (Houck et al., 2011), 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 towards change (+) or away from change (-). 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, ST and F/N/A.

The MISC has been found to possess good reliability and predictive validity in the substance abuse domain (Moyers, Martin, Houck, Christopher, & Tonigan, 2009; Vader, Walters, Prabhu, Houck, & Field, 2010). The MISC has only recently been applied to the field of GAD, nevertheless studies (e.g. Lombardi et al., 2014; Sijercic, Button, Westra, & Hara, 2016) have demonstrated both reliability and predictive validity for the MISC in this area of study.

2.4. 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](https://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 ST. In the few cases where these video recordings were unavailable, recordings of Session 2, 3 or 5 were used instead. If these too were unavailable, only one session was coded for that patient. Three CBT Session 2 videos were coded as Session 1. For Session 4, five MCT videos were from Session 5. Six CBT videos were from Session 5 and three from Session 3.

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 on their fourth and fifth year of the clinical psychology program. The students coded videos together, then they coded the same tapes independently to ensure inter-rater agreement, and finally they coded the remaining video recordings independent of each other. 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 patients'

treatment outcomes.

2.5. Analyses

The CT and ST scores included in the analyses were frequency counts. Change scores for CT and ST were calculated by subtracting Session 1 scores from Session 4 scores. Correlations between measures were included to provide a simple overview of the relationship between variables. We used a linear regression in order to isolate and determine the predictive value of patient motivation. PSWQ scores at post-treatment and 2-year follow-up were used as dependent variables. Worry scores at pre-treatment and treatment condition were entered on step 1 and 2. On step 3 CT and ST was entered. We also tested regression models where we replaced CT and ST variables with CT/ST ratio on step 3. Also, a stepwise linear regression was used in order to identify categories of MISC most predictive of worry scores. Only the categories of CT and ST significantly correlated with post-treatment and follow-up worry scores were added to the model.

Videos from nine patients were missing from the sample and 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 using the last observation carried forward technique were used for these patients. The three patients that had missing post-treatment scores were given their pre-treatment scores as post-treatment scores. For patients missing 2-year follow-up scores, we had 1-year follow-up scores available that were carried forward.

3. 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 on change talk and sustain talk, with the MCT group having a higher number of utterances. No such differences were present at Session 4. For descriptive statistics and examples of MISC category statements, see Supplemental Table 1. The results showed that positive reasons and negative

ability statements were most frequent in Session 1. For Session 4, positive commitments and positive taking steps statements were most frequent.

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. Sustain talk in Session 4 was positively correlated with worry severity at post-treatment and follow-up. Table 3 also shows the correlation between each category of patient motivational language and worry scores. From Session 1, negative *ability*-, positive *commitment*-, and positive *desire*-utterances were negatively correlated with worry scores at post-treatment. Additionally, positive utterances of *ability*-, positive *taking steps*-utterances at Session 4, and changes in ST were correlated negatively with post-treatment worry. Positive *taking steps* at Sessions 1 and 4, along with changes in ST were the only MISC categories correlated (negatively) with worry scores at follow-up.

Four linear regression models (Table 4) were used to predict worry scores at post-treatment and 2-year follow-up using change talk and sustain talk. Collinearity statistics indicated that multicollinearity was not found, with no VIF exceeding 2, or tolerance level falling short of 0.5. 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. Higher pre-treatment worry scores were associated with higher worry scores at post-treatment and follow-up. Furthermore, patients in the MCT condition reported less worry after treatment than patients in the CBT condition.

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. Higher change talk scores were associated with lower worry scores after treatment. CT and ST 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. Change talk was associated with lower worry and sustain talk with higher worry scores at follow-up. We also explored the CT/ST ratio from Session 4 as a predictor. The CT/ST ratio was a significant predictor of both post-treatment and 2-year follow-up and added 8–13% of explained variance.

The change in number of ST 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. We did not find support for CT or ST during Session 1 predicting worry severity at post-treatment. We also explored possible interaction effects between treatment condition and motivational language, but found no significant effects.

MISC category variables (frequency scores) significantly correlated with worry scores from Table 3 were added to a stepwise linear regression (Table 5). Early *commitments* to change and changes in ST were especially important for immediate therapy outcome, explaining 24% further variance in worry scores beyond pre-treatment worry and treatment condition (model 3). At 2-year follow-up, the number of positive *taking steps*-utterances from Session 4 emerged as the best factor (model 4). Positive *taking steps* at Session 4 explained an additional 10% variance in worry scores at follow-up.

