



Acceptance and Cognitive Reappraisal as Regulation Strategies for Symptom Annoyance in Individuals with Medically Unexplained Physical Symptoms

Maria Kleinstäuber^{1,2,4} · Japhia-Marie Gottschalk¹ · Judith Ruckmann¹ · Thomas Probst³ · Winfried Rief¹

Published online: 15 October 2018

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Abstract

Emotion processing has been demonstrated to have a strong impact on somatic symptom perception. In the current quasi-experimental trial associations between the application of emotion regulation strategies and symptom-related outcomes were examined in subjects with medically unexplained physical symptoms (MUS; $n = 48$) and in mentally healthy individuals ($n = 48$). Somatic symptoms were repeatedly induced four times in both samples. After each symptom induction, participants were instructed to apply another of four emotion regulation strategies. Symptom-related outcomes were rated before and after a strategy was applied. Hierarchical linear models showed that in the MUS group cognitive reappraisal was significantly and acceptance was marginally associated with lower symptom annoyance scores compared with compassionate self-support. In healthy subjects distraction was associated with better mood scores compared with compassionate self-support. Future research should examine the effects of acceptance and cognitive reappraisal strategies applied by MUS subjects over a longer period of time.

Keywords Medically unexplained symptoms · Emotion regulation · Acceptance · Cognitive reappraisal · Self-compassion · Quasi-experiment

Medically unexplained symptoms (MUS) are defined as somatic symptoms that cannot be or have not been sufficiently explained by somatic causes after a thorough physical examination (Sharpe et al. 1995). In contrast to mild bodily misperceptions, which are a common phenomenon (Hiller et al. 2006), clinically relevant MUS are associated with high rates of comorbid mental disorders (de Waal et al. 2004; van Eck van der Sluijs et al. 2015), and especially with mood and anxiety disorders. Consequently, negative

emotions are assumed to play an important role as maintaining factors of MUS.

This assumption is validated by empirical findings demonstrating that negative emotions are risk factors for developing habitual somatic symptom reporting (Bogaerts et al. 2010, 2015) or have modifying effects on the threshold of somatic perception and on symptom reporting in healthy individuals (Bogaerts et al. 2005) as well as in patients suffering from chronic somatic symptoms (Arnold et al. 2008). The relationship between chronic somatic symptoms and negative emotions can be assumed to be bidirectional—i.e., persistent, distressing, and disabling manifestations of somatic symptoms can cause negative emotions and, in turn, negative emotions have amplifying effects on symptom perceptions. Thus, research about how individuals suffering from MUS process and regulate negative emotions is of high relevance (Koechlin et al. 2018).

One of the concepts in the early research on emotion processing and regulation in the context of MUS was *alexithymia*. Alexithymia is defined as “difficulty in identifying and describing feelings” and “difficulty in distinguishing between feelings and the bodily sensations of emotional

✉ Maria Kleinstäuber
maria.kleinstaeuber@staff.uni-marburg.de

¹ Division of Clinical Psychology and Psychotherapy, Philipps-Universität Marburg, Marburg, Germany

² Department of Psychological Medicine, Faculty of Medical and Health Sciences, University of Auckland, Auckland, New Zealand

³ Department of Psychotherapy and Biopsychosocial Health, Danube-University Krems, Krems an der Donau, Austria

⁴ Division of Clinical Psychology and Psychotherapy, Department of Psychology, Philipps-Universität Marburg, Gutenbergstraße 18, 35032 Marburg, Germany

arousal” (Deary et al. 1997, p. 552). Whereas meta-analytic results demonstrated a significant positive relationship between somatic symptom reporting and alexithymia (De Gucht and Heiser 2003), single studies demonstrated that the association between somatic symptom reporting and alexithymia are more complex than expected (Rief et al. 1996a). In a psychosomatic outpatient sample the association between alexithymia and somatic symptom reporting disappeared as soon as the sample was controlled for depression (Rief et al. 1996a).

Emotion regulation is defined as “processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions” (Gross 1998, p. 275). Observational studies have demonstrated dysfunctional ways of dealing with negative emotions across patients with different kinds of syndromes of unexplained symptoms. For example, individuals diagnosed with chronic fatigue syndrome (CFS) were demonstrated to report higher levels of emotion suppression compared with healthy controls. At the same time, they reported more distress and autonomic arousal than healthy subjects (Brooks et al. 2017). Emotion suppression seems to be associated with unhelpful beliefs about negative emotions in CFS patients (Rimes et al. 2016). Similar findings have been confirmed for patients with fibromyalgia (FMS) (Bowers et al. 2017) and patients with irritable bowel syndrome (IBS; Bowers and Wroe 2016). In IBS patients, the relationship between dysfunctional beliefs about negative emotions and somatic symptom severity and disability turned out to be bidirectional and mediated by negative emotions (Sibelli et al. 2018).

Studies which have applied experimental designs in order to compare acute effects of different brief emotion regulation interventions mainly concentrate on outcomes such as pain tolerance and intensity after pain induction. Such studies were conducted in healthy subjects (Branstetter-Rost et al. 2009; Jackson et al. 2012; Kohl et al. 2013; Masedo and Esteve 2007) or in patients with chronic pain, such as chronic low back pain (Vowles et al. 2007) or fibromyalgia (Kohl et al. 2014). Studies of healthy samples demonstrated that acceptance-based strategies increased pain tolerance more strongly compared with distraction (Jackson et al. 2012), cognitive reappraisal (Kohl et al. 2013), suppression and spontaneous coping (Masedo and Esteve 2007), or control of pain-related thoughts (Gutierrez et al. 2004; Hayes et al. 1999; Roche et al. 2007). Similar findings were revealed for pain intensity (Kohl et al. 2013; Masedo and Esteve 2007) and pain distress (Masedo and Esteve 2007). In chronic low back pain patients, Vowles et al. (2007) showed that an acceptance-based strategy was significantly more helpful to increase overall functioning than continued practice or pain-control strategies. In a study by Kohl et al. (2014), FMS patients were randomly assigned to listen to

one of three instructions (acceptance, cognitive restructuring, or a neutral audiobook) after pain induction. The study’s results demonstrated that acceptance-based strategies and cognitive reappraisal increased tolerance of induced heat pain compared with the control instruction. In another study focusing on arousal-related symptoms in IBS, Constantinou et al. (2015) induced symptoms with negative pictures. In the context of a repeated measure design participants were instructed to either merely view the pictures, to emotionally label them, or to focus just on the content of the pictures. In contrast with other strategies, the emotion labeling strategy showed a marginally significant trend toward reducing reports of arousal-related symptoms in the IBS group.

