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Psychophysiological decoupling in alexithymic pain disorder patients

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ABSTRACT

Considering that impaired coping with stress is closely linked with emergence of stress-sensitive disorders most notably in alexithymic individuals, we conducted the first study examining stress-related autonomic reactivity in alexithymic pain disorder patients. Twenty-one pain disorder patients with high and an equivalent patient group with low alexithymia scores were exposed to three types of affect-inductive stimuli with variable affective involvement: arithmetic task, watching arousing video material and giving an oral presentation. Subjective appraisal of the induced emotional experience and physiological reactivity (heart rate, muscle tension and skin conductance) was documented. During oral presentation high alexithymia patients showed significantly lower skin conductance in combination with increased subjective negative affect compared to low alexithymia patients. Our results thus demonstrate a decoupling between physiological and affect processing in pain disorder patients with high alexithymia during a stressful situation that was subjectively associated with negative affect.

1. Introduction

The term alexithymia, originally introduced by Sifneos (1972), describes a multidimensional personality trait primarily characterized by a deficit in emotion processing and regulation. Individuals with alexithymia have difficulties in identifying and communicating one's own and others' feelings accompanied by an externally oriented cognitive style (Taylor and Bagby, 2004). As a personality trait, its manifestation varies between individuals; the overall occurrence in the population however matches approximately a normal distribution (Franz et al., 2008). Above-average alexithymia leads however to impaired emotional communication and may therefore predispose to psychological disturbances. Considering the affect-processing and -regulation deficit (Taylor et al., 1999) and the impaired coping with stress in affected individuals, alexithymia may be viewed as a risk factor for development of stress-sensitive disorders. The trait has been associated with numerous somatic and psychiatric disorders (Taylor et al., 1997) including depression (Saarijarvi et al., 2006; Vanheule et al., 2007), posttraumatic stress disorder (McCaslin et al., 2006), somatoform (Sifneos, 1973; Taylor et al., 1991; Bach and Bach, 1996) and eating disorders (Taylor et al., 1996). In the last three decades the link between alexithymia and psychopathology has been extensively investigated with a considerable emphasis on psychosomatic disorders (Taylor et al., 1991). Research has at the same time confirmed that patients with somatoform pain disorder show higher prevalence rates of alexithymia than healthy controls (Sriram et al., 1987; Cox, 1994; Garcia Nuñez et al., 2010; Hosoi et al., 2010) or other clinical patient samples (Lumley et al., 1997).

Alexithymia research has been intensified by a trend toward experimental studies examining the underlying affect dysregulation in terms of changes in the central nervous system processing as well as autonomic functioning of the organism. Recent studies point to early processing deficits in alexithymics displaying in reduced P3 amplitudes in response to unpleasant stimuli (Pollatos and Gramann, 2011) and a lower activation of emotional attention and recognition networks (van der Velde et al., 2013, 2015). Studies have examined alexithymia-associated tonic physiological activity as well as physiological response to affect-inducing stimuli to measure the potentially altered autonomic reactivity in alexithymic subjects (Pollatos et al., 2008). Altered physiological arousal is hypothesized to interfere with the use of psychological affect-regulation strategies to reduce arousal and improve subjective functioning (Friedlander et al., 1997).

The findings are however conflicting mainly due to incomparable experimental designs including diverse study populations as well as different alexithymia measurements tools. A number of studies repeatedly reported a baseline tonic increase of sympathetic response parameters (Papciak et al., 1985; Martin and Pihl,

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1986; Wehmer et al., 1995; Infrasca, 1997; Stone and Nielson, 2001; Pollatos et al., 2011a) while a number of rather recent studies described either no abnormal resting activity (Franz, 1999; Roedema and Simons, 1999; Connelly and Denney, 2007; Nielson and Meltzer, 2009; Pollatos et al., 2011b) or hypoarousal in high alexithymia individuals (Linden et al., 1996). While studies repeatedly reported a baseline tonic increase of sympathetic response parameters in alexithymic individuals, there is considerable inconsistency in autonomic reactivity to emotion-inducing stimuli. In this context, studies have shown evidence for a dissociation of verbal-cognitive and psychophysiological/somatic affect correlates in alexithymic patients (Franz, 1999; Stone and Nielson, 2001; Pollatos et al., 2011b). While high and low alexithymia was shown to be differentiated by the autonomic reactivity, the subjective appraisal of stimulus-related emotional experiences was not altered. This contradiction between altered psychophysiological reactivity and an inconspicuous subjective appraisal of the emotional state was initially discussed as the "decoupling hypothesis" (Franz, 1999). Unfortunately findings are rather inconsistent with regards to decoupling. It is not quite clear, whether alexithymics are inconspicuous or higher in subjective appraisal of stressful stimuli (Eastabrook et al., 2013) and lower in physiological response or the opposite. Furthermore, it might be important to differentiate between valence and arousal in subjective assessment of emotion as a specific impairment with regard to arousal has been discussed (Kensinger, 2004). An at least partially dissociated subjective appraisal of own emotional experience from psychophysiological affective correlates would speak for an altered psychophysiological reaction mode in alexithymic individuals.