4. Discussion

This study found that change talk at Session 4 was associated with lower worry scores at post-treatment, and at 2-year follow-up. Also, sustain talk at Session 4 was a significant predictor of higher worry scores at follow-up. However, change talk and sustain talk at Session 1 were not significant predictors of treatment outcome. Furthermore, reduction in sustain talk from the beginning of therapy to Session 4 was indicative of lower worry levels 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

Table 2
Worry Scores, Change Talk, and Sustain Talk in CBT and MCT conditions.

	Total (N = 51)	CBT (n = 24) n (%)	MCT (n = 27)	T	p
MISC codes					
Session 1	43 (84.3)	20 (83.3)	23 (85.2)		
Session 4	49 (96.1)	23 (95.8)	26 (96.3)		
Both sessions	41 (80.4)	19 (79.2)	22 (81.5)		
	M (SD)				
PSWQ					
Baseline	66.29 (7.26)	67.29 (6.12)	65.41 (8.16)	0.94	.353
Post-treatment	48.84 (14.89)	54.96 (12.54)	43.41 (14.90)	2.98	.005
Two-year f-u	49.10 (15.32)	54.21 (13.63)	44.56 (15.53)	2.35	.023
MISC Session 1					
CT	12.81 (8.38)	9.80 (6.63)	15.43 (8.98)	2.31	.026
ST	5.28 (3.68)	3.00 (2.99)	7.26 (3.05)	4.61	<.001
CT/ST ratio	2.98 (2.29)	3.86 (2.82)	2.21 (1.33)	2.40	.024
MISC Session 4					
CT	13.06 (9.08)	11.22 (6.57)	14.69 (10.70)	1.35	.184
ST	4.63 (3.73)	4.00 (3.62)	5.19 (3.81)	1.12	.268
CT/ST ratio	4.08 (4.23)	4.38 (4.38)	3.81 (4.17)	0.47	.641
MISC Session 1–4 changes					
CT Cha	-0.59 (7.68)	-1.42 (6.42)	0.14 (8.71)	0.64	.524
ST Cha	0.24 (4.04)	-1.21 (3.01)	1.50 (4.44)	2.25	.030

Note. PSWQ: Penn State Worry Questionnaire; CT/ST Cha: Changes in number of change talk/sustain talk utterances from Session 1 to 4.

Table 3

Correlations Between Measures across Both Treatment Conditions, and Correlations between MISC categories of CT/ST and PSWQ measures.

Measure	2	3	4	5	6	7	8	9
1. PSWQ pre	.49***	.47***	-.25	.17	-.32*	.15	.26	-.14
2. PSWQ post	–	.65***	-.27	-.25	.07	-.27	.30*	-.30*
3. PSWQ 2-year f-u	–	–	-.19	-.12	.05	-.22	.30*	-.40*
4. CT Session 1	–	–	–	.43**	.22	.63***	.27	.10
5. ST Session 1	–	–	–	–	-.59**	.37*	.42**	-.22
6. CT/ST ratio Session 1	–	–	–	–	–	.01	-.28	.27
7. CT Session 4	–	–	–	–	–	–	.08	.39**
8. ST Session 4	–	–	–	–	–	–	–	-.58**
9. CT/ST ratio Session 4	–	–	–	–	–	–	–	–

MISC categories	MISC Session 1, + (-)		MISC Session 4 + (-)	
	PSWQ-post	PSWQ 2-year	PSWQ-post	PSWQ 2-year
Reason	-.15 (-.23)	-.10 (.01)	-.12 (.04)	-.21 (.25)
Ability	-.11 (-.31*)	-.05 (-.21)	-.33* (.33*)	-.21 (.27)
Commitment	-.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
ST cha			-.49**	-.35*

Note. Correlations presented in parentheses represent sustain talk. Significant correlations between change talk and treatment outcome presented with bold font. PSWQ: Penn State Worry Questionnaire; CT: Change talk; ST: Sustain talk.

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

Table 4

Predicting worry scores using change talk and sustain talk.