Although these studies examined emotion regulation strategies on symptoms of specific functional somatic syndromes, experimental studies comparing acute effects of different kinds of emotion regulation strategies in patients with multiple and persistent medically unexplained physical symptoms are rare. In the cited studies, cognitive reappraisal, acceptance, and distraction were the emotion regulation strategies which were most frequently examined. According to Gross (1998), reappraisal is a strategy of cognitive change which “involves cognitively transforming the situation so as to alter its emotional impact” (p. 284). Acceptance is defined by Fletcher and Hayes (2005) as “a moment by moment process of actively embracing the private events evoked in the moment without unnecessary attempts to change their frequency or form” (p. 319). Distraction or attentional shifting means focusing “attention on nonemotional aspects of the situation” (Nix et al. 1995) or it can also involve turning attention away from the self and reducing self-focus (Nix et al. 1995). Persistent unexplained symptoms are associated with dysfunctional thoughts (Rief et al. 1998), dysfunctional coping behaviors (Weiss et al. 2016), and focusing attention on one’s own body (Köteles and Witthöft 2017). Studying the effects of acceptance, reappraisal, and distraction strategies in the context of unexplained symptoms appears to be plausible. Self-compassion is another emotion regulation strategy which was demonstrated to be associated with psychological well-being (Neff et al. 2007), but has not yet been studied in the context of MUS. According to Neff (2003), self-compassion means that individuals encounter themselves with warmth and non-judgmental understanding when they are exposed to negative experiences. Neff (2003) assumes that self-compassion enables an individual to approach their own feelings with a sufficient distance and mindful objectivity. In patients with chronic medical conditions, but also in healthy individuals, a self-sacrificing, defensive, and self-criticizing personality style is associated with somatic symptom severity (Hyphantis et al. 2013). In a study about a mindfulness-based cognitive therapy for patients with MUS, the process of change was explored using qualitative patient interviews (van Ravesteijn et al.

2014). One important finding was that patients started recognizing and changing their unhelpful behavioral patterns and that self-compassion seemed to be a positive consequence as well as a facilitating factor for this change. Therefore, self-compassion could be another emotion regulation strategy which is worthy of examination in the context of MUS.

Studying the effects of helpful emotion regulation strategies is highly relevant because it could help to streamline psychological interventions for MUS patients. A meta-analysis has shown that the effects of psychological interventions are rather low to moderate (Van Dessel et al. 2014). Although several therapeutic strategies—especially in cognitive behavior therapy (CBT)—foster changes which indirectly enable patients to improve their emotion regulation, emotion processing and regulation is a topic which has been rarely explicitly targeted in therapeutic approaches for MUS. There is only one randomized controlled trial of a CBT for MUS patients which includes a module on emotion processing (Allen et al. 2006). Interestingly, this study has shown better results compared with other studies on interventions for MUS patients. A recently published study (Thakur et al. 2017) showed that emotional awareness and expression training (EAET) in patients with IBS reduced symptom severity more strongly than a relaxation training. In an FMS sample, EAET was as effective as conventional CBT for most outcomes; however, it was more beneficial in reducing the number of somatic symptoms and widespread pain (Lumley et al. 2017).

The purpose of the current quasi-experimental study is to compare short-term effects of four emotion regulation strategies (acceptance, cognitive reappraisal, distraction, and compassionate self-support) on symptom-related outcomes in a group of subjects with MUS and in mentally healthy subjects. Contrary to most of the previous studies—which used physical stimulations to induce symptoms, such as the cold pressor task or a thermode to induce pain—the current trial applied a cognitive strategy to induce a physical symptom which was indicated by the participant to be most distressing (Schwarz et al. 2016). It is important to compare the effects of different emotion regulation strategies with each other because previous research has demonstrated differential effects of specific emotion regulation strategies, depending on the sample and outcome. For example, highly depressed patients seem to benefit from self-compassion strategies (Diedrich et al. 2014). Patients with chronic pain seem to benefit somewhat from acceptance and reappraisal strategies, as mentioned above. We assumed that in our sample of individuals with persistent MUS, acceptance and reappraisal strategies would have the biggest effect across different outcomes. Healthy individuals seem to benefit most from acceptance strategies after experimentally induced pain, as mentioned above. Therefore, we hypothesized that acceptance strategies are most helpful for the healthy sample.

Finally, we exploratively examined how feasible participants experience applying specific emotion regulation strategies.

Methods

Participants

Our study included a group of subjects with MUS and a group of mentally healthy individuals. The participants for both samples were recruited through announcements at pharmacies, grocery stores, the university's psychotherapy outpatient clinic and other departments, and via the Internet. Inclusion criteria for the MUS group were a minimum of three physical complaints that were unexplained or insufficiently explained by medical causes and lasting at least 6 months (Rief et al. 1996b). Mentally healthy participants were matched by age and sex, and had to be free of a history of or a current neurological disease, or mental disorder. Exclusion criteria for both groups were former or current neurological diseases, a history of or current drug abuse, or psychosis.

Study Procedure

Participants were initially screened via phone. During a first face-to-face appointment, informed consent was obtained, a diagnostic interview [clinical group: Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I); First et al. 1996; mentally healthy group: Mini-Diagnostic Interview for Mental Disorders Mini-DIPS; Margraf 1994] was conducted, and eligibility criteria were checked. After this first appointment, eligible participants completed questionnaires on the computer in order to assess the following demographic and clinical characteristics in both samples at baseline: physical symptom report over the past 4 weeks [Patient Health Questionnaire-15 (PHQ-15); Kroenke et al. 2002], disability caused by physical symptoms [Pain Disability Index (PDI) modified for MUS; Mewes et al. 2009], general psychopathology [Global Severity Index (GSI) of the Brief Symptom Inventory (BSI); Derogatis 1992]; and depressive symptoms [Beck Depression Inventory-II (BDI-II); Beck et al. 1996]. 1 week later, participants were invited to the quasi-experimental session. All subjects were compensated €30 for participation after they had accomplished all parts of the study. The study was approved by the Ethics Committee of the Department of Psychology, Philipps-Universität Marburg, Germany.

Quasi-experiment and Materials

Stimuli for the Induction of the Most Personally Distressing Somatic Symptom

At the beginning of the quasi-experimental session, a semi-structured interview was conducted in order to assess each

participant's most distressing somatic symptom (for more detailed information about the symptom induction, see Schwarz et al. 2016). We assessed participants' most disabling symptom in the MUS group or a recent severe medical condition in the healthy subject group, and participants' symptom- or illness-related thoughts and sensations. During the interview, the experimenter registered participants' replies. Participants were recorded when they read their replies aloud. The recording was later used as a stimulus for the symptom induction procedure.

Structure of the Quasi-experiment

The quasi-experiment comprised four trials (see Fig. 1). Each single trial started with the symptom induction procedure. Participants were asked to listen to their personal symptom report record. After the symptom induction, participants rated different symptom-related and affective variables on seven computerized visual analogue scales (VASs; post-induction assessment = pre-strategy assessment). Afterwards, participants were instructed how to apply one of four different emotion regulation tasks (acceptance, cognitive reappraisal, compassionate self-support, distraction), which should help them cope with the induced somatic symptom, symptom-related sensations, thoughts, and emotions. The instruction took approximately 5 min. The symptom induction procedure was repeated and participants were instructed to practice the recently explained emotion regulation strategy for 2 min on their own. Participants were again asked to complete the VASs (post-strategy assessment = pre-induction assessment) and three follow-up questions. A 15-s break followed before the next trial started. The order of the four

emotion regulation tasks in the four trials was permuted and participants were randomly assigned to one of each permuted order. After the fourth and final trial, participants were asked which emotion regulation strategy they preferred most. All stimuli were presented using Presentation®, Neurobehavioral Systems software.

