



Negative affect as mediator between emotion regulation and medically unexplained symptoms



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ABSTRACT

Background: Research on emotion regulation (ER) in medically unexplained physical symptoms (MUS) is rare. **Purpose:** The goal of this study was to compare ER skills between MUS-patients without comorbid depression, MUS-patients with comorbid depression (MUS + MDD), patients with major depressive disorder (MDD), and healthy controls. Additionally, we examined the mediating effect of depression and anxiety on the relationship between ER and somatization.

Methods: The Emotion-Regulation Skills Questionnaire (ERSQ) and other self-report measures were completed by 138 MUS-patients, 114 MUS + MDD-patients, 106 MDD-patients, and 100 healthy controls. Multiple mediation analyses were applied to investigate the role of depression and anxiety as potential mediators.

Results: A MANCOVA and post-hoc test with age, sex and education as covariates indicated that ER skills of the MUS-group were lower than the controls ($p < 0.001$ – $p = 0.047$), but higher than the MDD- and MUS + MDD-group ($p < 0.001$ – $p = 0.042$). ER skills of the MDD-group and MUS + MDD-group did not differ ($p = 0.78$ – $p = 0.99$), but were lower than controls ($p < 0.001$ – $p = 0.011$). In the MUS-groups depression and anxiety had a mediating effect on the relationship between ER and somatization ($b = -0.23$, 95% bias-corrected CI: $-0.30, -0.17$). The direct effect of ER on somatization was no longer significant when controlling for the mediating variables ($b = 0.07$, $p = 0.083$).

Conclusions: Our study reveals that patients with MUS + MDD have higher deficits in ER skills than MUS patients without MDD. Additionally, deficits in ER in MUS-patients are influenced by depression and anxiety. This indicates that MUS-patients with comorbid mental disorders might benefit from an emotion regulation training.

1. Introduction

Somatic symptoms without or with no sufficient underlying medical explanation are very common. Studies showed that only 16% to 21% of presented symptoms in primary care are medically explained while other symptoms remained medically unexplained [1,2]. Furthermore, approximately 10%–15% of the general population suffers from clinically relevant multiple medically unexplained physical symptoms (MUS) [3]. The number of symptoms is highly associated with functional impairment and comorbid psychiatric disorders such as anxiety or depression [4]. Moreover, this clinical group produces high health care costs [5]. In spite of the high relevance of MUS for health care systems worldwide, the effect sizes for psychological treatment for patients with MUS are rather small to moderate [6,7]. Thus, investigating psychological correlates of MUS seems important to

understand determinants of the development and maintenance of the disorder and to give implications for clinical practice.

In the last decade, the concept of emotion regulation (ER) has become the focus of research in many areas of clinical psychology. It describes “processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions” (p. 275) [8]. To our knowledge the application of ER in patients with persisting MUS has not been investigated so far. However, previous research showed that symptom perception and report is associated with negative affect. For example it was demonstrated that subjects with increased negative affect [9,10] report physical symptoms more often or have a lower threshold of symptom perception than subjects with low negative affect scores. Moreover, it was demonstrated that the relationship between pain symptoms and negative affect is influenced by dysfunctional ER strategies [11]. Thus, it can be assumed

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that effective ER strategies can be associated with a reduction of negative emotions and a decrease of somatic symptoms. This relationship was confirmed in several studies showing that effective ER was associated with reduced pain perception in a study using ambulatory assessment [12] and predicted improved adjustment to pain in chronic pain patients [13]. Additionally, it has been shown experimentally that the application of functional ER strategies can increase symptom tolerance in fibromyalgia patients [14] and that acceptance reduces physical disability in patients with chronic low back pain in contrast to pain control strategies [15].

In another study by Witthöft et al. the relationship between ER skills and unexplained physical symptoms was investigated in a general population sample [16]. The authors showed that associations between some specific ER strategies (distraction, reappraisal) and somatization disappeared after statistical control for depression, while an association between another ER strategy (symptom related rumination) and somatization was reduced, but was still significant.

Further studies showed that MUS have also been linked to deficits in various other aspects of emotional processing and expression such as Alexithymia, defined as a deficit in experiencing and expressing feelings [17], Theory of Mind, defined as the ability to perceive and describe one's feelings, and emotional awareness [18]. It has been demonstrated that emotional awareness can facilitate ER [19] while Alexithymia is associated with dysfunctional ER strategies [20,21]. Thus, MUS patients who usually show increased levels of Alexithymia and decreased emotional awareness might be prone to use less effective ER strategies than healthy controls. However, depression and anxiety have proven to influence the relationship between Alexithymia and somatic symptoms. Rief et al. showed that the association between Alexithymia and the number of somatoform symptoms in 174 inpatients of a psychosomatic hospital disappeared when it was corrected for the possible impact of depression [22]. In line with this finding, Lane et al. showed that patients with conversion disorder, functional somatic syndromes and medical controls did not differ in terms of Theory of Mind (ToM), emotional awareness or Alexithymia after adjusting for positive and negative affect [23].