Model 1 (n = 49)	Post-treatment				2-year follow-up			
	Adj. R ²	R ² Cha	F Cha	p	Adj. R ²	R ² Cha	F cha	P
1. PSWQ pre	.24	.25	15.84	<.001	.21	.22	13.38	.001
2. Condition	.37	.14	10.72	.002	.27	.08	4.91	.032
3. CT & ST Session 4	.48	.13	6.06	.005	.36	.12	4.31	.020

Final step	B	t	p	β	T	p
PSWQ pre	.45	4.93	.001	.40	3.24	.002
Condition	-.35	-3.17	.003	-.28	-2.25	.030
CT Session 4	-.32	-3.00	.004	-.25	-2.06	.046
ST Session 4	.19	1.76	.085	.26	2.10	.042

Model 2 (n = 41)	Adj. R ²	R ² Cha	F cha	p	Adj. R ²	R ² Cha	F cha	p
1. PSWQ pre	.23	.24	12.59	.001	.19	.21	10.26	.003
2. Condition	.35	.14	8.47	.006	.23	.06	3.30	.077
3. CT & ST change	.48	.15	5.71	.007	.32	.12	3.45	.043

Final step	B	t	p	B	T	p
PSWQ pre	.51	4.10	<.001	.52	3.67	.001
Condition	-.29	-2.32	.026	-.22	-1.57	.125
CT change	.20	1.56	.128	.29	1.94	.061
ST change	-.30	-2.33	.025	-.16	-1.05	.299

Note. Significant relationships between change talk and treatment outcome are indicated with bold font. PSWQ: Penn State Worry Questionnaire; CT: Change talk; ST: Sustain talk; Treatment: Treatment condition; CT/ST Cha: Changes in CT/ST from Session 1 to 4.

variation in worry scores at follow-up. 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 ST during Session 1. We found a medium correlation, as did Lombardi et al. (2014) and Poulin et al. (2019), indicating a complex relationship between the two. The positive nature of the correlation between CT and ST has been posited (Moyers et al., 2007) to indicate that they are separate constructs rather than endpoints on the same continuum, and we would also argue this. Some patients are more inclined to talk about change as a whole. 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-ST correlation at Session 4 was not significant. By Session 4 some of this ambivalence is likely resolved and thus the correlation between the two constructs could diminish, as some patients are moving into the *preparation* or *action* stage of Prochaska and DiClemente's (1982) model. Patients will express less sustain talk utterances as the ambivalence resolves. This could explain why changes in sustain talk from Session 1 to 4 predicted post-treatment outcome. With patients occupying different stages of change we could also expect more variation in utterances, which could differentiate patients able to benefit from

Table 5
Categories of CT and ST as predictors of worry scores at post and follow-up.

Model 3 (n = 41)	Post-treatment			
	Adj R ²	R ² Cha	F cha	P
1. PSWQ pre	.23	.24	12.59	.001
2. Condition	.35	.14	8.47	.006
3. Pos commitment ses. 1	.50	.16	12.85	.001
4. ST Cha	.59	.09	8.66	.006
Final Step	β	T	P	
PSWQ pre	.49	4.73	<.001	
Condition	-.28	-2.56	.015	
Pos commitment ses. 1	-.37	-3.57	.001	
ST Cha	-.32	-2.94	.006	
Model 4 (n = 49)	2-year follow-up			
	Adj R ²	R ² Cha	F cha	P
1. PSWQ pre	.21	.22	13.38	.001
2. Condition	.27	.08	4.91	.032
3. Pos taking steps ses. 4	.36	.10	7.55	.009
Final Step	β	T	p	
PSWQ pre	.43	3.67	.001	
Condition	-.24	-2.00	.051	
Pos taking steps ses. 4	-.32	-2.75	.009	

Note. Significant relationships between change talk and treatment outcome are presented with bold font. PSWQ: Penn State Worry Questionnaire; ST Cha: Change in number of sustain talk utterances from Session 1 to 4.

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 did not match those of Lombardi et al. (2014) and Poulin et al. (2019), who both found support for ST 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.

However, we found that *commitments* during Session 1 emerged as an important factor for post-treatment outcome, beyond pre-treatment worry scores and treatment condition. Patient commitment has 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. Verbal patient commitments have an empirical connection with subsequent behavior (e.g., Mussell et al., 2000; Putnam, Finney, Barkley, & Bonner, 1994) 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 study also found differences in change talk between conditions as the CBT condition had fewer CT and ST than the MCT condition, however only in Session 1. This finding is likely due to the focus on positive and negative metacognitions in the MCT condition, as therapist address how patients can perceive worry as both harmful and helpful. Patients receiving MCT were more vocal than the CBT group in all aspects of speech during Session 1. The CBT condition used the Borkovec and Costello (1993) manual, which included practicing diaphragmatic breathing - a nonverbal task during Session 1. Session 4 on the other hand is more free 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.