Instruction for Each Emotion Regulation Task

Instructions for the emotion regulation tasks were taken from the affect regulation training by Berking and Whitley (2014). These were adapted for the purposes of the current quasi-experiment and approved by several experts on the treatment of MUS, mindfulness-based treatments, and CBT. They have already been used in several previous studies (Kohl et al. 2013; Paez-Blarrina et al. 2008; Vowles et al. 2007).

For the acceptance instruction, we explained to participants the concept of mindfulness and that nonjudgmental awareness and acceptance can help to distance oneself from emotions, symptoms, and thoughts, and can help one refocus on personal goals. During the cognitive reappraisal instruction, we emphasized that it can be helpful to replace dysfunctional with functional thoughts and to reappraise somatic symptoms. Participants were asked to write down their less helpful thoughts about their somatic symptoms. Then, they were told to find alternative and helpful cognitions. The compassionate self-support instruction explained that being self-compassionate helps to provide support and comfort in a difficult situation. Participants were told to imagine how they would receive a gesture of compassion from themselves. For the distraction instruction, we explained that focusing attention on distressing events can

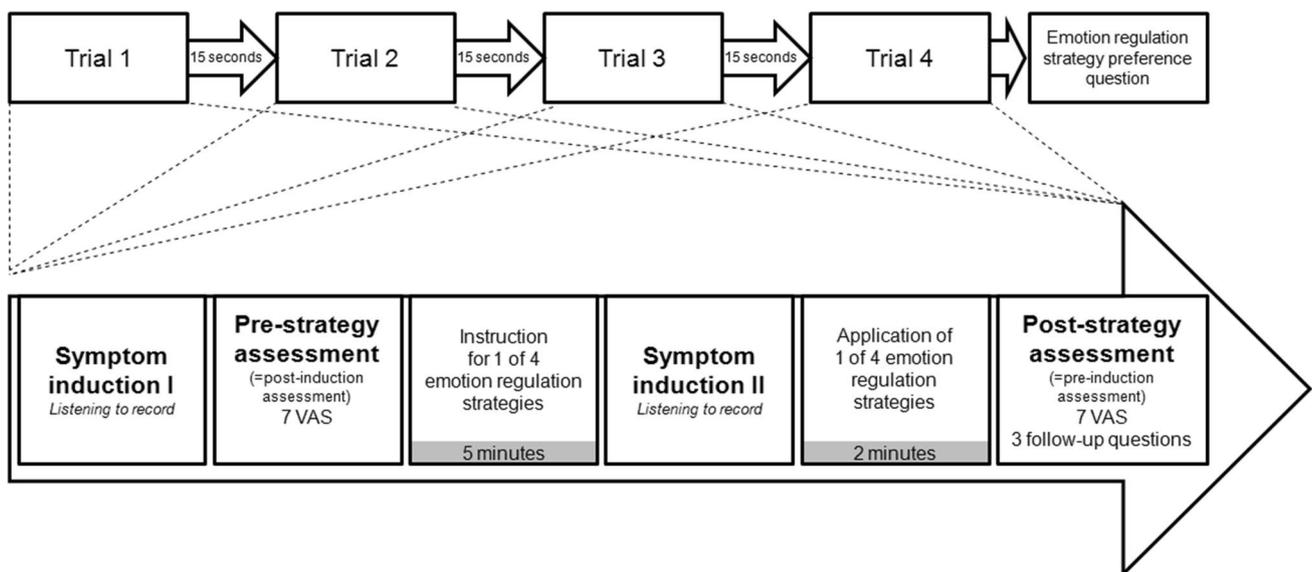


Fig. 1 Flow-chart of the study procedure (VAS visual analogue scale)

result in biased thinking, feelings, and can amplify sensations of somatic symptoms. Participants listened to a story about a famous botanic garden and its gardener as a distracting stimulus. The instructions are provided in their entirety in the Appendix.

Questionnaires: Visual Analogue Scales (VAS) in the Quasi-experiment

For the pre- and post-assessment in the quasi-experiment, participants were asked to rate symptom intensity (“How intense are your somatic symptoms right now?”), symptom annoyance (“How much do you feel annoyed by your somatic symptoms right now?”), symptom tolerance (“Do you feel able to tolerate your symptoms right now?”), physical strength (“How is your physical strength right now?”), mood (“How is your mood right now?”), symptom worry (“Are you worried about having a serious illness right now?”), and symptom control beliefs (“Do you think you can control your somatic symptoms right now?”) on a computerized VAS. These VASs are based on psychological features which were examined in a study by Rief et al. (2010) in order to classify patients with somatic symptoms. After each trial, participants were asked to rate the three follow-up questions which assessed participants’ level of distress (0 = not at all distressing, 100 = very distressing), their compliance with the instruction (0 = not at all compliant, 100 = very compliant), and their focus on the symptoms (0 = not at all, 10 = very much) when they applied the instructed emotion regulation strategy. The three follow-up questions were also assessed using computerized VASs. They were selected under consideration of a previous study’s follow-up questions about how well participants comprehended the emotion regulation strategy instructions in a sample of FMS patients (Vowles et al. 2007) and questions used to assess the feasibility of psychological interventions (Bowen et al. 2009). At the end of the quasi-experiment, participants were asked to rank the emotion regulation strategies in an order, according to their preference.

Statistical Analyses

According to the results of a power analysis, a minimum of 46 participants was required in order to achieve a small effect of $f = 0.20$ with 90% power and a .05 significance level. The expected small effect in our power calculation was based on findings of previous studies (Kohl et al. 2014; Vowles et al. 2007) of participants with chronic pain which found mainly small effect sizes when comparing similar emotion regulation strategies. All statistical analyses were conducted using SPSS (Windows Version 25). A probability value of 5% ($p = .05$) was used as the limit for Type I error. All seven VASs were coded such that high

VAS scores indicated a negative outcome (e.g., 0 indicates highest physical strength and 100 indicates lowest physical strength). In addition, t -tests for independent samples and Fisher’s exact tests were applied in order to check between-group differences in demographic and clinical variables at baseline.

In a preliminary analysis, we checked the effect of symptom induction and if the four emotion regulation strategies were preceded by inductions of comparable strength. Hierarchical linear modeling (HLM) analyses with three levels were run separately for each study group (MUS group and healthy group) and for each of the seven VASs (symptom intensity, symptom annoyance, symptom tolerance, physical strength, mood, symptom worry, symptom control beliefs). The first level (repeated measures within-subject factor “time of assessment”: pre- vs. post-induction) was nested within the second level (repeated measures within-subject factor “type of emotion regulation strategy”: acceptance, cognitive reappraisal, compassionate self-support, and distraction), which was nested in the third level (participants). Time and type of emotion regulation strategy were treated as fixed effects and participants as random effects within the model. VAS scores were entered as dependent variables. We evaluated the main and interaction effects of time and type of emotion regulation strategy. Pre–post induction change scores across emotion regulation strategies and corresponding effect sizes were estimated and reported as Cohen’s d (Cohen 1992).