Other studies (e.g. Wehmer et al., 1995; Roedema and Simons, 1999) however showed, in spite of using stimuli that were rated as affect-inductive, no decoupling. A likely reason for this discrepancy is the quality of the stimulus material in psychophysiological studies discussed. In this context, the complexity of the stimulus material might be important. Studies that use more complex cues to induce emotion (video clips), tend to find evidence of emotion experience deficits in alexithymic participants (Stone and Nielson, 2001; Luminet et al., 2004) whereas studies using less complex cues such as pictures do not (Aftanas et al., 2003). Ahrens and Deffner (1986) indicated in this regard that the "subjective involvement" of the subjects seems to play a crucial role for the ambiguity of the results in this kind of experimental research. They propose that if a high degree of subjective involvement is reached, especially high-alexithymic patients show a remarkably defensive reaction towards affective content. Taken together prior findings vary with regards to decoupling between altered psychophysiological reactivity and an unremarkable subjective appraisal of the emotional state depending on experimental designs applied and affect inductive stimuli used. Hence a carefully chosen experimental setting is crucial for research of emotion processing and coping with emotionally stressful situations.

Chronic pain patients particularly focus on bodily sensations, which may lead to a sensitization as described by the term somatosensory amplification. In this context they are prone to misattribute somatic sensations to disease, which are in fact somatic equivalents of emotional arousal. This difficulty to identify emotions and its bodily expression is a core feature of alexithymia, which shows a high prevalence in somatoform patients (e.g. Lumley et al., 1997). However, data are remarkably lacking in pain disorder patients regarding their psychophysiological reaction to different affect-inductive tasks taking alexithymia into account (Pollatos et al., 2011b). It seems reasonable to hypothesize that the misinterpretation of the emotional salience of bodily stimuli corresponds to a dissociation of subjective awareness of autonomic arousal and physiological response. Particularly under circumstances inducing stress and the corresponding (negative) emotions this mismatch may result in a painfully enhanced awareness of bodily sensations. Against findings in other populations examined we predicted that high-alexithymic individuals might be predisposed to an overall heightened autonomic response compared to their non-alexithymic counterparts in a resting condition. In view of ambiguous results concerning subjective emotional experience and psychophysiological response patterns to affect-inductive stimuli this study aims at elucidating the possibility of a previously described decoupling between subjective and physiological arousal during stimulating exposition in highly alexithymic pain disorder patients and elaborating on its implications as risk factor for stress-related disorders. The goal of the present study was hence to examine the relationship between alexithymia in patients with pain disorder and their stress-related autonomic reaction measured by HR, EMG and SCR as well as subjective emotional experience in face of various affect-inductive stimuli.

2. Methods

2.1. Study subjects

Forty-two male patients (mean age: 42.83 ± 11.5 (SD)) with the diagnosis of persistent somatoform pain disorder (ICD-10: F45.4), defined by the DSM-IV as pain disorder associated with psychological factors (DSM-IV: 307.80), were included into the study. The patients were recruited from in- and outpatient populations at the clinic for psychosomatic medicine and psychotherapy and outpatients from the pain clinic at University of Bonn.

Before the experiment all subjects underwent a clinical examination including a Structured Clinical Interview for DSM-IV (SCID I and II) (Wittchen et al., 1997) to detect and rule out further psychiatric illness and the Toronto Alexithymia Scale (TAS-20) (Bagby et al., 1994a, 1994b) to identify the severity of alexithymia based on which the assignment to either alexithymia or non-alexithymia group of patients took place. The Toronto Alexithymia Scale (TAS-20) has been recognized worldwide to be a valid alexithymia self-report rating scale (Bagby et al., 1988; Taylor and Bagby, 1988; Parker et al., 2003; Taylor et al., 2003; Franz et al., 2008). It assesses the three components of alexithymia: (I) difficulty identifying feelings and distinguishing between feelings and bodily sensations (DIF), (II) difficulty describing feelings (DDF) and (III) externally oriented thinking (EOT). We applied the current international threshold criterion for alexithymia of a TAS-20 sum score ≥ 61 to distinguish alexithymia from non-alexithymia individuals (Gündel and Ceballos-baumann, 2002). The groups consisted of 21 pain disorder patients with high alexithymia scores (mean age: 42.95 ± 9.58 (SD); mean TAS-20: 66.48 ± 4.84 (SD)) and 21 age-matched control patients with low alexithymia scores (mean age: 42.71 ± 13.38 (SD); mean TAS-20: 38.81 ± 5.06 (SD)).

Exclusion criteria for both groups were the diagnosis of acute organic disorders, psychiatric illness, addiction or dementia, wearing pacemakers, intake of medication that could influence the autonomic nervous system or vigilance. All participants gave written informed consent prior to examination. The study was carried out in accordance with the latest version of the Declaration of Helsinki and approved by the local ethics committee at the University of Bonn.

2.2. Experimental protocol

During experimental testing that took about 50 min participants were exposed to three different affect inductive stressors