To the best of our knowledge, no studies have been conducted so far which investigated ER skills specifically in patients with persisting multiple MUS. Since previous studies demonstrated strong associations between negative emotions and symptom perception or report [9,10] it would be important to know if there are specific deviances in emotion regulation strategies in patients with MUS in contrast to healthy controls and other clinical groups. As clinical control group patients with depression would be of special interest since depression is the most frequent comorbid disorder in patients diagnosed with MUS [5,24]. In addition, studies show that patients with depression frequently show deficits in ER [25]. Thus, as our first research question we investigated whether ER skills of MUS-patients without comorbid depression differed significantly from those of MUS-patients with comorbid depression, healthy controls and patients with depression. We had no particular hypotheses regarding comparison of ER skills in the four samples, because to our knowledge there were no previous studies addressing this research question. Thus, we followed an exploratory approach.

In the context of our second research question we wanted to examine whether negative affect in the sense of depressiveness and anxiety serves as mediator of the relationship between ER skills and the severity of somatoform symptoms in MUS patients (see Fig. 2). In the following we summarize findings of previous research which provide a rationale for our second research question. In addition to research question 1 where we differentiated between patients with a full diagnosis of depression vs. MUS, we wanted to identify whether negative affect in general, measured as depressive and anxiety symptoms, influences somatization. Studies have shown that primary care patients with mild forms of mental disorders are also often diagnosed with MUS [26]. Thus, even patients who do not fulfill criteria of a diagnosis of depression and/or anxiety, but have only slight depressive or anxiety

symptoms might perceive increased levels of somatoform symptoms. Consequently, we included all patients with MUS in our second analysis regardless of their comorbid diagnosis. We assume a strong relationship between ER skills and somatoform symptoms (path c' in Fig. 2) in our sample. This assumption is based on a variety of studies demonstrating that deficits in ER may have a direct effect on pain perception [12] and somatization [17,18] in clinical groups. Secondly, we expect to find an association between ER and depression (path $a1$ in Fig. 2), because former studies have demonstrated that deficits in ER contribute to the development of depression [25]. Other studies showed an association between the use of functional vs. dysfunctional ER strategies, symptoms of depression [27] and negative affect in general [28]. Consequently, we also assume a significant relationship between ER and anxiety (path $a2$ in Fig. 2) as another important component of negative affect. Studies investigating the relationship between ER and anxiety also showed that ER skills can either augment or diminish fear [29] and that the use of dysfunctional ER strategies is associated with higher levels of anxiety [30]. We also assume a strong relationship between depression and somatization (path $b1$ in Fig. 2) as negative affect leads to increased symptom perception and report in clinical [9] and nonclinical participants [10] and depression is the most frequent comorbid disorder in patients diagnosed with MUS [5,24]. Additionally, diagnosed anxiety disorders and depressive mood are a risk factor for chronic MUS [31]. Thus, we would expect that there is also an association between anxiety and somatoform symptoms (path $b2$ in Fig. 2). Consequently, an association between ER and somatization could be explained by the indirect paths of ER on negative affect and the influence of negative affect on somatic symptoms. With a mediation analysis, we wanted to examine whether the direct effect of ER on somatization is still significant under statistical control of negative affect (anxiety and depressive symptoms).

2. Method

2.1. Participants

Participants with MUS were recruited in 7 university outpatient clinics in Germany (Marburg, Gießen, Hamburg, Munich, Wuppertal, Mannheim, and Landau) between February 2014 and September 2016. They were recruited through announcements at grocery stores, pharmacies, hospitals and outpatient clinics, at universities, through public media and internet platforms, through referrals by physicians from private practices. Data collection took place in the context of a large multicenter randomized controlled trial (24; Trial registration: NCT01908855). For the analysis in this article, we used the baseline scores prior to psychotherapeutic treatment. To be eligible for the study, participants had to meet the following criteria: (a) current diagnosis of a Somatic Symptom Disorder, according to the criteria in the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5) [32] with minimum of three medically unexplained or insufficiently explained symptoms lasting at least six months, (b) minimum score of 4 in the modified version of the Pain Disability Index (PDI) [33], (c) minimum score of 5 in the Patient Health Questionnaire-15 (PHQ-15) [34], (d) age between 18 and 69, (e) thorough medical examination of the symptoms in the past, (d) no severe alcohol or drug addiction, acquired brain injuries, psychosis, primary disorder other than MUS, biomedical etiology of major symptoms, use of psychoactive drugs (benzodiazepines, antipsychotic drugs, opioids), or an ongoing psychotherapy. Patients on medication with antidepressant drugs were only included if they were on constant maintenance drug therapy for at least 4 weeks. We considered no further exclusion criteria (e.g. non-opioid analgesics, non-centrally acting drugs and comorbidity) in order to maximize generalizability to other patients with MUS. We assigned participants with somatoform disorders ($N = 254$) either to the MUS-group ($n = 139$) or to the MUS + MDD group ($n = 115$) when they had a comorbid diagnosis of an episode of a major depression, recurrent depressive disorder, bipolar disorder, dysthymia or unspecified mood

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