In order to evaluate the effect of emotion regulation strategies, we performed separate HLM models with two levels for each study group and each of the seven VASs. The first level (repeated measures within-subject factor “type of emotion regulation strategy”: acceptance, cognitive reappraisal, compassionate self-support, and distraction) was nested in the second level (participants). Type of emotion regulation strategy was treated as fixed effects and participants as a random effect within the models. VAS scores at the post-strategy assessment were entered as dependent variables in these models. Corresponding VAS scores at the pre-strategy assessment were entered as covariates because they varied on level 1 (repeated measures within-subject factor “type of emotion regulation strategy”). This procedure is more appropriate to detect differences in the efficacy between interventions than including the pre- and post-strategy assessments as a time variable (e.g., Van Breukelen 2006). In cases where the main effect for type of emotion regulation strategy reached statistical significance, Bonferroni-corrected post-hoc tests (including the pre-strategy VAS score as covariate) were conducted in order to compare all four emotion regulation strategies against each other. We reported estimates of pre–post strategy change scores and corresponding effect sizes (Cohen’s d) separately for each emotion regulation

strategy, VAS, and study group. We also reported Cohen's *d* for significant differences between emotion regulation strategies in post-strategy scores, corrected for pre-strategy scores.

All mentioned, HLM models were performed with the full maximum likelihood estimation and one random term (random intercept at the participant level). HLM models have several advantages over traditional ANOVAs, because their assumptions are less restrictive, missing data can be managed more flexibly, they allow comparisons on the individual level, and covariates varying with time can be considered (Lininger et al. 2015; Raudenbush and Bryk 2002; Singer and Willett 2003).

Finally, replies to the three follow-up questions after each quasi-experimental trial were compared between both study groups. For this purpose, mixed 4 (emotion regulation strategies) \times 2 (study groups) ANOVAs were conducted for each of the three follow-up VASs. VAS scores were entered as dependent variables, type of emotion regulation strategy as repeated measure factor, and study group as between-subject factor. If necessary, significant main and interaction effects were broken up with Bonferroni-corrected post-hoc cell comparisons.

Results

Characteristics of Participants

Table 1 summarizes the demographic and clinical characteristics of the participants at baseline and test statistics of differences between the MUS and healthy subject group. As expected, the MUS group scored significantly higher in all clinical measures. The study groups did not differ in demographic variables.

Preliminary Analysis: Check of the Effect of Somatic Symptom Induction

HLM models (including three levels: emotion regulation strategy, time of assessment, participants) revealed significant main effects of time for all outcomes (MUS group: $4.11 \leq F \leq 17.78$, $p < .050$; healthy group: $8.08 \leq F \leq 27.98$, $p < .010$) but neither showed significant main effects of type of emotion regulation strategy (MUS group: $0.15 \leq F \leq 1.85$, $.138 \leq p \leq .927$; healthy group: $0.17 \leq F \leq 1.41$, $.915 \leq p \leq .240$), nor were there significant strategy \times time interaction effects in either group

Table 1 Participant characteristics and differences between the MUS and mentally healthy group in demographic and clinical variables

	MUS group (<i>n</i> = 48) <i>n</i> (%)	Healthy subjects (<i>n</i> = 48) <i>n</i> (%)	Test statistics
Sex (female)	34 (70.8)	24 (50.0)	Exact Fisher's test: $p = .060$
Diagnosis (DSM-IV code)			
Somatization disorder (300.81)	14 (29.2)		
Undifferentiated somatoform disorder (300.82)	19 (39.6)		
Pain disorder (307.80/.89)	12 (25.0)		
Somatoform disorder not otherwise specified (300.82)	3 (6.3)		
Comorbid mental disorders			
Major depression	8 (16.7)		
Anxiety disorder	8 (16.7)		
Major depression and anxiety disorder	3 (6.3)		
Other comorbid mental disorder	5 (10.4)		
No comorbid mental disorder	24 (50.0)		
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
Duration of MUS (in years)	5.74 (5.86)		
Age (in years)	40.92 (14.72)	37.63 (15.34)	$t(94) = 1.07$, $p = .286$
Somatic symptom severity (PHQ-15)	11.15 (5.67)	2.11 (2.41)	$t(94) = 10.17$, $p < .001$
Somatic symptom disability (PDI)	29.77 (13.67)	3.17 (7.55)	$t(94) = 11.80$, $p < .001$
General psychopathology (BSI-GSI)	1.81 (0.62)	1.15 (0.16)	$t(94) = 7.18$, $p < .001$
Depressive mood (BDI-II)	18.29 (12.63)	3.75 (4.49)	$t(94) = 7.52$, $p < .001$

PHQ-15 Patient Health Questionnaire-15, *PDI* Pain Disability Index, *BDI-II* Beck Depression Inventory-II, *BSI-GSI* Global Severity Index of the Brief Symptom Inventory

(MUS group: $0.20 \leq F \leq 2.28$, $.079 \leq p \leq .897$; healthy group: $0.20 \leq F \leq 1.18$, $.317 \leq p \leq .896$). All estimates of change scores between pre- and post-induction had a positive sign (MUS group: $2.34 \leq M_{\Delta\text{pre-post induction}} \leq 5.62$, $1.16 \leq SE_{\Delta\text{pre-post induction}} \leq 1.52$, $0.09 \leq d \leq 0.29$; healthy group: $5.09 \leq M_{\Delta\text{pre-post induction}} \leq 9.12$, $1.24 \leq SE_{\Delta\text{pre-post induction}} \leq 2.08$, $0.18 \leq d \leq 0.32$). All in all, these results indicate that symptom inductions show the expected effect on all outcomes and a comparable size of effect in each emotion regulation trial.

Effects of Emotion Regulation Strategies in the MUS Group

All estimates of the change between pre- and post-strategy assessment had a negative sign ($-9.22 \leq M_{\Delta\text{pre-post strategy}} \leq -0.45$, $1.30 \leq SE_{\Delta\text{pre-post strategy}} \leq 2.99$). This indicated that, for each emotion regulation strategy, VAS values were lower or outcomes were more positive after emotion regulation strategies had been applied compared with the pre-strategy assessment. Zero effects were identified for compassionate self-support (Cohen's d : 0.02–0.07) and mainly small effect sizes (Cohen's d : 0.08–0.38) for the remaining emotion regulation strategies.

After controlling for the pre-strategy VAS scores, the HLM models (including two levels: type of emotion regulation strategy, participants) resulted in a significant main effect of the emotion regulation strategy on post-strategy scores of the VAS symptom annoyance (see estimates and test statistics in Table 2; Fig. 2). Bonferroni-corrected post-hoc comparisons showed that compassionate self-support was associated with a significantly higher symptom annoyance at the post-strategy assessment in contrast to cognitive reappraisal ($M_{\text{diff}} = 7.51$, $SE = 2.57$, $p = .025$, $d = 0.33$), after controlling for the pre-strategy VAS score. Compared with acceptance, the compassionate self-support strategy showed marginally higher symptom annoyance scores ($M_{\text{diff}} = 6.88$, $SE = 2.57$, $p = .052$, $d = 0.23$) at the post-strategy assessment after controlling for the pre-strategy VAS. The remaining post-hoc comparisons did not reveal any further significant differences between the effects of emotion regulation strategies on symptom annoyance ($.309 \leq p \leq 1.000$).

