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An experimental paradigm to repeatedly induce somatic symptoms

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ABSTRACT

Objective: Experimental research in the field of medically unexplained physical symptoms (MUPS) is rare. We examined a method of script driven imagery in terms of manipulating the intensity of the symptom, the impairment by the symptom and the symptom tolerance. Additionally, we identified relevant predictors for the efficacy of symptom induction.
Methods: We assessed the most impairing symptom in 48 subjects suffering from multiple, chronic MUPS and a severe physical illness that 48 age-matched healthy controls suffered from in the past. An individual script including thoughts and sensations accompanying the symptom was recorded. During the experiment, participants were exposed to the script repeatedly and then rated the intensity of, impairment by and tolerance of the symptom on a visual analog scale (VAS).
Results: A mixed model repeated-measures-ANOVA revealed a significant main effect for the factor time (pre- and post-induction assessment; $p < .001$) but not for group (MUPS- vs. control-groups; $p = .159$–$.314$) indicating that the manipulation of all VASs was effective for both groups. The interaction time × group was significant for tolerance and post-hoc analyses showed no significant reduction for tolerance in the MUPS-group. The number of somatic symptoms and endurance behavior predicted higher induction efficacy in the MUPS-group for intensity. For healthy controls, endurance behavior and pain-persistence were associated with lower induction efficacy for all VAS.
Conclusion: Script-driven imagery could be a promising research procedure in the field of MUPS. It could be used to investigate short term effects of psychological interventions as well as physiological and cognitive processes accompanying symptom manipulation.

Introduction

The group of individuals suffering from multiple somatic symptoms without or with no sufficient underlying medical explanation – so called multiple medically unexplained physical symptoms (MUPS) – plays an important role for national health care systems worldwide. This is due to the high prevalence rates of severe MUPS of 10%–15% [1]. Additionally, this clinical group shows high utilization of medical resources and therefore produces extensive health care costs [2].

Research investigating the etiology of MUPS has been mainly focused on psychological [3,4] and psychosocial correlates [2,5] of the disorder. Methodologically, longitudinal and cross-sectional designs are most common, whereas experimental designs are rather scarce and mainly examine the influence of basic perceptual processes in the context of somatization [6,7]. One possible explanation for this lack of experimental research could be the fact that form and number of somatic symptoms are interindividually highly heterogeneous and are difficult to examine experimentally [8]. Experimental research includes among others experimental paradigms of inducing the symptoms of interest with a standardized, non-invasive stimulus such as pictures of food inducing craving in patients with eating disorders [9], or low-mood music combined with negative self-statements inducing negative affect in patients with depressive disorders [10]. Because of the heterogeneity of somatic symptoms, these techniques using the same, standardized stimulus for each participant are difficult to apply in individuals suffering from MUPS.

The use of individualized stimuli may be more appropriate for symptom provocation in subjects with MUPS. In a previous study investigating brain activation of patients with obsessive compulsive disorder (OCD) [11] the authors identified 20–30 words related to the individual compulsive fear of the subject and presented these words during functional magnetic imaging. Another study investigated the effects of different emotion regulation strategies on the occurrence of intrusive thoughts in patients with OCD and healthy controls [12]. Each participant was asked to identify his or her most unwanted intrusive thought and to describe it in writing. Then, prior to the presentation of several emotion regulation techniques, participants reread the description to activate this thought. Another method that is also based on individualized stimuli and that is often used to investigate psychophysiological correlates of emotional arousal is script-driven imagery. Scripts usually

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include an individual description of an emotional situation and accompanying visceral and muscular reactions [13]. For example in studies investigating posttraumatic stress disorder, the traumatic experience [14] and for borderline personality disorder self-injurious behavior [15] was described. Orr and Roth [14] demonstrated that individuals with PTSD showed more intense psychophysiological responses during the imagination of their own trauma-related experiences compared to the imagination of standardized stressful events. These findings indicate that individual stimuli are more effective in provoking symptoms than standardized stimuli.

In research on MUPS experimental studies manipulating the intensity of physical symptoms with non-invasive methods are rare. Most of the studies use a direct physical stimulation that induces one specific symptom. A typical method is using heat or cold stimuli in order to induce pain [16]. There is one study where ambiguous visual stimulus material was used to investigate its effect on pain intensity and symptom change in participants with Complex Regional Pain Syndrome (CRPS) [17]. The authors found that the stimulus material caused increased pain and other somatic sensations such as perception-changes of the affected limb, changes in temperature, weight and feelings of disorientation. However, for patients with MUPS no research so far indicated that visual manipulation influences somatic symptoms and can thus serve as an induction method.

Consequently the aim of this study is to apply and evaluate a new method to induce somatic symptoms in patients with MUPS and healthy controls. The procedure of script driven imagery [13] has proven to be effective in inducing emotional states and accompanying visceral and muscular reactions in psychiatric patients [14,15]. Thus, we expect this method to effectively induce somatoform symptoms. Additionally, we wanted to find out whether it is possible to induce these symptoms repeatedly and identify factors that predict the efficacy of this induction method. Since MUPS participants experience the symptoms most of the time, we expect the method of script driven imagery to intensify the present symptoms rather than to induce new symptoms. In spite of these different processes underlying the changes in each group, we will subsequently use the term *induction* to describe these manipulation effects coherently.