In terms of clinical implications, the findings of this study suggest that therapists should monitor motivation as decreasing sustain talk in the early phase of therapy may be predictive of treatment outcome. These findings also suggest, that patients may recover despite having sustain talk in Session 1. However, therapists should look for positive

commitments in Session 1 and indications of patients taking steps by Session 4. Therapists might need to address therapy progress and tailor treatment for patients presenting with sustain talk and few indications of positive taking steps by Session 4. On the other hand, highly motivated patients may benefit more from proceeding with the action-oriented therapies such as those included in this trial.

The study has different limitations to consider. The relatively small sample size was an issue. The sample size was also too small to do multilevel modelling to account for therapist effects, however, a one-way ANOVA found no significant difference between therapists on PSWQ or MISC scores. Future studies can also benefit from including more than just the PSWQ when assessing treatment outcome, and test inter-rater reliability. It should also be noted that previous studies (Lombardi et al., 2014; Poulin et al., 2019) have divided CT and ST by the total number of utterances in the session to account for differences in patient verbosity. This was not included in the current study as we would argue 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. Furthermore, the findings regarding the MISC categories should be interpreted with caution as we used a stepwise regression which has different drawbacks (e.g., Harrell, 2001). Such regression models may fit the data well in-sample, but do poorly out-of-sample. Replication studies are therefore needed. The non-significant Session 1 findings should also be interpreted with caution, as session 1 was less free in structure than Session 4, which could relate to its predictive capacity. It is also a limitation that a few of the videos were not from Session 1 or 4 (but Session 2 or 5) as some recordings were missing.

This study highlights the importance of patients' motivational utterances, and suggests that certain types of change talk are of particular importance. Although not as frequent as other types of speech, utterances opposing change were associated with less improvement. Patients willing to commit to behavioral changes already during the first session and taking steps in order to change behavior in Session 4 was associated with significant improvement.

CRediT authorship contribution statement

Isak Joramo: Conceptualization, Methodology, Coding, Writing – original draft, Formal analysis. **Stian Solem:** Conceptualization, Methodology, Writing – review & editing, Reviewing and Editing, Formal analysis, Project administration, Supervision. **Bendik Romundstad:** Coding, Writing – review & editing, Reviewing and Editing. **Hans M. Nordahl:** PI of the RCT, Writing – review & editing, Reviewing and Editing.

Declaration of competing interest

All authors declare no competing interests. The study was conducted without external funding.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jbtep.2021.101650>.

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>
- 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>
- 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>
- 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](https://doi.org/10.1016/0005-7967(92)90093-v)
- 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.
- First, M. B., Gibbon, M., Spitzer, R. L., Williams, J. B., & Benjamin, L. (1997). *Structured clinical interview for DSM-IV Axis I personality disorders (SCID-II)*. American Psychiatric Association.
- 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.
- Goodwin, B. J., Constantino, M. J., Westra, H. A., Button, M. L., & Antony, M. M. (2019). Patient motivational language in the prediction of symptom change, clinically significant response, and time to response in psychotherapy for generalized anxiety disorder. *Psychotherapy*, 56(4), 537–548. <https://doi.org/10.1037/pst0000269>
- Harrell, F. E. (2001). *Regression modeling strategies*. Springer.
- 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>.
- 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 Behaviour 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., et al. (2015). Advancing methods for reliably assessing motivational interviewing fidelity using the Motivational Interviewing Skills Code. *Journal of Substance Abuse Treatment*, 50–57. <https://doi.org/10.1016/j.jsat.2014.08.005>
- Magill, M., Apodaca, T. R., Borsari, B., Gaume, J., Hoadley, A., Gordon, R. E., et al. (2018). A meta-analysis of motivational interviewing process: Technical, relational, and conditional process models of change. *Journal of Consulting and Clinical Psychology*, 86(2), 140–157. <https://doi.org/10.1037/ccp0000250>
- Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn state worry questionnaire. *Behavior research and therapy*, 28, 487–489. [https://doi.org/10.1016/0005-7967\(90\)90135-6](https://doi.org/10.1016/0005-7967(90)90135-6)
- Miller, W. R. (1983). Motivational interviewing with problem drinkers. *Behavioural 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: Guilford Press.
- Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change* (2nd ed.). Guilford 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>
- Nordahl, H. M., Borkovec, T. D., Hagen, R., Kennair, L. E. O., Hjemdal, O., Solem, S., et al. (2018). Metacognitive therapy vs. cognitive-behavioral therapy in adults with generalized anxiety disorder. *BJPsych Open*, 4(5), 393–400.
- 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/fpsyg.2018.02211>
- Poulin, L. E., Button, M. L., Westra, H. A., Constantino, M. J., & Antony, M. M. (2019). 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 and 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., et al. (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>