Effects of Emotion Regulation Strategies in Mentally Healthy Subjects

All estimates of the change between pre- and post-strategy assessment revealed a negative sign ($-12.82 \leq M_{\Delta\text{pre-post strategy}} \leq -0.61$, $1.52 \leq SE_{\Delta\text{pre-post strategy}} \leq 4.16$). This result indicated that, for each emotion regulation strategy, VAS values were lower or outcomes were more positive after the emotion regulation

strategy had been applied compared with the pre-strategy assessment (Fig. 3). Zero to very small effects were identified for compassionate self-support (Cohen's d : 0.02–0.19) and mainly small effect sizes (Cohen's d : 0.13–0.40) for the remaining emotion regulation strategies.

The HLM models including baseline VAS scores as covariates resulted in a significant main effect of the type of emotion regulation strategy on mood at the post-strategy assessment. Bonferroni-corrected post-hoc comparisons demonstrated that distraction was associated with significantly better mood scores than compassionate self-support at the post-strategy assessment ($M_{\text{diff}} = 8.26$, $SE = 2.93$, $p = .033$, $d = 0.37$), after controlling for the pre-strategy VAS. The remaining post-hoc comparisons did not reveal any further significant differences between the effects of emotion regulation strategies on mood ($.456 \leq p \leq 1.000$).

Follow-Up Questions at the End of the Quasi-experimental Trials

A mixed 4×2 ANOVA revealed a significant effect of the study group, $F(1, 94) = 21.66$, $p < .001$, $\eta^2 = .19$, but neither a main effect of emotion regulation strategy, $F(1, 94) = 2.51$, $p = .059$, $\eta^2 = .03$, nor a group \times strategy interaction effect, $F(1, 94) = 0.29$, $p = .883$, $\eta^2 = .002$, on the perceived distress during the emotion regulation task. The significant main effect of the study group indicated that participants with MUS experienced significantly higher levels of distress during the emotion regulation tasks.

A mixed 4×2 ANOVA showed a significant main effect of study group, $F(1, 94) = 6.66$, $p < .05$, $\eta^2 = .07$, and emotion regulation strategy, $F(1, 94) = 7.40$, $p < .001$, $\eta^2 = .07$, but no strategy \times group interaction effect, $F(1, 94) = 0.65$, $p = .583$, $\eta^2 = .01$, on the compliance to the emotion regulation instructions. Bonferroni-corrected post-hoc cell comparisons showed that participants were significantly more compliant with cognitive reappraisal instructions in contrast with the instructions for all of the other three strategies (acceptance: $M_{\text{diff}} = -7.66$, $SE = 1.86$, $p < .001$, $d = 0.34$; compassionate self-support: $M_{\text{diff}} = -8.27$, $SE = 2.33$, $p = .004$, $d = 0.36$; distraction: $M_{\text{diff}} = -10.79$, $SE = 2.58$, $p < .001$, $d = 0.73$). The group effect indicated that healthy subjects reported complying with the instructions to a significantly greater extent than did MUS participants.

Finally, a mixed 4×2 ANOVA revealed for the dependent variable symptom focus during emotion regulation tasks a significant difference between the emotion regulation strategies, $F(1, 94) = 15.00$, $p < .001$, $\eta^2 = .14$, but neither a main effect of the study group, $F(1, 94) = 1.41$, $p = .238$, $\eta^2 = .02$, nor a significant strategy \times group interaction effect, $F(1, 94) = 1.95$, $p = .123$, $\eta^2 = .02$. Bonferroni-corrected post-hoc cell comparisons demonstrated that the level of concentrating on symptoms was lowest during the distraction

Table 2 The effect of each emotion regulation strategy after controlling for the VAS pre-strategy score

Outcome	AC				DI				CS				CR				CS				DI				Strategy				Pre-strategy VAS score			
	AC	CR	CS	DI	AC	CR	CS	DI	AC	CR	CS	DI	AC	CR	CS	DI	AC	CR	CS	DI	AC	CR	CS	DI	df _n	df _d	F	df _n	df _d	F		
Group: MUS patients (n = 48)																																
Symptom intensity	0.23	0.24	0.07	0.14	36.42 (2.15)	36.80 (2.15)	40.92 (2.15)	40.03 (2.15)	3	67.65	1.36	1	34.14	210.44***																		
Symptom annoyance	0.27	0.38	0.02	0.23	33.81 (2.27)	33.18 (2.26)	40.69 (2.26)	38.25 (2.27)	3	110.59	3.92*	1	100.43	109.78***																		
Symptom tolerance ^a	0.21	0.08	0.02	0.28	32.88 (2.32)	35.79 (2.33)	38.13 (2.32)	33.43 (2.33)	3	101.08	1.42	1	74.83	93.33***																		
Physical strength ^a	0.28	0.29	0.03	0.35	33.54 (2.14)	33.40 (2.14)	38.60 (2.14)	32.18 (2.14)	3	118.32	2.30	1	75.03	115.80***																		
Mood ^a	0.21	0.21	0.02	0.10	36.08 (1.78)	36.06 (1.78)	39.79 (1.78)	38.58 (1.78)	3	124.19	1.37	1	77.05	216.43***																		
Symptom worry	0.14	0.17	0.07	0.11	31.20 (1.50)	30.47 (1.50)	33.21 (1.50)	32.04 (1.50)	3	130.10	0.66	1	52.50	851.61***																		
Symptom control beliefs ^a	0.28	0.20	0.20	0.12	45.52 (2.01)	47.90 (2.01)	47.98 (2.01)	49.69 (2.01)	3	135.63	0.73	1	69.87	444.53***																		
Group: mentally healthy subjects (n = 48)																																
Symptom intensity	0.13	0.27	0.17	0.23	32.94 (2.66)	30.47 (2.66)	31.71 (2.66)	30.92 (2.66)	3	117.91	0.23	1	92.84	128.10***																		
Symptom annoyance	0.39	0.22	0.11	0.20	26.23 (2.77)	31.86 (2.77)	33.55 (2.77)	29.65 (2.77)	3	139.04	1.58	1	90.27	176.23***																		
Symptom tolerance ^a	0.29	0.40	0.17	0.22	25.15 (2.23)	24.28 (2.34)	28.61 (2.23)	26.72 (2.23)	3	110.63	0.99	1	75.83	156.84***																		
Physical strength ^a	0.27	0.29	0.06	0.18	22.32 (2.17)	21.82 (2.17)	27.11 (2.17)	23.90 (2.17)	3	109.45	2.02	1	57.31	165.86***																		
Mood ^a	0.20	0.18	0.02	0.40	28.06 (2.31)	28.54 (2.31)	31.32 (2.31)	23.32 (2.31)	3	137.71	2.73*	1	81.77	174.05***																		
Symptom worry	0.25	0.32	0.15	0.30	16.31 (1.58)	14.51 (1.58)	18.83 (1.58)	15.09 (1.58)	3	140.54	1.78	1	66.10	442.69***																		
Symptom control beliefs ^a	0.31	0.30	0.19	0.29	40.27 (3.57)	40.28 (3.57)	43.10 (3.57)	40.12 (3.57)	3	108.23	0.46	1	172.88	15.61***																		

VAS visual analogue scale, AC acceptance strategy, CR cognitive reappraisal, CS compassionate self-support, DI distraction