Method

Participants

In the MUPS as well as in the control group 48 participants took part. They were recruited via announcements at grocery stores, pharmacies, the Psychotherapy Outpatient Clinic of Marburg-University, in other departments at Marburg-University, and via the Internet. Inclusion criteria for the clinical group were a minimum of three medically unexplained or insufficiently explained symptoms lasting at least six months [18] and an age between 18 and 69 years. Control participants were matched by age, had no MUPS and no current mental disorder. They could have experienced physical symptoms in the last 6 months as long as they were medically explained. Exclusion criteria for both groups were former or current neurological diseases, a history of or current drug abuse, psychosis or the diagnosis of a personality disorder. All subjects were paid for participation. The study was approved by the local ethics committee at the faculty of psychology, Philipps-University-Marburg (registration number 2012-26K) and according to ethical guidelines of the American Psychological Association (APA).

Study procedure and experimental design

All potential participants were initially interviewed by telephone and then invited to visit an in-site session at Marburg-University (Fig. 1). Informed consent was obtained verbally at the beginning of the telephone interview followed by written consent as part of the in-site session. During the first session, diagnostic interviews were conducted: the German version of the Structured Clinical Interview for DSM-IV Axis I Disorders [SCID-I, 19] was used for the MUPS-group because this interview shows high psychometric quality for diagnosing mental disorders [19]. For the control-group, we used the Mini-Diagnostic Interview for Psychological Disorders [MINI-DIPS, 20] because it shows higher practicability compared to the SCID-I, provides satisfying test criteria [20] and is more economic. The MINI-DIPS addressed better our goal to screen for mental disorders rather than making differential diagnoses. The assessment was divided into two sessions because it was our impression that the duration of one session would have exceeded the attention span of the participants.

In order to give participants enough time for completing questionnaires online, the actual experiment took place approximately one week after the first session. We conducted a semi-structured interview assessing the most impairing symptom in individuals with MUPS ("Could you tell us about the last time your symptoms were especially severe"). In controls we assessed a recent clinically relevant physical illness ("Could you tell us about the last time that you felt really bad physically."). We assessed typical thoughts (When I have… I think…) and sensations (My… feels like…) accompanying the symptom/illness and participants recorded a description of them on a dictaphone. An example of such an induction stimulus is: "Most of the time I suffer from headaches. When I have headache I think it will never stop, how can I continue to live with this pain, it's driving me crazy. My headache feels like someone is drilling a hot iron in my head". This recording served as induction method in the following experimental paradigm.

At the beginning of the experiment, participants listened to the record, which was played over the dictaphone by a research-assistant in

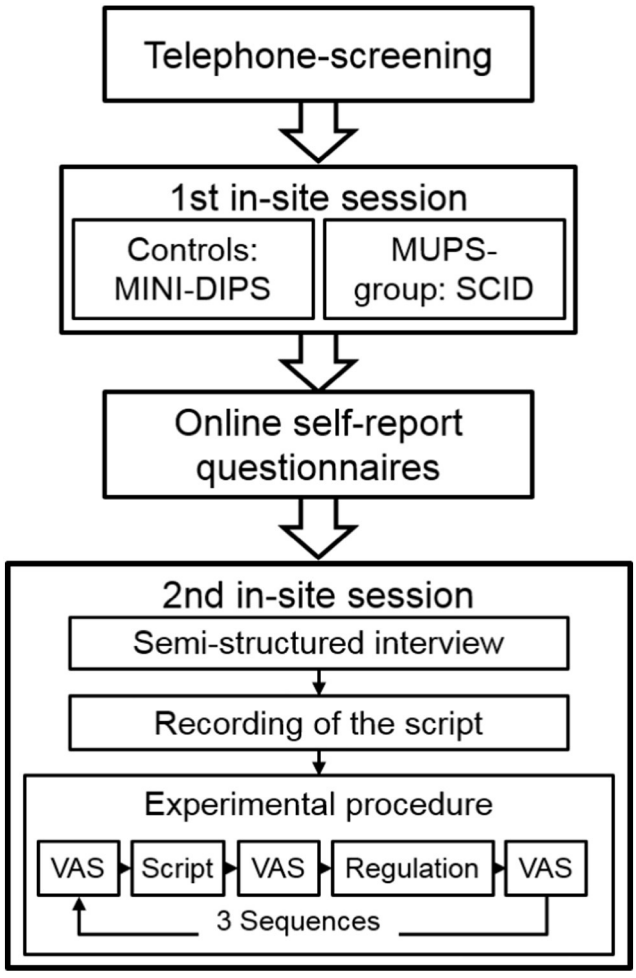

Fig. 1. Study procedure.