*** $p < .001$, * $p < .05$

^aThe VAS was recoded in order to have high VAS indicating a negative outcome (e.g., 100 indicates lowest physical strength)

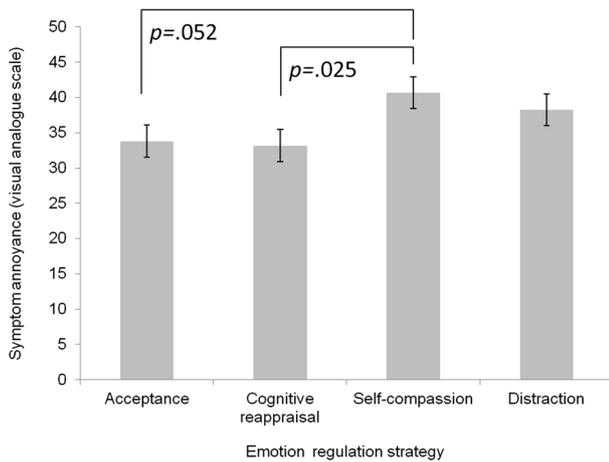


Fig. 2 Differences in estimated mean change scores (before vs. after emotion regulation strategy) of the outcome symptom annoyance and standard errors for each of four emotion regulation strategies in the group of participants with persistent MUS

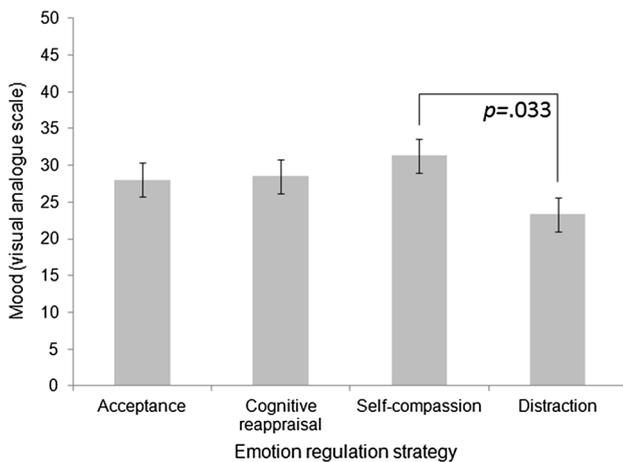


Fig. 3 Differences in estimated mean change scores (before vs. after emotion regulation strategy) of the outcome mood and standard errors for each of four emotion regulation strategies in the group of healthy participants

task in contrast with all other emotion regulation strategies (acceptance: $M_{diff} = -13.95$, $SE = 2.99$, $p < .001$, $d = 0.53$; cognitive reappraisal: $M_{diff} = -11.94$, $SE = 2.84$, $p < .001$, $d = 0.45$; compassionate self-support: $M_{diff} = -14.95$, $SE = 2.96$, $p < .001$, $d = 0.72$). Mean values and SD for all analyses of the follow-up questions and Cohen's d of differences between groups are summarized in Table 3.

At the end of the quasi-experimental trial, 33.3% ($n = 16$) of the MUS participants preferred the acceptance strategy, 22.9% ($n = 11$) cognitive reappraisal, 20.8% ($n = 10$) distraction, and 14.6% ($n = 7$) compassionate self-support (one participant did not answer the question, three participants were unable to indicate a clear preference for one strategy). In the healthy subject group, 31.3% ($n = 15$) preferred the

cognitive reappraisal strategy, 25.0% ($n = 12$) distraction, 18.8% ($n = 9$) acceptance, and 18.8% ($n = 9$) compassionate self-support (three participants were unable to indicate a clear preference for one strategy). Groups did not differ significantly in their preference ratings, Chi square ($N = 89$, $df = 3$) = 3.00, $p = .392$.

Discussion

The central aim of the quasi-experiment was to examine short-term effects of four emotion regulation strategies (acceptance, cognitive reappraisal, distraction, compassionate self-support) on symptom-related outcomes after a somatic symptom induction in a group of people with persistent MUS and in a group of mentally healthy subjects. A preliminary manipulation check showed that the symptom induction procedure was associated with changes of the VAS score in the hypothesized direction for each VAS. The size of these changes in the VAS scores was similar between the four types of emotion regulation strategies.

There are two main findings of this study. The first important finding is that differences in the efficacy of emotion regulation strategies were identified more for cognitive-affective outcomes (in subjects with MUS: annoyance; in healthy group: mood) than symptom intensity or symptom tolerance. Symptom tolerance and intensity are outcomes which were most commonly used in previous studies on effects of emotion regulation strategies on induced somatic perceptions. In healthy subjects (Branstetter-Rost et al. 2009; Gutierrez et al. 2004; Hayes et al. 1999; Jackson et al. 2012; Kohl et al. 2013; Masedo and Esteve 2007; Roche et al. 2007) as well as in chronic pain patients (Kohl et al. 2014), pain tolerance could be consistently significantly increased through acceptance-based strategies compared with different kinds of other emotion or pain-control interventions. We did not find this effect, but substantial methodological differences between the previous and the current study have to be considered. In most of the previous studies, a very specific somatic symptom—pain—was induced with a cold pressor task (e.g., Branstetter-Rost et al. 2009) or a thermode (e.g., Kohl et al. 2013) and pain tolerance was operationalized as how long participants were able to tolerate the physically induced pain stimulus. In our study, somatic symptoms were induced by listening to a personal symptom report and symptom tolerance was measured with a self-report VAS. Moreover, the mentioned studies involved experimental designs with a random assignment of participants to different emotion regulation strategies. Instead, our study applied a repeated-measure, quasi-experimental design. On the one hand, the repeated measure design bears the advantage of reducing error variance (due to missing between-subject variance). On the other hand, it is possible that applying

Table 3 Means and standard deviations for follow-up questions (perceived distress and symptom focus during the emotion regulation task and compliance with the emotion regulation instruction) at post-strategy assessment in the MUS and mentally healthy group and between-group effect sizes

VAS	Strategy	MUS group (<i>n</i> = 48) <i>M</i> (<i>SD</i>)	Healthy subject group (<i>n</i> = 48) <i>M</i> (<i>SD</i>)	Cohen's <i>d</i>
Distress	Acceptance	32.81 (25.52)	16.49 (22.19)	0.68
	Cognitive reappraisal	26.98 (22.19)	12.02 (19.91)	0.71
	Compassionate self-support	33.75 (25.47)	15.02 (21.18)	0.80
	Distraction	28.88 (28.08)	11.42 (17.50)	0.75
Compliance	Acceptance	64.55 (23.73)	74.44 (23.12)	−0.42
	Cognitive reappraisal	70.94 (23.46)	83.36 (16.01)	−0.62
	Compassionate self-support	63.63 (24.66)	74.12 (23.50)	−0.44
	Distraction	63.44 (23.76)	69.29 (27.34)	−0.23
Symptom focus	Acceptance	66.19 (21.76)	73.94 (23.04)	−0.35
	Cognitive reappraisal	64.02 (23.20)	72.09 (24.05)	−0.34
	Compassionate self-support	68.19 (22.58)	73.95 (23.10)	−0.25
	Distraction	57.40 (27.70)	54.84 (31.34)	0.09

Coding of VAS: distress: 0 = not at all distressing, 100 = very distressing; compliance: 0 = not at all compliant, 100 = very compliant; symptom focus: 0 = not at all, 100 = very much

VAS visual analogue scales

different emotion regulation strategies consecutively could result in a smaller effect of each single strategy. Participants probably do not use a single strategy as thoroughly (in a repeated measure design) as they would do if they were to concentrate only on one strategy (in a randomized controlled design). This would also reduce the chance of finding differences between strategies in a repeated measure design. Finally, compared with our study, previously mentioned trials often used control interventions which were expected to have low effects (e.g., symptom suppression, thought control). In contrast, our study design implemented interventions which have already been demonstrated to be substantially effective.

Previous research showed contradictory effects of emotion regulation strategies on pain intensity or severity. In healthy subjects, some studies showed significantly less pain intensity after applying emotion regulation strategies in contrast to control interventions (Kohl et al. 2013; Masedo and Esteve 2007), whereas another study showed even higher pain intensity ratings in the emotion regulation group (Branstetter-Rost et al. 2009) or no between-group differences at all (Gutierrez et al. 2004; Paez-Blarrina et al. 2008). In a chronic pain group, no specific effects of emotion regulation strategies were found on pain intensity (Kohl et al. 2014; Vowles et al. 2007). In the current study, differences between the effects of strategies on symptom intensity could not be identified. Psychological interventions, such as emotion regulation strategies, do not usually primarily target changing the intensity of the somatic symptom; rather they are used to target how individuals deal with their symptoms. Pain intensity or severity as a primary outcome for examining the efficacy of psychological interventions in patients with MUS

is therefore questioned in general (Rief et al. 2017). Another possible explanation for these less clear effects of emotion regulation on symptom intensity could be that this outcome is not sensitive enough for examining the effect of short-term emotion regulation strategies. This might also apply to the variables symptom worry, control beliefs, and physical strength, since emotion regulation strategies did not change these variables in our study. It can be assumed that these three variables are connected to cognitive schemas such as illness or symptom perceptions (Leventhal et al. 2016), and causal symptom attributions or body-image-related cognitive schemas (Klaus et al. 2013). Such cognitive schemas can hardly be modified with brief interventions as those applied in our study. In the current study, emotion regulation strategies differed in their effects on the cognitive-affective variables symptom annoyance (clinical group) and mood (healthy group). There is one study which included symptom distress as an outcome in a healthy sample (Masedo and Esteve 2007) and another study with symptom impairment as a dependent variable in a sample of patients with chronic low back pain (Vowles et al. 2007). Both studies revealed for these outcomes significant differences between emotion regulation strategies.

A second important result of our study is that, according to our hypothesis, in the MUS group, acceptance and cognitive reappraisal strategies were demonstrated to be more effective in reducing symptom annoyance than compassionate self-support. This finding is in correspondence with the preference and compliance rating provided by our participants: A majority of the MUS subjects most preferred the acceptance strategy or the cognitive reappraisal strategy. Cognitive reappraisal was considered to be the

strategy which was easiest to follow and be compliant with in both groups. Previous research has revealed similar findings. Kohl et al. (2014) demonstrated in a sample of FMS patients that acceptance and cognitive reappraisal strategies significantly increased symptom tolerance compared with a control condition. Vowles et al. (2007) showed in a group of patients with chronic low back pain that acceptance significantly increased their overall functioning and significantly decreased their perceived impairment compared with a pain control strategy or continued practice. A similar quasi-experiment implemented in our study has already been conducted in a sample of depressive patients (Diedrich et al. 2014). Interestingly, acceptance, cognitive restructuring, and supportive self-compassion were similarly effective in reducing negative mood. However, supportive self-compassion was more effective than cognitive reappraisal or acceptance, especially in highly depressed individuals. This result gives a hint that specific types of emotion regulation strategies probably work well for specific groups of patients. Whereas supportive self-compassion is maybe more effective in regulating mood in individuals with depression, acceptance and cognitive reappraisal is probably more effective regulating symptom-related emotions in patients with MUS.

In our healthy subject sample, distraction was significantly more effective in improving symptom-related mood than the self-compassion strategy. This result is in accordance with the healthy participants' preferences and symptom focus rating: distraction was one of the most preferred strategies in the healthy subjects and was associated with the lowest symptom focus in both groups. There are two further studies which examined distraction as pain regulation strategy (Jackson et al. 2012; Kohl et al. 2013) in healthy participants. The results are contradictory. In the study by Kohl et al. (2013) distraction did not differ in affecting pain tolerance from cognitive reappraisal or acceptance. However, distraction significantly decreased pain intensity compared with an acceptance-based strategy. In another study (Jackson et al. 2012), the distraction group was less pain tolerant than the acceptance group. Differences between the previous study and our study could be explained by differences in examined outcomes. Probably, distraction works better with regard to symptom-related mood than for other outcomes. Also, differences in how symptoms were induced have to be considered. It is possible that distraction works better when participants concentrate on a somatic symptom perception which they have experienced in the past, but which was not actually induced. In addition, differences in how distraction was instructed should be considered. While in our study and in the study by Kohl et al. (2013) participants had to listen to an audiobook with neutral content, in the study by Jackson et al. (2012) distraction was instructed by focusing attention on personally compelling images, fantasies, and memories.

To our knowledge, this is the first study which examined short-term emotion regulation strategies in patients with chronic MUS; previous studies focused on pain only or specific functional somatic syndromes such as IBS. In contrast to previous research projects, this study included a clinical but also healthy sample. Also, contrary to previous studies, we applied a symptom induction method other than the cold pressor task or thermode.

Notwithstanding these strengths, the current study has some limitations. The main limitation is the quasi-experimental design with repeated-measure assessments. We tried to deal with this limitation of a repeated-measure design by permuting the order in which emotion regulation strategies were introduced and checking statistically that symptom induction effects preceding the application of the emotion regulation strategies were similar between the strategies. Another problem of the quasi-experimental design is that it does not allow a causal interpretation of the data. A third limitation is that the symptom induction task is different from realistic symptoms, both in terms of symptom duration and in terms of the consequences. Although our results indicate significant changes for all outcomes and in each group between pre- and post-induction, the effect sizes are small. Healthy participants in our study may have reflected on instances of acute symptoms, while the MUS group may be more likely to describe chronic, persistent symptoms. This would mean that our MUS group would have to regulate chronic symptoms with greater consequences, whereas our healthy participants would have to regulate acute symptoms. Specifically, the findings in the healthy sample could be limited regarding their external validity. Translating this laboratory-based study into a real-life setting would provide results with higher ecological validity. Researcher-friendly systems which enable such real-life studies have been developed in the last few years (e.g., Schobel et al. 2018; Torous et al. 2016). A fourth limitation is that our study design misses a control intervention with an expected zero or very small effect. We justify this limitation by the fact that we included only emotion regulation strategies which have already been tested in comparison with low impact interventions in previous studies. That emotion regulation strategies differ with regard to the level of individualization can be considered to be a fifth limitation. Whereas the distraction strategy is standardized for all participants, cognitive appraisal refers to participants' individual thoughts. Two final critical issues are that we cannot draw conclusions about long-term effects of the applied emotion regulation strategies and that the sample size is small for the kind of statistical analysis we applied. Our a priori power analysis was based on variance analysis methods. However, we had to include pre-strategy VAS scores as covariates varying with time to our analysis. For this reason, we had to apply HLM methods which actually require higher sample sizes.

Conclusions

In summary, acceptance and cognitive reappraisal strategies seem to be associated with a better short-term regulation of symptom annoyance in individuals with MUS. This result corresponds to findings of previous studies in individuals suffering from chronic pain conditions. The participants with MUS in the current sample had already suffered from their symptoms for 6 years on average. This means the somatic symptom(s) had already become a permanent stressor in their lives. This could explain why acceptance-based strategies, but also cognitive reappraisal techniques, are more attractive and helpful to patients with chronic somatic conditions in comparison with other groups of mental disorders, such as patients with depressive disorders, for example. Acceptance-based strategies (Hayes et al. 2012) can help patients to deal with persistently distressing conditions and to mindfully accept these conditions. As a consequence, people learn to become more distanced from their condition, to refocus themselves away from the somatic symptom back to important values and goals in life, and to gain more space for reappraising their symptoms and associated problems. Future research is needed to replicate our findings with an experimental design and in real-life contexts, and to examine effects of acceptance-based and reappraisal strategies when they are applied over a longer period of time. If it could be demonstrated that patients with MUS benefit from acceptance-based and cognitive reappraisal strategies in the long term, there would be an implication that CBT for chronic MUS should be augmented with acceptance-based strategies. Patients should be instructed to learn to differentiate between conditions which are more or less changeable and when it is more helpful to apply either solution-focused or acceptance-focused strategies.

Compliance with Ethical Standards

Conflict of interest Maria Kleinstäuber, Japhia-Marie Gottschalk, Judith Ruckmann, Thomas Probst and Winfried Rief declare that they have no conflicts of interest.

Ethical Approval The research was approved by the Ethics Committee of the Department of Psychology, Philipps-Universität Marburg, Germany (2012-26K).

Informed Consent All participants provided written informed consent.

Animal Rights No animal studies were carried out by the authors for this article.

Appendix: Emotion Regulation Task Instructions

Acceptance Strategy

First, please focus on your somatic symptom right now, even if it is unpleasant. [Short break]

We will start this strategy by practicing mindfulness; focus on your breathing sensations without trying to control them. When you become distracted, you should find a word to describe what is happening and gently bring your attention back to your breathing. Now, we are going to practice shifting your focus and awareness onto your somatic symptom, your thoughts, and your emotions in the moment. Consider that when emotions, symptoms, and thoughts are accepted, they can no longer control behavioral tendencies and cannot interfere with your personal goals. Try to label your somatic symptoms, your feelings, and your thoughts with short mental notes without evaluating them. Name everything as accurately as possible at this moment. Then, try to rate the intensity of these symptoms, feelings, and thoughts on a scale from 0 to 10. Now, do your best to create a positive attitude toward your feelings, symptoms, and thoughts. Next, remind yourself that you can tolerate challenging feelings, symptoms, and thoughts, at least for a while. Think of ways you have been able to endure intensely negative situations in the past. Now, continue by reminding yourself that feelings, symptoms, and thoughts are not permanent.

Now, you will hear the audio recording of your symptom report again. Try to accept all of your thoughts, your emotions, and your symptoms to make it easier for you to deal with and to put up with your somatic symptom. Try to apply the strategy you just heard described. [Two-minute break] Now, slowly bring your attention back to this room at your own pace and open your eyes.

Cognitive Reappraisal Strategy

[Material needed: sheet of paper, pen]

First, please focus on your somatic symptom right now, even if it is unpleasant. [Short break] Please write down on this sheet of paper two different thoughts concerning your somatic symptom. For example, you might think that it is getting worse, it will never stop, or that you cannot put up with it. [One-minute break] Now, I would like you to put down your pen. [Short break]

Sometimes, it helps to consider a situation from different perspectives and to develop another point of view. Depending on how we judge a certain situation, we have different feelings and behavioral tendencies. On the one

hand, negative thoughts may influence bodily sensations in a negative way. On the other hand, positive thoughts may cause pleasant bodily sensations. The way you feel and the way your body responds depends on how you appraise the situation. Unpleasant thoughts can be replaced by helpful thoughts. Therefore, you act differently depending on your point of view. Please read again through your thoughts. I want you to try to develop another point of view of the somatic symptoms. Here are some examples of helpful thoughts: “I feel really bad right now, but I’m certain I do not have a serious illness” or “Other people are worse off than me.” To help yourself, imagine what a good friend might advise you to do when you experience somatic symptoms. Try to modify your thoughts and evolve alternative and helpful thoughts that will make it easier for you to endure the discomfort. Please collect these thoughts and write them down. [One-minute break]

Now, you will hear the audio recording of your symptom report again. Try to use your alternative and helpful thoughts to make it easier for you to deal with and to put up with your somatic symptom. Try to apply the strategy you just heard described. [Two-minute break] Now, slowly bring your attention back to this room at your own pace and open your eyes.

Compassionate Self-Support Strategy

First, please focus on your somatic symptom right now, even if it is unpleasant. [Short break]

Do your best to let a feeling of compassion toward yourself rise within you—a strong and warm feeling of empathy for yourself that is accompanied by the desire to help yourself and to end your suffering. Visualize yourself entering this scene. Observe yourself and try to become aware of what distresses you in this scenario. Tell yourself that this somatic symptom creates a difficult situation. Normalize your negative emotions and provide reassurance by telling yourself that you are there to support and reassure yourself (not to give advice). If it seems appropriate, visualize giving yourself a gesture of compassion (e.g., laying a hand on your shoulder or giving yourself a hug). Provide encouragement to yourself. You might say something like, “You have gone through a lot in the past and you will get through this too. I will be with you as you work through this. We will get through this together.” Give yourself a big, kind, reassuring smile. Take your time as you give yourself all the support you need in this situation. Then, when the moment feels right, you can begin to mentally say goodbye to yourself at your own pace. Remember that this is not a goodbye forever. You will always be able to mentally return to this place and provide support for yourself when needed. If there is something you want to say to yourself before leaving, feel free to do so now.

Now, you will hear the audio recording of your symptom report again. Try to provide support for yourself to make it easier for you to deal with and to put up with your somatic symptom. Try to apply the strategy you just heard described [Two-minute break]. Now, slowly bring your attention back to this room at your own pace and open your eyes.

Distraction Strategy

First, please focus on your somatic symptom right now, even if it is unpleasant. [Short break]

Distraction can lead to reduced perception of thoughts, feelings, and somatic symptoms. Our attention works like a spotlight. Therefore, shifting attention to other aspects can help us to cope with somatic symptoms, unpleasant thoughts, and feelings. [At this point, a story about a famous botanic garden and its gardener was narrated. The story is written in a way to stimulate an imagining which arouses all senses and distracts the participant.]

Now, you will hear the audio recording of your symptom report again. Try to shift your attention and apply the strategy you just heard described. [Two-minute break] Now, slowly bring your attention back to this room at your own pace and open your eyes.

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